

# Issues in Biomedical Engineering Research and Application

2013 Edition

Q. Ashton Acton, PhD  
General Editor

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Issues in Biomedical Engineering Research and  
Application  
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# Introduction

Issues in Biomedical Engineering Research and Application / 2013 Edition is a ScholarlyEditions™ book that delivers timely, authoritative, and comprehensive information about Reproductive Biomedicine.

The editors have built Issues in Biomedical Engineering Research and Application / 2013 Edition on the vast information databases of ScholarlyNews™. You can expect the information about Reproductive Biomedicine in this book to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Biomedical Engineering Research and Application / 2013 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources (except content about patents), and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

# Chapter 1

## Biomedical Engineering

### **Aristotle University, Thessaloniki: FISH image analysis using a modified radial basis function network**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news originating from Thessaloniki, Greece, by NewsRx correspondents, research stated, “Fluorescent in situ hybridization ( FISH) is an exceptionally useful method in determining HER-2/neu gene status in breast carcinoma samples, which is a valuable cancer prognostic indicator. Its visual evaluation is a difficult task, which involves manual counting of red/green dots in multiple microscopy images, a procedure which is both time consuming and prone to human errors.”

Our news journalists obtained a quote from the research from Aristotle University, “A number of algorithms have recently been developed dealing with the (semi)-automated analysis of FISH images. Their performance is quite promising, but further improvement is required in their diagnostic accuracy. In addition, they have to be evaluated on large FISH image data sets. Here, we present a novel method for analyzing FISH images based on cell nuclei and red/green spot modelling by radial basis functions (RBFs). Our method was compared to one of the most prominent methods reported in the literature on a large data set, comprised of 246 breast cancer cases (in total 3412 FISH images) and showed statistically significant diagnostic accuracy improvement, especially on HER-2/neu positive cases.”

According to the news editors, the research concluded: “The overall diagnostic accuracy of the proposed method is 95.93% over this data set.”

For more information on this research see: FISH image analysis using a modified radial basis function network. *Biomedical Signal*

*Processing and Control*, 2013;8(1):30-40. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from C. Sagonas, Aristotle University, Sch Med, Dept. of Pathol, Thessaloniki 54124, Greece. (2013 Feb 20)

### **Eindhoven University of Technology: 3-D warped discrete cosine transform for MRI image compression**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating in Eindhoven, Netherlands, by NewsRx journalists, research stated, “Image compression is an application of data compression on digital images. Several lossy/lossless transform coding techniques are used for image compression.”

The news reporters obtained a quote from the research from the Eindhoven University of Technology, “Discrete cosine transform (DCT) is one such widely used technique. A variation of DCT, known as warped discrete cosine transform (WDCT), is used for 2-D image compression and it is shown to perform better than the DCT at high bit-rates. We extend this concept and develop the 3-D WDCT, a transform that has not been previously investigated. We outline some of its important properties, which make it especially suitable for image compression. We then propose a complete image coding scheme for volumetric data sets based on the 3-D WDCT scheme.”

According to the news reporters, the research concluded: “It is shown that the 3-D WDCT-based compression scheme performs better than a similar 3-D DCT scheme for volumetric data sets at high bit-rates.”

For more information on this research see: 3-D warped discrete cosine transform for MRI image compression. *Biomedical Signal Processing and Control*, 2013;8(1):50-58. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news correspondents report that additional information may be obtained by contacting K.M.M. Prabhu, Eindhoven University of Technology, Dept. of Elect Engn, Signal Proc Syst Grp, NL-5600 MB Eindhoven, Netherlands. (2013 Feb 20)



**Texas A&M University, College Station: Dual-wavelength polarimetric glucose sensing in the presence of birefringence and motion artifact using anterior chamber of the eye phantoms**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Optics. According to news reporting originating in College Station, Texas, by NewsRx journalists, research stated, “Noninvasive glucose monitoring is being investigated as a tool for effectively managing diabetes mellitus. Optical polarimetry has emerged as one such method, which can potentially be used to ascertain blood glucose levels by measuring the aqueous humor glucose levels in the anterior chamber of the eye.”

The news reporters obtained a quote from the research from Texas A&M University, “The key limitation for realizing this technique is the presence of sample noise due to corneal birefringence, which in the presence of motion artifact can confound the glucose signature in the aqueous humor of the eye. We present the development and characterization of a real-time, closed-loop, dual-wavelength polarimetric system for glucose monitoring using both a custom-built plastic eye phantom (in vitro) and isolated rabbit corneas (ex vivo) mounted in an artificial anterior chamber. The results show that the system can account for these noise sources and can monitor physiologic glucose levels accurately for a limited range of motion-induced birefringence. Using the dual-wavelength system in vitro and ex vivo, standard errors were 14.5 mg/dL and 22.4 mg/dL, respectively, in the presence of birefringence with motion.”

According to the news reporters, the research concluded: “The results indicate that although dual-wavelength polarimetry has a limited range of compensation for motion-induced birefringence, when aligned correctly, it can minimize the effect of time-varying corneal birefringence for a range of motion larger than what has been reported in vivo.”

For more information on this research see: Dual-wavelength polarimetric glucose sensing in the presence of birefringence and motion artifact using anterior chamber of the eye phantoms. *Journal of Biomedical Optics*, 2013;18(1):17007.

Our news correspondents report that additional information may be obtained by contacting B.H. Malik, Texas A&M University, Dept. of Biomedical Engineering, 5045 Emerging Technologies Building, 3120 TAMU, College Station, Texas, United States. (2013 Feb 20)

## **University of Arizona, Tucson: Ratio images and ultraviolet C excitation in autofluorescence imaging of neoplasms of the human colon**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Optics are presented in a new report. According to news reporting originating from Tucson, Arizona, by NewsRx correspondents, research stated, “The accepted screening technique for colon cancer is white light endoscopy. While most abnormal growths (lesions) are detected by this method, a significant number are missed during colonoscopy, potentially resulting in advanced disease.”

Our news editors obtained a quote from the research from the University of Arizona, “Missed lesions are often flat and inconspicuous in color. A prototype ultraviolet spectral imager measuring autofluorescence (AF) and reflectance has been developed and applied in a study of 21 fresh human colon surgical specimens. Six excitation wavelengths from 280 to 440 nm and formulaic ratio imaging were utilized to increase lesion contrast and cause neoplasms to appear bright compared to normal tissue. It was found that in the subset of lesions which were most difficult to visualize in standard color photographs [low contrast lesions, (LCLs)] a ratio image (F340/F440) of AF images excited at 340 and 440 nm produced extraordinary images and was effective in about 70% of these difficult cases. Contrast may be due to increased levels of reduced nicotinamide adenine dinucleotide, increased hemoglobin absorption, and reduced signal from submucosal collagen. A second successful ratio image (R480/R555) combined two reflectance images to produce exceptional images especially in particular LCLs where F340/F440 was ineffective.”

According to the news editors, the research concluded: “The newly discovered ratio images can potentially improve detection rate in screening with a novel AF colonoscope.”

For more information on this research see: Ratio images and ultraviolet C excitation in autofluorescence imaging of neoplasms of the human colon. *Journal of Biomedical Optics*, 2013;18(1):16005.

The news editors report that additional information may be obtained by contacting T.E. Renkoski, University of Arizona, College of Optical Sciences, 1630 E University Boulevard, Tucson, Arizona 85721, United States. (2013 Feb 20)

## **Yunnan University, Kunming: ECG compression using the context modeling arithmetic coding with dynamic learning vector-scalar quantization**

By a News Reporter-Staff News Editor at Telemedicine Week – Current study results on Biomedical Engineering have been published. According to news originating from Kunming, People’s Republic of China, by NewsRx correspondents, research stated, “Electrocardiogram (ECG) compression can significantly reduce the storage and transmission burden for the long-term recording system and telemedicine applications. In this paper, an improved wavelet-based compression method is proposed.”

Our news journalists obtained a quote from the research from Yunnan University, “A discrete wavelet transform (DWT) is firstly applied to the mean removed ECG signal. DWT coefficients in a hierarchical tree order are taken as the component of a vector named tree vector (TV). Then, the TV is quantized with a vector-scalar quantizer (VSQ), which is composed of a dynamic learning vector quantizer and a uniform scalar dead-zone quantizer. The context modeling arithmetic coding is finally employed to encode those quantized coefficients from the VSQ. All tested records are selected from the Massachusetts Institute of Technology-Beth Israel Hospital arrhythmia database.”

According to the news editors, the research concluded: “Statistical results show that the compression performance of the proposed method outperforms several published compression algorithms.”

For more information on this research see: ECG compression using the context modeling arithmetic coding with dynamic learning vector-scalar quantization. *Biomedical Signal Processing and Control*, 2013;8(1):59-65. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from B.Q. Huang, Yunnan University, Dept. of Elect Engr, Kunming 650091, Yunnan, People’s Republic of China. (2013 Feb 19)

## **Drexel University, Philadelphia: Accurate optical parameter extraction procedure for broadband near-infrared spectroscopy of brain matter**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators discuss new findings in Central Nervous System. According to news reporting from Philadelphia, Pennsylvania, by NewsRx journalists, research stated, “Modeling behavior of broadband (30 to 1000 MHz) frequency modulated near-infrared (NIR) photons through a phantom is the basis for accurate extraction of optical absorption and scattering parameters of biological turbid media. Photon dynamics in a phantom are predicted using both analytical and numerical simulation and are related to the measured insertion loss (IL) and insertion phase (IP) for a given geometry based on phantom optical parameters.”

The news correspondents obtained a quote from the research from Drexel University, “Accuracy of the extracted optical parameters using finite element method (FEM) simulation is compared to baseline analytical calculations from the diffusion equation (DE) for homogeneous brain phantoms. NIR spectroscopy is performed using custom-designed, broadband, free-space optical transmitter (Tx) and receiver (Rx) modules that are developed for photon migration at wavelengths of 680, 780, and 820 nm. Differential detection between two optical Rx locations separated by 0.3 cm is employed to eliminate systemic artifacts associated with interfaces of the optical Tx and Rx with the phantoms. Optical parameter extraction is achieved for four solid phantom samples using the least-square-error method in MATLAB (for DE) and COMSOL (for FEM) simulation by fitting data to measured results over broadband and narrowband frequency modulation.”

According to the news reporters, the research concluded: “Confidence in numerical modeling of the photonic behavior using FEM has been established here by comparing the transmission mode’s experimental results with the predictions made by DE and FEM for known commercial solid brain phantoms.”

For more information on this research see: Accurate optical parameter extraction procedure for broadband near-infrared spectroscopy of brain matter. *Journal of Biomedical Optics*, 2013;18(1):17008.

Our news journalists report that additional information may be obtained by contacting E. Sultan, Drexel University, Dept. of Electrical and Computer Engineering, Philadelphia, Pennsylvania, United States. (2013 Feb 18)

## **Iran University of Science and Technology, Tehran: Chi-square distance kernel of the gaits for the diagnosis of Parkinson's disease**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Tehran, Iran, by NewsRx editors, the research stated, “In this paper, a new approach for the diagnosis of the subjects with Parkinson's disease (PD) from the healthy control subjects is proposed. This method uses the measurements of gait signals using the ground reaction forces under usual walking of the subjects.”

Our news editors obtained a quote from the research from the Iran University of Science and Technology, “These measurements were computed using 8 sensors placed underneath of each foot. The absolute value of the difference between the force measurements were calculated for each sensor at each time and these signals went through a short-time Fourier transform (STFT) and several features were extracted from the spectrum of the signals. The histogram of these features was computed and the bin selection was performed using the feature discriminant ratio (FDR) method. Then the chi-square distance between the reduced histograms was computed and it formed a kernel for support vector machines (SVMs) for classification.”

According to the news editors, the research concluded: “The results on 93 subjects with PD and 73 healthy control subjects show that the proposed approach obtains an accuracy of 91.20% for the diagnosis of the PD using gait signals.”

For more information on this research see: Chi-square distance kernel of the gaits for the diagnosis of Parkinson's disease. *Biomedical Signal Processing and Control*, 2013;8(1):66-70. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news editors report that additional information may be obtained by contacting M.R. Daliri, Iran Univ Sci & Technol, Fac Elect Engrn, Iran Neural Technol Center, Tehran 1684613114, Iran. (2013 Feb 18)

## Optimizing thymic recovery in HIV patients through multidrug therapies

By a News Reporter-Staff News Editor at AIDS Weekly – Fresh data on Biomedical Engineering are presented in a new report. According to news originating from San Martin, Argentina, by NewsRx correspondents, research stated, “An optimal control approach based on an enlarged nonlinear model for the dynamics of HIV infection and thymic function is composed to simulate and evaluate antiretroviral therapies. In addition to the relevant biological agents, an extra state variable is included, associated with the thymus capacity for healthy cells production.”

Our news journalists obtained a quote from the research, “The methodology contemplates eventual deleterious effects of drugs over children’s thymus recovery. The intake of ‘Reverse Transcriptase Inhibitors’ and ‘Protease Inhibitors’ are modeled as two independent control variables, each affecting a different term in the dynamics, so extending the prevailing pure-HAART-therapy analysis. The objective function designed here is also more inclusive than usual, accounting for the costs of the two drug families involved and for the thymus deterioration, in addition to penalizing eventual virus excess and healthy cells deficits. The search for the best combined therapy is treated as an optimal control problem. A hybrid version of Dynamic Programming for continuous and discrete variables is used to treat the problem numerically. Long time-horizons are explored, aiming to avoid typical peaks in drug prescriptions found at the beginning and at the end of the optimization periods.”

According to the news editors, the research concluded: “Results indicate that certain combinations of drugs are more convenient than pure protocols when the value of thymus functioning is relevant, specially for children patients.”

For more information on this research see: Optimizing thymic recovery in HIV patients through multidrug therapies. *Biomedical Signal Processing and Control*, 2013;8(1):90-97. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from V. Costanza, UNSAM, Escuela Ciencia & Tecnol, Center Matemat Aplicada, RA-1650 San Martin, Pcia De Buenos, Argentina. (2013 Feb 18)

## **University of Wisconsin, Madison: Perioperative Brain Shift and Deep Brain Stimulating Electrode Deformation Analysis: Implications for rigid and non-rigid devices**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – New research on Central Nervous System is the subject of a report. According to news reporting originating from Madison, Wisconsin, by NewsRx correspondents, research stated, “Deep brain stimulation (DBS) efficacy is related to optimal electrode placement. Several authors have quantified brain shift related to surgical targeting; yet, few reports document and discuss the effects of brain shift after insertion.”

Our news editors obtained a quote from the research from the University of Wisconsin, “To quantify brain shift and electrode displacement after device insertion. Twelve patients were retrospectively reviewed, and one post-operative MRI and one time-delayed CT were obtained for each patient and their implanted electrodes modeled in 3D. Two competing methods were employed to measure the electrode tip location and deviation from the prototypical linear implant after the resolution of acute surgical changes, such as brain shift and pneumocephalus. In the interim between surgery and a pneumocephalus free postoperative scan, electrode deviation was documented in all patients and all electrodes. Significant shift of the electrode tip was identified in rostral, anterior, and medial directions ( $p < 0.05$ ). Shift was greatest in the rostral direction, measuring an average of 1.41 mm. Brain shift and subsequent electrode displacement occurs in patients after DBS surgery with the reversal of intraoperative brain shift. Rostral displacement is on the order of the height of one DBS contact.”

According to the news editors, the research concluded: “Further investigation into the time course of intraoperative brain shift and its potential effects on procedures performed with rigid and non-rigid devices in supine and semi-sitting surgical positions is needed.”

For more information on this research see: Perioperative Brain Shift and Deep Brain Stimulating Electrode Deformation Analysis: Implications for rigid and non-rigid devices. *Annals of Biomedical Engineering*, 2013;41(2):293-304. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting K.A. Sillay, University of Wisconsin, Sch Med & Public Hlth, Dept. of Neurol Surg, Madison, WI 53792, United States. (2013 Feb 18)

**Abbott, Singapore: Development and validation of LC-MS/MS method for the estimation of beta-hydroxy-beta-methylbutyrate in rat plasma and its application to pharmacokinetic studies**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Singapore, Singapore, by NewsRx correspondents, research stated, “A simple, sensitive and specific high-performance liquid chromatography mass spectrometry (LC-MS/MS) method was developed and validated for the quantification of beta-hydroxy-beta-methyl butyrate (HMB) in small volumes of rat plasma using warfarin as an internal standard (IS). The API-4000 LC-MS/MS was operated under the multiple reaction-monitoring mode using the electrospray ionization technique.”

Our news editors obtained a quote from the research from Abbott, “A simple liquid-liquid extraction process was used to extract HMB and IS from rat plasma. The total run time was 3 min and the elution of HMB and IS occurred at 1.48 and 1.75 min respectively; this was achieved with a mobile phase consisting of 0.1% formic acid in a water-acetonitrile mixture (15:85, v/v) at a flow rate of 1.0 mL/min on a Agilent Eclipse XDB C8 (150 x 4.6, 5  $\mu$ m) column. The developed method was validated in rat plasma with a lower limit of quantitation of 30.0 ng/mL for HMB. A linear response function was established for the range of concentrations 30-4600 ng/mL ( $r^2 \geq 0.998$ ) for HMB. The intra- and inter-day precision values for HMB were acceptable as per Food and Drug Administration guidelines. HMB was stable in the battery of stability studies, viz. bench-top, autosampler freeze-thaw cycles and long-term stability for 30 days in plasma.”

According to the news editors, the research concluded: “The developed assay method was applied to a bioavailability study in rats.”

For more information on this research see: Development and validation of LC-MS/MS method for the estimation of beta-hydroxy-beta-methylbutyrate in rat plasma and its application to pharmacokinetic studies. *Biomedical Chromatography*, 2013;27(2):142-147. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-0801)

The news editors report that additional information may be obtained by contacting P. Deshpande, Abbott Nutr Res & Dev, Singapore 138668, Singapore. (2013 Feb 13)



## **Akdeniz University, Antalya: Elastic Light Single-Scattering Spectroscopy for the Detection of Cervical Precancerous Ex vivo**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Antalya, Turkey, by NewsRx correspondents, research stated, “Potential application of elastic light single-scattering spectroscopy (ELSSS) for differentiating high-grade squamous intraepithelial lesions (HSIL) from non-HSIL tissues was investigated. An ELSSS system was used to acquire spectra from cervix tissues.”

Our news editors obtained a quote from the research from Akdeniz University, “A single-fiber optical probe with a diameter of 100  $\mu\text{m}$  was used for both delivery and detection of white light to and from the cervix tissue. Spectroscopic measurements were acquired from 95 ex vivo biopsy samples of 60 pap smear positive patients and normal cervix tissue from 10 patients after hysterectomy were used as a negative control group. Spectroscopic results of 95 cervix biopsy were compared to the histopathology of the biopsy samples. Sensitivity and specificity of the ELSSS system in the differentiation of HSIL and non-HSIL tissues are 87.5% and 45.6%, respectively, for the pap smear and colposcopy positive biopsy samples.”

According to the news editors, the research concluded: “The ELSSS system has the potential for use in real-time diagnosis of HSIL tissues as an adjunct to Papanicolaou test (pap smear) and colposcopy.”

For more information on this research see: Elastic Light Single-Scattering Spectroscopy for the Detection of Cervical Precancerous Ex vivo. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):123-127. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting T. Denkceken, Akdeniz University, Fac Med, Dept. of Biostat & Med Informat, TR-07058 Antalya, Turkey. (2013 Feb 13)

## **Bishop's University, Sherbrooke: Dynamic Cardiac PET Imaging: Extraction of Time-Activity Curves Using ICA and a Generalized Gaussian Distribution Model**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating in Sherbrooke, Canada, by NewsRx journalists, research stated, “Kinetic modeling of metabolic and physiologic cardiac processes in small animals requires an input function (IF) and a tissue time-activity curves (TACs). In this paper, we present a mathematical method based on independent component analysis (ICA) to extract the IF and the myocardium's TACs directly from dynamic positron emission tomography (PET) images.”

The news reporters obtained a quote from the research from Bishop's University, “The method assumes a super-Gaussian distribution model for the blood activity, and a sub-Gaussian distribution model for the tissue activity. Our approach was applied on 22 PET measurement sets of small animals, which were obtained from the three most frequently used cardiac radiotracers, namely: desoxy-fluoro-glucose (F-18-FDG), [N-13]-ammonia, and [C-11]-acetate. Our study was extended to PET human measurements obtained with the Rubidium-82 (Rb-82) radio-tracer.”

According to the news reporters, the research concluded: “The resolved mathematical IF values compare favorably to those derived from curves extracted from regions of interest (ROI), suggesting that the procedure presents a reliable alternative to serial blood sampling for small-animal cardiac PET studies.”

For more information on this research see: Dynamic Cardiac PET Imaging: Extraction of Time-Activity Curves Using ICA and a Generalized Gaussian Distribution Model. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):63-71. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting R. Mabrouk, Bishops Univ, Dept. of Comp Sci, Sherbrooke, PQ J1M 1Z7, Canada. (2013 Feb 13)

## Chinese Academy of Science, Beijing: Toward Ubiquitous Healthcare Services With a Novel Efficient Cloud Platform

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating from Beijing, People’s Republic of China, by NewsRx correspondents, research stated, “Ubiquitous healthcare services are becoming more and more popular, especially under the urgent demand of the global aging issue. Cloud computing owns the pervasive and on-demand service-oriented natures, which can fit the characteristics of healthcare services very well.”

Our news editors obtained a quote from the research from the Chinese Academy of Science, “However, the abilities in dealing with multi-modal, heterogeneous, and nonstationary physiological signals to provide persistent personalized services, meanwhile keeping high concurrent online analysis for public, are challenges to the general cloud. In this paper, we proposed a private cloud platform architecture which includes six layers according to the specific requirements. This platform utilizes message queue as a cloud engine, and each layer thereby achieves relative independence by this loosely coupled means of communications with publish/subscribe mechanism. Furthermore, a plug-in algorithm framework is also presented, and massive semistructure or unstructured medical data are accessed adaptively by this cloud architecture.”

According to the news editors, the research concluded: “As the testing results showing, this proposed cloud platform, with robust, stable, and efficient features, can satisfy high concurrent requests from ubiquitous healthcare services.”

For more information on this research see: Toward Ubiquitous Healthcare Services With a Novel Efficient Cloud Platform. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):230-234. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting C.G. He, Chinese Academy Sci, Beijing 100049, People’s Republic of China. (2013 Feb 13)

## **Guangzhou University, Guangdong: Rapid LC-MS/MS determination and pharmacokinetic application of linarin in rat plasma**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news originating from Guangdong, People's Republic of China, by NewsRx correspondents, research stated, "A sensitive, selective and robust liquid chromatography tandem mass spectrometry (LC-MS/MS) method was developed for the rapid determination of linarin in rat plasma. Separation of the analyte and warfarin as internal standard (IS) from 100  $\mu$ L rat plasma was carried out by simple protein precipitation treatment."

Our news journalists obtained a quote from the research from Guangzhou University, "Chromatographic separation of the analyte was performed on a Diamonsil  $\mu$  C18 column (150 x 4.6 mm, 5  $\mu$ m) using isocratic mobile phase consisting of methanol 0.5% formic acid (80:20, v/v). The flow rate was 0.6 mL/min and the total run time was not more than 4.0 min. The method was validated over a wide dynamic concentration range of 1.001000 ng/mL for linarin. The precision and accuracy values for linarin met the acceptance criteria according to US Food and Drug Administration guidelines. Linarin was stable in the stability studies including a long-term test (-80 degrees C for 43 days), a short-term test (ambient for 2 h and autosampler for 8 h) and three freeze-thaw cycles (-80/25 degrees C)."

According to the news editors, the research concluded: "The developed assay method was applied to the pharmacokinetic study in rats after a single intramuscular administration of 713  $\mu$ g/kg linarin."

For more information on this research see: Rapid LC-MS/MS determination and pharmacokinetic application of linarin in rat plasma. *Biomedical Chromatography*, 2013;27(2):186-190. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-0801)

The news correspondents report that additional information may be obtained from C. Yan, Guangzhou Univ Chinese Med, Coll Chinese Tradit Med, Guangzhou 510006, Guangdong, People's Republic of China. (2013 Feb 13)

## Indian Statistical Institute, Calcutta: An Interactive Approach to Multiobjective Clustering of Gene Expression Patterns

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Calcutta, India, by NewsRx correspondents, research stated, “Some recent studies have posed the problem of data clustering as a multiobjective optimization problem, where several cluster validity indices are simultaneously optimized to obtain tradeoff clustering solutions. A number of cluster validity index measures are available in the literature.”

Our news journalists obtained a quote from the research from Indian Statistical Institute, “However, none of the measures can perform equally well in all kinds of datasets. Depending on the dataset properties and its inherent clustering structure, different cluster validity measures perform differently. Therefore, it is important to find the best set of validity indices that should be optimized simultaneously to obtain good clustering results. In this paper, a novel interactive genetic algorithm-based multiobjective approach is proposed that simultaneously finds the clustering solution as well as evolves the set of validity measures that are to be optimized simultaneously. The proposed method interactively takes the input from the human decision maker (DM) during execution and adaptively learns from that input to obtain the final set of validity measures along with the final clustering result. The algorithm is applied for clustering real-life benchmark gene expression datasets and its performance is compared with that of several other existing clustering algorithms to demonstrate its effectiveness.”

According to the news editors, the research concluded: “The results indicate that the proposed method outperforms the other existing algorithms for all the datasets considered here.”

For more information on this research see: An Interactive Approach to Multiobjective Clustering of Gene Expression Patterns. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):35-41. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from A. Mukhopadhyay, Indian Stat Inst, Machine Intelligence Unit, Calcutta 700108, W Bengal, India. (2013 Feb 13)

## **Indiana University School of Medicine, Indianapolis: A Minimally Invasive Implantable Wireless Pressure Sensor for Continuous IOP Monitoring**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news originating from Indianapolis, Indiana, by NewsRx correspondents, research stated, “This paper presents a minimally invasive implantable pressure sensing transponder for continuous wireless monitoring of intraocular pressure (IOP). The transponder is designed to make the implantation surgery simple while still measuring the true IOP through direct hydraulic contact with the intraocular space.”

Our news journalists obtained a quote from the research from the Indiana University School of Medicine, “Furthermore, when IOP monitoring is complete, the design allows physicians to easily retrieve the transponder. The device consists of three main components: 1) a hypodermic needle (30 gauge) that penetrates the sclera through pars plana and establishes direct access to the vitreous space of the eye; 2) a micro-machined capacitive pressure sensor connected to the needle back-end; and 3) a flexible polyimide coil connected to the capacitor forming a parallel LC circuit whose resonant frequency is a function of IOP. Most parts of the sensor sit externally on the sclera and only the needle penetrates inside the vitreous space. In vitro tests show a sensitivity of 15 kHz/mmHg with approximately 1-mmHg resolution.”

According to the news editors, the research concluded: “One month in vivo implants in rabbits confirm biocompatibility and functionality of the device.”

For more information on this research see: A Minimally Invasive Implantable Wireless Pressure Sensor for Continuous IOP Monitoring. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):250-256. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from G. Chitnis, Indiana Univ Sch Med, Dept. of Ophthalmol, Indianapolis, IN 46202, United States. (2013 Feb 13)

## **Korea University, Seoul: Massively Parallel Energy Space Exploration for Uncluttered Visualization of Vascular Structures**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news originating from Seoul, South Korea, by NewsRx correspondents, research stated, “Images captured using computed tomography and magnetic resonance angiography are used in the examination of the abdominal aorta and its branches. The examination of all clinically relevant branches simultaneously in a single 2-D image without any misleading overlaps facilitates the diagnosis of vascular abnormalities.”

Our news journalists obtained a quote from the research from Korea University, “This problem is called uncluttered single-image visualization (USIV). We can solve the USIV problem by assigning energy-based scores to visualization candidates and then finding the candidate that optimizes the score; this approach is similar to the manner in which the protein side-chain placement problem has been solved. To obtain near-optimum images, we need to explore the energy space extensively, which is often time consuming. This paper describes a method for exploring the energy space in a massively parallel fashion using graphics processing units. According to our experiments, in which we used 30 images obtained from five patients, the proposed method can reduce the total visualization time substantially.”

According to the news editors, the research concluded: “We believe that the proposed method can make a significant contribution to the effective visualization of abdominal vascular structures and precise diagnosis of related abnormalities.”

For more information on this research see: Massively Parallel Energy Space Exploration for Uncluttered Visualization of Vascular Structures. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):240-244. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from Y. Jeon, Korea University, Sch Ind Management Engrn, Seoul 136713, South Korea. (2013 Feb 13)

## **Massachusetts Institute of Technology, Cambridge: On-Chip Systolic Networks for Real-Time Tracking of Pairwise Correlations Between Neurons in a Large-Scale Network**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of Cambridge, Massachusetts, by NewsRx editors, research stated, “The correlation map of neurons emerges as an important mathematical framework for a spectrum of applications including neural circuit modeling, neurologic disease bio-marking and neuroimaging. However, constructing a correlation map is computationally expensive, especially when the number of neurons is large.”

Our news journalists obtained a quote from the research from the Massachusetts Institute of Technology, “This paper proposes a hardware design using hierarchical systolic arrays to calculate pairwise correlations between neurons. Through mapping a computationally efficient algorithm for cross-correlation onto a massively parallel structure, the hardware is able to construct the correlation maps in a much shorter time. The proposed architecture was evaluated using a field programmable gate array. The results show that the computational delay of the hardware for constructing correlation maps increases linearly with the number of neurons, whereas the growth of delay is quadratic for a software-based serial approach.”

According to the news editors, the research concluded: “Also, the efficiency of our method for detecting abnormal behaviors of neural circuits is demonstrated by analyzing correlation maps of retinal neurons.”

For more information on this research see: On-Chip Systolic Networks for Real-Time Tracking of Pairwise Correlations Between Neurons in a Large-Scale Network. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):198-202. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting B. Yu, MIT, Harvard MIT Div Hlth Sci & Technol, Cambridge, MA 02139, United States. (2013 Feb 13)



## National Institutes of Health, Bethesda: Introducing Willmore Flow Into Level Set Segmentation of Spinal Vertebrae

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from Bethesda, Maryland, by NewsRx journalists, research stated, “Segmentation of spinal vertebrae in 3-D space is a crucial step in the study of spinal related disease or disorders. However, the complexity of vertebrae shapes, with gaps in the cortical bone and boundaries, as well as noise, inhomogeneity, and incomplete information in images, has made spinal vertebrae segmentation a difficult task.”

The news correspondents obtained a quote from the research from the National Institutes of Health, “In this paper, we introduce a new method for an accurate spinal vertebrae segmentation that is capable of dealing with noisy images with missing information. This is achieved by introducing an edge-mounted Willmore flow, as well as a prior shape kernel density estimator, to the level set segmentation framework. While the prior shape model provides much needed prior knowledge when information is missing from the image, and draws the level set function toward prior shapes, the edge-mounted Willmore flow helps to capture the local geometry and smoothes the evolving level set surface.”

According to the news reporters, the research concluded: “Evaluation of the segmentation results with ground-truth validation demonstrates the effectiveness of the proposed approach: an overall accuracy of 89.32 +/- 1.70% and 14.03 +/- 1.40 mm are achieved based on the Dice similarity coefficient and Hausdorff distance, respectively, while the inter-and intraobserver variation agreements are 92.11 +/- 1.97%, 94.94 +/- 1.69%, 3.32 +/- 0.46, and 3.80 +/- 0.56 mm.”

For more information on this research see: Introducing Willmore Flow Into Level Set Segmentation of Spinal Vertebrae. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):115-122. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting P.H. Lim, National Institutes of Health, Bethesda, MD 20892, United States. (2013 Feb 13)

## **National Institutes of Health, Bethesda: Kidney Tumor Growth Prediction by Coupling Reaction-Diffusion and Biomechanical Model**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting out of Bethesda, Maryland, by NewsRx editors, research stated, “It is desirable to predict the tumor growth rate so that appropriate treatment can be planned in the early stage. Previously, we proposed a finite-element-method (FEM)-based 3-D kidney tumor growth prediction system using longitudinal images.”

Our news journalists obtained a quote from the research from the National Institutes of Health, “A reaction-diffusion model was applied as the tumor growth model. In this paper, we not only improve the tumor growth model by coupling the reaction-diffusion model with a biomechanical model, but also take the surrounding tissues into account. Different diffusion and biomechanical properties are applied for different tissue types. An FEM is employed to simulate the coupled tumor growth model. Model parameters are estimated by optimizing an objective function of overlap accuracy using a hybrid optimization parallel search package. The proposed method was tested with kidney CT images of eight tumors from five patients with seven time points.”

According to the news editors, the research concluded: “The experimental results showed that the performance of the proposed method improved greatly compared to our previous work.”

For more information on this research see: Kidney Tumor Growth Prediction by Coupling Reaction-Diffusion and Biomechanical Model. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):169-173. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting X.J. Chen, National Institutes of Health, Radiol & Imaging Sci Department, Bethesda, MD 20892, United States. (2013 Feb 13)

## **National University, Kildare: The Use of Ensemble Empirical Mode Decomposition With Canonical Correlation Analysis as a Novel Artifact Removal Technique**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Kildare, Ireland, by NewsRx journalists, research stated, “Biosignal measurement and processing is increasingly being deployed in ambulatory situations particularly in connected health applications. Such an environment dramatically increases the likelihood of artifacts which can occlude features of interest and reduce the quality of information available in the signal.”

The news reporters obtained a quote from the research from National University, “If multichannel recordings are available for a given signal source, then there are currently a considerable range of methods which can suppress or in some cases remove the distorting effect of such artifacts. There are, however, considerably fewer techniques available if only a single-channel measurement is available and yet single-channel measurements are important where minimal instrumentation complexity is required. This paper describes a novel artifact removal technique for use in such a context. The technique known as ensemble empirical mode decomposition with canonical correlation analysis (EEMD-CCA) is capable of operating on single-channel measurements. The EEMD technique is first used to decompose the single-channel signal into a multidimensional signal. The CCA technique is then employed to isolate the artifact components from the underlying signal using second-order statistics.”

According to the news reporters, the research concluded: “The new technique is tested against the currently available wavelet denoising and EEMD-ICA techniques using both electroencephalography and functional near-infrared spectroscopy data and is shown to produce significantly improved results.”

For more information on this research see: The Use of Ensemble Empirical Mode Decomposition With Canonical Correlation Analysis as a Novel Artifact Removal Technique. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):97-105. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting K.T. Sweeney, Natl Univ Ireland Maynooth, Dept. of Elect Engn, Maynooth, Kildare, Ireland. (2013 Feb 13)

## **Northwest Polytechnic University, Xi'an: fMRI Signal Analysis Using Empirical Mean Curve Decomposition**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating from Xi'an, People's Republic of China, by NewsRx correspondents, research stated, "Functional magnetic resonance imaging (fMRI) time series is nonlinear and composed of components at multiple temporal scales, which presents significant challenges to its analysis. In the literature, significant effort has been devoted into model-based fMRI signal analysis, while much less attention has been directed to data-driven fMRI signal analysis."

Our news editors obtained a quote from the research from Northwest Polytechnic University, "In this paper, we present a novel data-driven multiscale signal decomposition framework named empirical mean curve decomposition (EMCD). Targeted on functional brain mapping, the EMCD optimizes mean envelopes from fMRI signals and iteratively extracts coarser-to-finer scale signal components."

According to the news editors, the research concluded: "The EMCD framework was applied to infer meaningful low-frequency information from blood oxygenation level-dependent signals from resting-state fMRI, task-based fMRI, and natural stimulus fMRI, and promising results are obtained."

For more information on this research see: fMRI Signal Analysis Using Empirical Mean Curve Decomposition. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):42-54. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting F. Deng, NW Polytechnic Univ, Sch Automat, Xian 710072, People's Republic of China. (2013 Feb 13)

## **University Hospital, Lausanne: A Novel Approach to Reducing Number of Sensing Units for Wearable Gait Analysis Systems**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting out of Lausanne, Switzerland, by NewsRx editors, research stated, "Gait analysis methods to estimate spatiotemporal measures, based on two, three or four gyroscopes attached on lower limbs have been discussed in the literature. The most common approach to reduce the

number of sensing units is to simplify the underlying biomechanical gait model.”

Our news journalists obtained a quote from the research from University Hospital, “In this study, we propose a novel method based on prediction of movements of thighs from movements of shanks. Datasets from three previous studies were used. Data from the first study (ten healthy subjects and ten with Parkinson’s disease) were used to develop and calibrate a system with only two gyroscopes attached on shanks. Data from two other studies (36 subjects with hip replacement, seven subjects with coxarthrosis, and eight control subjects) were used for comparison with the other methods and for assessment of error compared to a motion capture system. Results show that the error of estimation of stride length compared to motion capture with the system with four gyroscopes and our new method based on two gyroscopes was close ( $-0.8 \pm 6.6$  versus  $3.8 \pm 6.6$  cm). An alternative with three sensing units did not show better results (error:  $-0.2 \pm 8.4$  cm). Finally, a fourth that also used two units but with a simpler gait model had the highest bias compared to the reference (error:  $-25.6 \pm 7.6$  cm).”

According to the news editors, the research concluded: “We concluded that it is feasible to estimate movements of thighs from movements of shanks to reduce number of needed sensing units from 4 to 2 in context of ambulatory gait analysis.”

For more information on this research see: A Novel Approach to Reducing Number of Sensing Units for Wearable Gait Analysis Systems. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):72-77. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting A. Salarian, CHU Vaudois, Dept. of Orthoped Surg & Traumatol, CH-1011 Lausanne, Switzerland. (2013 Feb 13)

### **University of Aberdeen: Structure-based finite strain modelling of the human left ventricle in diastole**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating from Aberdeen, United Kingdom, by NewsRx correspondents, research stated, “Finite strain analyses of the left ventricle provide important information on heart function and have the potential to provide insights into the biomechanics of myocardial contractility in health and disease. Systolic dysfunction is the most common cause

of heart failure; however, abnormalities of diastolic function also contribute to heart failure, and are associated with conditions including left ventricular hypertrophy and diabetes.”

Our news editors obtained a quote from the research from the University of Aberdeen, “The clinical significance of diastolic abnormalities is less well understood than systolic dysfunction, and specific treatments are presently lacking. To obtain qualitative and quantitative information on heart function in diastole, we develop a three-dimensional computational model of the human left ventricle that is derived from noninvasive imaging data. This anatomically realistic model has a rule-based fibre structure and a structure-based constitutive model. We investigate the sensitivity of this comprehensive model to small changes in the constitutive parameters and to changes in the fibre distribution. We make extensive comparisons between this model and similar models that employ different constitutive models, and we demonstrate qualitative and quantitative differences in stress and strain distributions for the different constitutive models.”

According to the news editors, the research concluded: “We also provide an initial validation of our model through comparisons to experimental data on stress and strain distributions in the left ventricle.”

For more information on this research see: Structure-based finite strain modelling of the human left ventricle in diastole. *International Journal for Numerical Methods in Biomedical Engineering*, 2013;29(1):83-103. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

The news editors report that additional information may be obtained by contacting H.M. Wang, University of Aberdeen, Kings College, Sch Engn, Aberdeen, United Kingdom. (2013 Feb 13)

### **University of California, Los Angeles: Enabling Large-Scale Ground-Truth Acquisition and System Evaluation in Wireless Health**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Los Angeles, California, by NewsRx correspondents, research stated, “Large-scale activity monitoring is a core component of systems aiming to improve our ability to manage fitness, deliver care, and diagnose conditions.”

Our news editors obtained a quote from the research from the University of California, “While much research has been devoted to the

accurate classification of motion, the challenges arising from scaling to large communities have received little attention. This paper introduces the problem of scaling, and addresses two of the most important issues: enabling robust large-scale ground-truth acquisition and building a common database for systems comparison.”

According to the news editors, the research concluded: “This paper presents a voice powered mobile acquisition system with efficient annotation tools and an extendable online searchable activity database with 331 datasets totaling over 700 h with 8 sensing modalities and 15 activities.”

For more information on this research see: Enabling Large-Scale Ground-Truth Acquisition and System Evaluation in Wireless Health. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):174-178. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting J.Y. Xu, University of California, Dept. of Elect Engn, Los Angeles, CA 90024, United States. (2013 Feb 13)

### **University of California, Los Angeles: Reducing False Intracranial Pressure Alarms Using Morphological Waveform Features**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Los Angeles, California, by NewsRx journalists, research stated, “False alarms produced by patient monitoring systems in intensive care units are a major issue that causes alarm fatigue, waste of human resources, and increased patient risks. While alarms are typically triggered by manually adjusted thresholds, the trend and patterns observed prior to threshold crossing are generally not used by current systems.”

The news correspondents obtained a quote from the research from the University of California, “This study introduces and evaluates, a smart alarm detection system for intracranial pressure signal (ICP) that is based on advanced pattern recognition methods. Models are trained in a supervised fashion from a comprehensive dataset of 4791 manually labeled alarm episodes extracted from 108 neurosurgical patients. The comparative analysis provided between spectral regression, kernel spectral regression, and support vector machines indicates the significant improvement of the proposed framework in detecting false

ICP alarms in comparison to a threshold-based technique that is conventionally used. Another contribution of this work is to exploit an adaptive discretization to reduce the dimensionality of the input features.”

According to the news reporters, the research concluded: “The resulting features lead to a decrease of 30% of false ICP alarms without compromising sensitivity.”

For more information on this research see: Reducing False Intracranial Pressure Alarms Using Morphological Waveform Features. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):235-239. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting F. Scalzo, University of California, Dept. of Neurosurg, Los Angeles, CA 90095, United States. (2013 Feb 13)

### **University of Illinois, Champaign: Analyzing individual and group differences in multijoint multiwaveform gait data using the Parafac2 model**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news originating from Champaign, Illinois, by NewsRx correspondents, research stated, “Locomotion research often involves analyzing multiwaveform data (e.g., velocities, accelerations, etc.) from various body locations (e.g., knees, ankles, etc.) of several subjects. Therefore, some multivariate technique such as principal component analysis is often used to examine interrelationships between the many correlated waveforms.”

Our news journalists obtained a quote from the research from the University of Illinois, “Despite its extensive use in locomotion research, principal component analysis is for two-mode data, whereas locomotion data are typically collected in higher mode form. In this paper, we present the benefits of analyzing four-mode locomotion data (subjects x time x joints x waveforms) using the Parafac2 model, which is a component model designed for analyzing variation in multimode data. Using bilateral hip, knee, and ankle angular displacement, velocity, and acceleration waveforms, we demonstrate Parafac2’s ability to produce interpretable components describing (i) the fundamental patterns of variation in lower limb angular kinematics during healthy walking and (ii) the fundamental differences between normal and atypical subjects multijoint multiwaveform locomotive patterns. Also, we illustrate how



Parafac2 makes it possible to determine which waveforms best characterize the individual and/or group differences captured by each component.”

According to the news editors, the research concluded: “Our results indicate that different waveforms should be used for different purposes, confirming the need for the holistic analysis of multijoint multiwaveform locomotion data, particularly when investigating atypical motion patterns.”

For more information on this research see: Analyzing individual and group differences in multijoint multiwaveform gait data using the Parafac2 model. *International Journal for Numerical Methods in Biomedical Engineering*, 2013;29(1):62-82. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2040-7947](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2040-7947))

The news correspondents report that additional information may be obtained from N.E. Helwig, University of Illinois, Dept. of Stat, Champaign, IL 61820, United States. (2013 Feb 13)

### **University of Illinois, Urbana: Denoising MR Spectroscopic Imaging Data With Low-Rank Approximations**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Urbana, Illinois, by NewsRx journalists, research stated, “This paper addresses the denoising problem associated with magnetic resonance spectroscopic imaging (MRSI), where signal-to-noise ratio (SNR) has been a critical problem. A new scheme is proposed, which exploits two low-rank structures that exist in MRSI data, one due to partial separability and the other due to linear predictability.”

The news correspondents obtained a quote from the research from the University of Illinois, “Denoising is performed by arranging the measured data in appropriate matrix forms (i.e., Casorati and Hankel) and applying low-rank approximations by singular value decomposition (SVD). The proposed method has been validated using simulated and experimental data, producing encouraging results. Specifically, the method can effectively denoise MRSI data in a wide range of SNR values while preserving spatial-spectral features.”

According to the news reporters, the research concluded: “The method could prove useful for denoising-MRSI data and other spatial-spectral and spatial-temporal imaging data as well.”

For more information on this research see: Denoising MR Spectroscopic Imaging Data With Low-Rank Approximations. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):78-89. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting H.M. Nguyen, University of Illinois, Beckman Inst, Urbana, IL 61801, United States. (2013 Feb 13)

### **University of Melbourne: Using smooth particle hydrodynamics to investigate femoral cortical bone remodelling at the Haversian level**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting from Melbourne, Australia, by NewsRx journalists, research stated, “In the neck of the femur, about 70% of the strength is contributed by the cortical bone, which is the most highly stressed part of the structure and is the site where failure is almost certainly initiated. A better understanding of cortical bone remodelling mechanisms can help discern changes at this anatomical site, which are essential if an understanding of the mechanisms by which hips weaken and become vulnerable to fracture is to be gained.”

The news correspondents obtained a quote from the research from the University of Melbourne, “The aims of this study were to (i) examine a hypothesis that low strain fields arise because of subject-specific Haversian canal distributions causing bone resorption and reduced bone integrity and (ii) introduce the use of a meshless particle-based computational modelling approach SPH to capture bone remodelling features at the level of the Haversian canals. We show that bone remodelling initiated by strain at the Haversian level is highly influenced by the subject-specific pore distribution, bone density, loading and osteocyte density.”

According to the news reporters, the research concluded: “SPH is shown to be effective at capturing the intricate bone pore shapes that evolved over time.”

For more information on this research see: Using smooth particle hydrodynamics to investigate femoral cortical bone remodelling at the Haversian level. *International Journal for Numerical Methods in Biomedical Engineering*, 2013;29(1):129-143. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774,

NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; International Journal for Numerical Methods in Biomedical Engineering - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news journalists report that additional information may be obtained by contacting J.W. Fernandez, University of Melbourne, Melbourne Dental Sch, Melbourne, Vic, Australia. (2013 Feb 13)

### **University of Oxford: Gaussian Processes for Personalized e-Health Monitoring With Wearable Sensors**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news originating from Oxford, United Kingdom, by NewsRx correspondents, research stated, “Advances in wearable sensing and communications infrastructure have allowed the widespread development of prototype medical devices for patient monitoring. However, such devices have not penetrated into clinical practice, primarily due to a lack of research into ‘intelligent’ analysis methods that are sufficiently robust to support large-scale deployment.”

Our news journalists obtained a quote from the research from the University of Oxford, “Existing systems are typically plagued by large false-alarm rates, and an inability to cope with sensor artifact in a principled manner. This paper has two aims: 1) proposal of a novel, patient-personalized system for analysis and inference in the presence of data uncertainty, typically caused by sensor artifact and data incompleteness; 2) demonstration of the method using a large-scale clinical study in which 200 patients have been monitored using the proposed system.”

According to the news editors, the research concluded: “This latter provides much-needed evidence that personalized e-health monitoring is feasible within an actual clinical environment, at scale, and that the method is capable of improving patient outcomes via personalized healthcare.”

For more information on this research see: Gaussian Processes for Personalized e-Health Monitoring With Wearable Sensors. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):193-197. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from L. Clifton, Oxford Univ Hosp NHS Trust, Oxford OX3 9DU, United Kingdom. (2013 Feb 13)

## **University of Rochester: Non-Contact ECG Sensing Employing Gradiometer Electrodes**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating in Rochester, New York, by NewsRx journalists, research stated, “Noncontact, capacitive electrocardiogram (ECG) measurements are complicated by motion artifacts from the relative movement between the ECG electrodes and the subject. To compensate for such motion we propose to employ first and second order gradiometer electrode designs.”

The news reporters obtained a quote from the research from the University of Rochester, “A MATLAB-based simulation tool to enable assessment of different electrode configurations and placements on human subjects has been developed to guide the refinement of electrode designs. Experimental measurements of the sensitivity, motion artifact cancellation, and common mode rejection for various prototype designs were conducted with human subjects. Second order gradiometer electrode designs appear to give the best performance as measured by signal to noise plus distortion ratio.”

According to the news reporters, the research concluded: “Finally, both gradiometer designs were compared with standard ECG recording methods and showed less than 1% beat detection mismatch employing an open source beat detection algorithm.”

For more information on this research see: Non-Contact ECG Sensing Employing Gradiometer Electrodes. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):179-183. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting G.C. Peng, University of Rochester, Dept. of Elect & Comp Engn, Rochester, NY 14627, United States. (2013 Feb 13)

## **Veterans Affairs Medical Center, Cleveland: Center of Mass Acceleration Feedback Control of Standing Balance by Functional Neuromuscular Stimulation Against External Postural Perturbations**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Cleveland, Ohio, by NewsRx journalists, research

stated, “This study investigated the use of center of mass (COM) acceleration feedback for improving performance of a functional neuromuscular stimulation control system to restore standing function to a subject with complete, thoracic-level spinal cord injury. The approach for linearly relating changes in muscle stimulation to changes in COM acceleration was verified experimentally and subsequently produced data to create an input-output map driven by sensor feedback.”

The news reporters obtained a quote from the research from Veterans Affairs Medical Center, “The feedback gains were systematically tuned to reduce upper extremity (UE) loads applied to an instrumented support device while resisting external postural disturbances. Total body COM acceleration was accurately estimated (>89% variance explained) using 3-D outputs of two accelerometers mounted on the pelvis and torso. Compared to constant muscle stimulation employed clinically, feedback control of stimulation reduced UE loading by 33%. COM acceleration feedback is advantageous in constructing a standing neuroprosthesis since it provides the basis for a comprehensive control synergy about a global, dynamic variable and requires minimal instrumentation.”

According to the news reporters, the research concluded: “Future work should include tuning and testing the feedback control system during functional reaching activity that is more indicative of activities of daily living.”

For more information on this research see: Center of Mass Acceleration Feedback Control of Standing Balance by Functional Neuromuscular Stimulation Against External Postural Perturbations. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):10-19. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting R. Nataraj, Cleveland Louis Stokes Vet Affairs Med Center, Mot Study Lab, Cleveland, OH 44106, United States. (2013 Feb 13)

### **Chung Hua University, Hsinchu: Experimental Analysis of 1-3 Piezocomposites for High-Intensity Focused Ultrasound Transducer Applications**

By a News Reporter-Staff News Editor at Telemedicine Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Hsinchu, Taiwan, by NewsRx journalists, research

stated, “Piezocomposites with 1-3 connectivity have been extensively used in medical imaging transducers and high-intensity focused ultrasound transducers, but most studies of 1-3 piezocomposites address medical imaging applications. The purpose of this study was to completely investigate 1-3 composites specifically for high-power ultrasonic transducer applications via a series of experimental analyses.”

The news correspondents obtained a quote from the research from Chung Hua University, “PZT4-epoxy composite focused transducers with various aspect ratios and volume fractions were constructed in-house for the evaluation of the coupling factor, dielectric loss tangent, quality factor, bandwidth, acoustic impedance, and electroacoustic efficiency. The experimental analyses demonstrated that although the coupling factor of composite transducers was higher than that of the ceramic transducer, the composite transducers had a lower efficiency due to the high dielectric loss and high mechanical energy loss of the composites. In addition, the bandwidth and acoustic impedance of composite transducers were superior to the ceramic transducer. For the composite transducers, the efficiency and acoustic impedance were inversely proportional to the aspect ratio and linearly proportional to the volume fraction. The coupling of inter pillars that are too close to each other could cause a significant decrease in the efficiency of the composite transducer.”

According to the news reporters, the research concluded: “With an appropriate design in terms of the aspect ratio, volume fraction, and PZT-pillar spacing, a high-efficiency composite high-intensity focused ultrasound transducer can be achieved.”

For more information on this research see: Experimental Analysis of 1-3 Piezocomposites for High-Intensity Focused Ultrasound Transducer Applications. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):128-134. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting G.S. Chen, Chung Hua Univ, Dept. of Mech Engrn, Hsinchu 300, Taiwan. (2013 Feb 12)

## **University Hospital, Parma: Merging Person-Specific Bio-Markers for Predicting Oral Cancer Recurrence Through an Ontology**

By a News Reporter-Staff News Editor at Cancer Weekly – New research on Oral Cancer is the subject of a report. According to news reporting originating from Parma, Italy, by NewsRx correspondents, research stated, “One of the major problems related to cancer treatment is its recurrence. Without knowing in advance how likely the cancer will relapse, clinical practice usually recommends adjuvant treatments that have strong side effects.”

Our news editors obtained a quote from the research from University Hospital, “A way to optimize treatments is to predict the recurrence probability by analyzing a set of bio-markers. The NeoMark European project has identified a set of preliminary bio-markers for the case of oral cancer by collecting a large series of data from genomic, imaging, and clinical evidence. This heterogeneous set of data needs a proper representation in order to be stored, computed, and communicated efficiently. Ontologies are often considered the proper mean to integrate biomedical data, for their high level of formality and for the need of interoperable, universally accepted models. This paper presents the NeoMark system and how an ontology has been designed to integrate all its heterogeneous data.”

According to the news editors, the research concluded: “The system has been validated in a pilot in which data will populate the ontology and will be made public for further research.”

For more information on this research see: Merging Person-Specific Bio-Markers for Predicting Oral Cancer Recurrence Through an Ontology. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):216-220. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting D. Salvi, University Hospital Parma, Head & Neck Department, Maxillofacial Surg Sect, I-43100 Parma, Italy. (2013 Feb 12)

## University of Texas, Arlington: An Integrated mu LED Optrode for Optogenetic Stimulation and Electrical Recording

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Central Nervous System. According to news reporting from Arlington, Texas, by NewsRx journalists, research stated, “In this letter, we developed an integrated neural probe prototype for optogenetic stimulation by microscale light-emitting diode (mu LED) and simultaneous recording of neural activities with microelectrodes on a single-polyimide platform. Optogenetics stimulates in vivo neural circuits with high-cellular specificity achieved by genetic targeting and precise temporal resolution by interaction of light-gated ion channels with optical beam.”

The news correspondents obtained a quote from the research from the University of Texas, “In our newly developed optrode probe, during optogenetic stimulation of neurons, continuous sensing of neuronal activities in vicinity of the activation site can provide feedback to stimulation or examine local responses in signal pathways. In the device, focusing the light from the mu LED was achieved with an integrated photo-polymerized lens. The efficacy of the optrode for cortical stimulation and recording was tested on mice visual cortex neurons expressing channelrhodopsin-2. Stimulation intensity and frequency-dependent spiking activities of visual cortex were recorded.”

According to the news reporters, the research concluded: “Our device has shown advantages over fiber-coupled laser-based optrode in terms of closed-loop integration, single-implant compactness and lower electrical power requirements, which would be clinically applicable for future prosthetic applications in personalized medicine.”

For more information on this research see: An Integrated mu LED Optrode for Optogenetic Stimulation and Electrical Recording. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):225-229. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting H. Cao, Univ Texas Arlington, Dept. of Phys, Arlington, TX 76019, United States. (2013 Feb 12)



## **Kongju National University, Kong Ju: Dynamical Nonstationarity of Resting EEGs in Patients With Attention-Deficit/Hyperactivity Disorder (AD/HD)**

By a News Reporter-Staff News Editor at Mental Health Weekly Digest – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Kong Ju, South Korea, by NewsRx correspondents, research stated, “This study applied dynamical nonstationarity analysis (DNA) to the resting EEGs of patients with attention-deficit/hyperactivity disorder (AD/HD). We aimed to assess and characterize AD/HD using features based on the local and global duration of dynamical microstate.”

Our news editors obtained a quote from the research from Kongju National University, “We hypothesized that AD/HD patients would have difficulties in maintaining stable cognitive states (e. g., attention deficit and impulsivity) and that they would thus exhibit EEGs with temporal dynamics distinct from normal controls, i.e., rapidly and frequently changing dynamics. To test this hypothesis, we recorded EEGs from 12 adolescent subjects with AD/HD and 11 age-matched healthy subjects in the resting state with eyes closed and eyes open. We found that AD/HD patients exhibited significantly faster changes in dynamics than controls in the right temporal region during the eyes closed condition, but slower changes in dynamics in the frontal region during the eyes open condition. AD/HD patients exhibited a disruption in the rate of change of dynamics in the frontotemporal region at rest, probably due to executive and attention processes.”

According to the news editors, the research concluded: “We suggest that the DNA using complementary local and global features based on the duration of dynamical microstates could be a useful tool for the clinical diagnosis of subjects with AD/HD.”

For more information on this research see: Dynamical Nonstationarity of Resting EEGs in Patients With Attention-Deficit/Hyperactivity Disorder (AD/HD). *IEEE Transactions on Biomedical Engineering*, 2013;60(2):159-163. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting C.F.V. Latchoumane, Kongju Natl Univ, Dept. of Phys, Kong Ju 314701, South Korea. (2013 Feb 11)

## **Massachusetts Institute of Technology, Cambridge: A Wearable Cardiac Monitor for Long-Term Data Acquisition and Analysis**

By a News Reporter-Staff News Editor at Cardiovascular Week – A new study on Biomedical Engineering is now available. According to news reporting originating from Cambridge, Massachusetts, by NewsRx correspondents, research stated, “A low-power wearable ECG monitoring system has been developed entirely from discrete electronic components and a custom PCB. This device removes all loose wires from the system and minimizes the footprint on the user.”

Our news editors obtained a quote from the research from the Massachusetts Institute of Technology, “The monitor consists of five electrodes, which allow a cardiologist to choose from a variety of possible projections. Clinical tests to compare our wearable monitor with a commercial clinical ECG recorder are conducted on ten healthy adults under different ambulatory conditions, with nine of the datasets used for analysis. Data from both monitors were synchronized and annotated with PhysioNet’s waveform viewer WAVE ([physionet.org](http://physionet.org)) [1]. All gold standard annotations are compared to the results of the QRS detection algorithm [2] provided by PhysioNet.”

According to the news editors, the research concluded: “QRS sensitivity and QRS positive predictability are extracted from both monitors to validate the wearable monitor.”

For more information on this research see: A Wearable Cardiac Monitor for Long-Term Data Acquisition and Analysis. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):189-192. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting E.S. Winokur, MIT, Cambridge, MA 02139, United States. (2013 Feb 11)

## **Samsung Electronics, Gyunggi Do: Patient-Specific Identification of Optimal Ubiquitous Electrocardiogram (U-ECG) Placement Using a Three-Dimensional Model of Cardiac Electrophysiology**

By a News Reporter-Staff News Editor at Cardiovascular Week – Researchers detail new data in Biomedical Engineering. According to news reporting out of Gyunggi Do, South Korea, by NewsRx editors, research stated, “A bipolar mini-ECG for ubiquitous healthcare (U-ECG)

has been introduced, and various studies using the U-ECG device are in progress. Because it uses two electrodes-within a small torso surface area, the design of the U-ECG must be suitable for detecting ECG signals.”

Our news journalists obtained a quote from the research from Samsung Electronics, “Using a 3-D model of cardiac electrophysiology, we have developed a simulation method for identifying the optimal placement of U-ECG electrodes on the torso surface. We simulated the heart-torso model to obtain a body surface potential map and ECG waveforms, which were compared with the empirical data. Using this model, we determined the optimal placement of the two U-ECG electrodes, spaced 5 cm apart, for detecting the P, R, and T waves. The ECG data, obtained using the optimal U-ECG placement for a specific wave, showed a clear shape for the target wave, but equivocal shapes for the other waves.”

According to the news editors, the research concluded: “The present study provides an efficient simulation method to identify the optimal attachment position and direction of the U-ECG electrodes on the surface of the torso.”

For more information on this research see: Patient-Specific Identification of Optimal Ubiquitous Electrocardiogram (U-ECG) Placement Using a Three-Dimensional Model of Cardiac Electrophysiology. *IEEE Transactions on Biomedical Engineering*, 2013;60(2):245-249. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting K.M. Lim, Samsung Elect, Yongin, Gyunggi Do, South Korea. (2013 Feb 11)

### **State University of Campinas: Greater Cardiac Cell Excitation Efficiency With Rapidly Switching Multidirectional Electrical Stimulation**

By a News Reporter-Staff News Editor at Cardiovascular Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting out of Campinas, Brazil, by NewsRx editors, research stated, “Electric field (E) stimulation is widely used in experiments with myocardial preparations and in the clinical setting (e. g., defibrillation). As a rule, stimuli are applied in a single direction, which limits excitatory cell recruitment because myocytes are disposed in different directions and their sensitivity to E depends on the stimulus orientation with respect to the cell major axis.”

Our news journalists obtained a quote from the research from the State University of Campinas, “Here, we propose a stimulatory approach, namely rapidly switching multidirectional stimulation (RSMS), in which stimuli are delivered in three directions within the electric refractory period. In populations of randomly oriented isolated rat cardiomyocytes, RSMS doubled the percentage of cells excited by near-threshold E ( $P < 0.001$ ), which was more than the increase in recruitment in a single direction achieved by doubling E intensity. This effect was similar for monophasic and biphasic pulses, but for the latter, a given percent recruitment was obtained with 20-30% lower E intensity ( $P < 0.01$ ), so that RSMS with biphasic pulses allowed at least 60% reduction of E intensity for recruitment of  $>70\%$  of the cells.”

According to the news editors, the research concluded: “RSMS can be applied to improve stimulation efficiency in experiments with isolated cardiac myocytes, and may be a promising alternative for decreasing shock intensity requirements for cardioversion and defibrillation.”

For more information on this research see: Greater Cardiac Cell Excitation Efficiency With Rapidly Switching Multidirectional Electrical Stimulation. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):28-34. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting A.V.S. Fonseca, Campinas State University, Dept. of Biomed Engr, Sch Elect & Comp Engr, BR-13083881 Campinas, SP, Brazil. (2013 Feb 11)

### **University of Leicester: Direct and simultaneous quantitation of 5-aminolaevulinic acid and porphobilinogen in human serum or plasma by hydrophilic interaction liquid chromatography-atmospheric pressure chemical ionization/tandem mass spectrometry**

By a News Reporter-Staff News Editor at Gastroenterology Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Leicester, United Kingdom, by NewsRx correspondents, research stated, “Serum/plasma concentrations of 5-aminolaevulinic acid (ALA) and porphobilinogen (PBG) are elevated in patients with acute hepatic porphyrias, especially during acute attacks. Current assays require lengthy sample pre-treatment and derivatization steps.”

Our news editors obtained a quote from the research from the University of Leicester, “We report here a rapid, sensitive and specific hydrophilic interaction liquid chromatography-tandem mass spectrometry method for the direct and simultaneous quantitation of ALA and PBG in serum or plasma following simple protein precipitation with acetonitrile and centrifugation prior to injection. ALA and PBG were detected using selected reaction monitoring mode, following positive atmospheric pressure chemical ionization. Calibration was linear from 0.05 to 50  $\mu\text{mol/L}$  for ALA and PBG. For both analytes, imprecision (relative standard deviation) was  $\leq 13\%$  and accuracy (percentage nominal concentrations) was between 92 and 107%.”

According to the news editors, the research concluded: “The method was successfully applied to the measurement of ALA and PBG in serum or plasma samples for the screening, biochemical diagnosis and treatment monitoring of patients with acute hepatic porphyrias.”

For more information on this research see: Direct and simultaneous quantitation of 5-aminolaevulinic acid and porphobilinogen in human serum or plasma by hydrophilic interaction liquid chromatography-atmospheric pressure chemical ionization/tandem mass spectrometry. *Biomedical Chromatography*, 2013;27(2):267-272. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-0801](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-0801))

The news editors report that additional information may be obtained by contacting C.M. Benton, University of Leicester, RKCSB, Leicester LE2 7LX, Leics, United Kingdom. (2013 Feb 11)

### **University of Nice Sophia-Antipolis, Sophia Antipolis: Spatial Variability of the 12-Lead Surface ECG as a Tool for Noninvasive Prediction of Catheter Ablation Outcome in Persistent Atrial Fibrillation**

By a News Reporter-Staff News Editor at Cardiovascular Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Sophia Antipolis, France, by NewsRx correspondents, research stated, “Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia encountered in clinical practice. Radiofrequency catheter ablation (CA) is increasingly employed to treat this disease, yet the selection of persistent AF patients who will benefit from this treatment remains a challenging task.”

Our news editors obtained a quote from the research from the University of Nice Sophia-Antipolis, “Several parameters of the surface

electrocardiogram (ECG) have been analyzed in previous works to predict AF termination by CA, such as fibrillatory wave (f-wave) amplitude. However, they are usually manually computed and only a subset of electrodes is inspected. In this study, a novel perspective of the role of f-wave amplitude as a potential noninvasive predictor of CA outcome is adopted by exploring ECG interlead spatial variability. An automatic procedure for atrial amplitude computation based on cubic Hermite interpolation is first proposed. To describe the global f-wave peak-to-peak amplitude distribution, signal contributions from multiple leads are then combined by condensing the most representative features of the atrial signal in a reduced-rank approximation based on principal component analysis (PCA).”

According to the news editors, the research concluded: “We show that exploiting ECG spatial diversity by means of this PCA-based multilead approach does not only increase the robustness to electrode selection, but also substantially improves the predictive power of the amplitude parameter.”

For more information on this research see: Spatial Variability of the 12-Lead Surface ECG as a Tool for Noninvasive Prediction of Catheter Ablation Outcome in Persistent Atrial Fibrillation. *IEEE Transactions on Biomedical Engineering*, 2013;60(1):20-27. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting M. Meo, Univ Nice Sophia Antipolis, Lab Informat Signaux & Syst Sophia Antipolis I3S, CNRS, F-06903 Sophia Antipolis, France. (2013 Feb 11)

### **Kyungpook National University, Daegu: Chemiluminescence microfluidic system of gold nanoparticles enhanced luminol-silver nitrate for the determination of vitamin B12**

By a News Reporter-Staff News Editor at Health & Medicine Week – Researchers detail new data in Biomedical Microdevices. According to news reporting originating in Daegu, South Korea, by NewsRx journalists, research stated, “A rapid and sensitive chemiluminescence (CL) system coupled with a microfluidic chip has been presented to determine vitamin B12 (VB12) based on the reaction of luminol and silver nitrate ( $\text{AgNO}_3$ ) in the presence of gold nanoparticles (AuNPs). A microfluidic chip was fabricated by a soft-lithographic procedure using

polydimethyl siloxane (PDMS) having four inlets and one outlet with a 200  $\mu\text{m}$  wide, 250  $\mu\text{m}$  deep, and 100  $\mu\text{m}$  long microchannel.”

The news reporters obtained a quote from the research from Kyungpook National University, “Ag(+) was used as a chemiluminogenic oxidant in this CL reaction which oxidized luminol to produce strong CL signal in the presence of AuNPs. Luminol reacted with AgNO<sub>3</sub> under the catalysis of AuNPs to produce luminol radicals which reacted with dissolved oxygen and emitted CL light. The proposed CL system was applied to determine the amount of VB12 in VB12 tablets and multivitamin. Under the optimum conditions, the CL intensity of the system was increased with the concentration of VB12 in the range of 0.25-100 ng mL<sup>-1</sup> with the correlation coefficient of 0.9982. The limit of detection was found to be 0.04 ng mL<sup>-1</sup> with the relative standard deviation of 1.56 % for five replicate determinations of 25 ng mL<sup>-1</sup> of VB12.”

According to the news reporters, the research concluded: “The CL reaction mechanism was demonstrated by UV-visible spectra and CL emission spectra.”

For more information on this research see: Chemiluminescence microfluidic system of gold nanoparticles enhanced luminol-silver nitrate for the determination of vitamin B12. *Biomedical Microdevices*, 2013;15(1):195-202. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news correspondents report that additional information may be obtained by contacting M. Kamruzzaman, Dept. of Chemistry, Kyungpook National University, Daegu, 702-701, South Korea.

The publisher of the journal *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (2013 Feb 08)

### **University of Padova: Improved detection of synovial boundaries in ultrasound examination by using a cascade of active-contours**

By a News Reporter-Staff News Editor at Health & Medicine Week – Researchers detail new data in Medical Engineering and Physics. According to news reporting originating in Padova, Italy, by NewsRx journalists, research stated, “Rheumatoid arthritis (RA) is a chronic multisystemic autoimmune disease, with an unclear etiopathogenesis. Its early diagnosis and activity assessment are essential to adjust the proper therapy.”

The news reporters obtained a quote from the research from the University of Padova, “Among the different imaging techniques, ultrasonography (US) allows direct visualization of early inflammatory joint

changes as synovitis, being also rapidly performed and easily accepted by patients. We propose an algorithm to semi-automatically detect synovial boundaries on US images, requiring minimal user interaction. In order to identify the synovia-bone and the synovia-soft tissues interfaces, and to tackle the morphological variability of diseased joints, a cascade of two different active contours is developed, whose composition corresponds to the whole synovial boundary. The algorithm was tested on US images acquired from proximal interphalangeal (PIP) and metacarpophalangeal (MCP) finger joints of 34 subjects. The results have been compared with a consensus manual segmentation.”

According to the news reporters, the research concluded: “We obtained an overall mean sensitivity of 85%±13%, and a mean Dice’s similarity index of 80%±8%, with a mean Hausdorff distance from the manual segmentation of 28%±10 pixels (approximately 1.4%±0.5mm), that are a better performance than those obtained by the raters with respect to the consensus.”

For more information on this research see: Improved detection of synovial boundaries in ultrasound examination by using a cascade of active-contours. *Medical Engineering & Physics*, 2013;35(2):188-94. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting E. Veronese, Dept. of Information Engineering, University of Padova, Via Gradenigo 6, b, 35131 Padova, Italy. (2013 Feb 08)

### **Chungnam National University, Daejeon: Reduction of thermal damage in photodynamic therapy by laser irradiation techniques**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Optics is now available. According to news reporting out of Daejeon, South Korea, by NewsRx editors, the research stated, “General application of continuous-wave (CW) laser irradiation modes in photodynamic therapy can cause thermal damage to normal tissues in addition to tumors. A new photodynamic laser therapy system using a pulse irradiation mode was optimized to reduce nonspecific thermal damage.”

Our news journalists obtained a quote from the research from Chungnam National University, “In in vitro tissue specimens, tissue energy deposition rates were measured in three irradiation modes, CW, pulse, and burst-pulse. In addition, methods were tested for reducing variations in laser output and specific wavelength shifts using a thermoelectric cooler and thermistor. The average temperature elevation per 10 J/cm<sup>2</sup> was 0.27%±176°C, 0.09%±176°C, and 0.08%±176°C using the



three methods, respectively, in pig muscle tissue. Variations in laser output were controlled within  $\pm 0.2\%$ , and specific wavelength shift was limited to  $\pm 3$  nm.”

According to the news editors, the research concluded: “Thus, optimization of a photodynamic laser system was achieved using a new pulse irradiation mode and controlled laser output to reduce potential thermal damage during conventional CW-based photodynamic therapy.”

For more information on this research see: Reduction of thermal damage in photodynamic therapy by laser irradiation techniques. *Journal of Biomedical Optics*, 2012;17(12):128001.

Our news journalists report that additional information may be obtained by contacting H.S. Lim, Chungnam National University, College of Medicine, Dept. of Biomedical Engineering, Chungnam National University Hospital, Faculty Building 2036, Daesa Dong 640, Jung-Gu, Daejeon, South Korea. (2013 Feb 06)

### **Delft University of Technology: Modulated electron-multiplied fluorescence lifetime imaging microscope: all-solid-state camera for fluorescence lifetime imaging**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news reporting originating in Delft, Netherlands, by NewsRx journalists, research stated, “We have built an all-solid-state camera that is directly modulated at the pixel level for frequency-domain fluorescence lifetime imaging microscopy (FLIM) measurements. This novel camera eliminates the need for an image intensifier through the use of an application-specific charge coupled device design in a frequency-domain FLIM system.”

The news reporters obtained a quote from the research from the Delft University of Technology, “The first stage of evaluation for the camera has been carried out. Camera characteristics such as noise distribution, dark current influence, camera gain, sampling density, sensitivity, linearity of photometric response, and optical transfer function have been studied through experiments. We are able to do lifetime measurement using our modulated, electron-multiplied fluorescence lifetime imaging microscope (MEM-FLIM) camera for various objects, e.g., fluorescein solution, fixed green fluorescent protein (GFP) cells, and GFP-actin stained live cells. A detailed comparison of a conventional microchannel plate (MCP)-based FLIM system and the MEM-FLIM system is presented. The MEM-FLIM camera shows higher resolution and a better image quality.”

According to the news reporters, the research concluded: “The MEM-FLIM camera provides a new opportunity for performing frequency-domain FLIM.”

For more information on this research see: Modulated electron-multiplied fluorescence lifetime imaging microscope: all-solid-state camera for fluorescence lifetime imaging. *Journal of Biomedical Optics*, 2012;17(12):126020.

Our news correspondents report that additional information may be obtained by contacting Q. Zhao, Delft University of Technology, Lorentzweg 1, 2628 CJ, Delft, Netherlands. (2013 Feb 06)

### **Georgia Institute of Technology and Emory University, Atlanta: A Novel Left Heart Simulator for the Multi-modality Characterization of Native Mitral Valve Geometry and Fluid Mechanics**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting from Atlanta, Georgia, by NewsRx journalists, research stated, “Numerical models of the mitral valve have been used to elucidate mitral valve function and mechanics. These models have evolved from simple two-dimensional approximations to complex three-dimensional fully coupled fluid structure interaction models.”

The news correspondents obtained a quote from the research from the Georgia Institute of Technology and Emory University, “However, to date these models lack direct one-to-one experimental validation. As computational solvers vary considerably, experimental benchmark data are critically important to ensure model accuracy. In this study, a novel left heart simulator was designed specifically for the validation of numerical mitral valve models. Several distinct experimental techniques were collectively performed to resolve mitral valve geometry and hemodynamics. In particular, micro-computed tomography was used to obtain accurate and high-resolution (39  $\mu$ m voxel) native valvular anatomy, which included the mitral leaflets, chordae tendinae, and papillary muscles. Three-dimensional echocardiography was used to obtain systolic leaflet geometry. Stereoscopic digital particle image velocimetry provided all three components of fluid velocity through the mitral valve, resolved every 25 ms in the cardiac cycle. A strong central filling jet ( $V \sim 0.6$  m/s) was observed during peak systole with minimal out-of-plane velocities. In addition, physiologic hemodynamic boundary conditions were defined and all data were synchronously acquired through a central trigger. Finally, the simulator is a precisely controlled environment, in which flow conditions and geometry can be systematically prescribed and resultant valvular function and hemodynamics assessed.”

According to the news reporters, the research concluded: “Thus, this work represents the first comprehensive database of high fidelity experimental data, critical for extensive validation of mitral valve fluid structure interaction simulations.”

For more information on this research see: A Novel Left Heart Simulator for the Multi-modality Characterization of Native Mitral Valve Geometry and Fluid Mechanics. *Annals of Biomedical Engineering*, 2013;41(2):305-15. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting J.P. Rabbah, Wallace H Coulter Dept. of Biomedical Engineering, Georgia Institute of Technology and Emory University, 313 Ferst Drive, Suite 2119, Atlanta, GA, 30332-0535, United States. (2013 Feb 06)

### **Harvard University School of Medicine, Boston: Validation of two-dimensional and three-dimensional measurements of subpleural alveolar size parameters by optical coherence tomography**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Optical Coherence Tomography have been presented. According to news reporting out of Boston, Massachusetts, by NewsRx editors, research stated, “Optical coherence tomography (OCT) has been increasingly used for imaging pulmonary alveoli. Only a few studies, however, have quantified individual alveolar areas, and the validity of alveolar volumes represented within OCT images has not been shown.”

Our news journalists obtained a quote from the research from the Harvard University School of Medicine, “To validate quantitative measurements of alveoli from OCT images, we compared the cross-sectional area, perimeter, volume, and surface area of matched subpleural alveoli from microcomputed tomography (micro-CT) and OCT images of fixed air-filled swine samples. The relative change in size between different alveoli was extremely well correlated ( $r > 0.9$ ,  $p < 0.0001$ ), but OCT images underestimated absolute sizes compared to micro-CT by 27% (area), 7% (perimeter), 46% (volume), and 25% (surface area) on average. We hypothesized that the differences resulted from refraction at the tissue-air interfaces and developed a ray-tracing model that approximates the reconstructed alveolar size within OCT images. Using this model and OCT measurements of the refractive index for lung tissue (1.41 for fresh, 1.53 for fixed), we derived equations to obtain absolute size measurements of superellipse and circular alveoli with the use of predictive correction factors.”

According to the news editors, the research concluded: “These methods and results should enable the quantification of alveolar sizes from OCT images in vivo.”

For more information on this research see: Validation of two-dimensional and three-dimensional measurements of subpleural alveolar size parameters by optical coherence tomography. *Journal of Biomedical Optics*, 2012;17(12):126015.

Our news journalists report that additional information may be obtained by contacting C.I. Unglert, Harvard Medical School and Massachusetts General Hospital, Wellman Center for Photomedicine, 40 Parkman Street, RSL 160, Boston, Massachusetts 02114, United States. (2013 Feb 06)

### **Huazhong University of Science and Technology, Wuhan: Dynamic change of collateral flow varying with distribution of regional blood flow in acute ischemic rat cortex**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting from Wuhan, People’s Republic of China, by NewsRx journalists, research stated, “Cerebral blood flow (CBF) is critical for the maintenance of cerebral function by guaranteed constant oxygen and glucose supply to brain. Collateral channels (CCs) are recruited to provide alternatives to CBF to ischemic regions once the primary vessel is occluded during ischemic stroke.”

The news correspondents obtained a quote from the research from the Huazhong University of Science and Technology, “However, the knowledge of the relationship between dynamic evolution of collateral flow and the distribution of regional blood flow remains limited. In this study, laser speckle imaging was used to assess dynamic changes of CCs and regional blood flow in a rat cortex with permanent middle cerebral artery occlusion (MCAo). We found that CCs immediately provided blood flow to ischemic territories after MCAo. More importantly, there were three kinds of dynamic changes of CCs during acute stroke: persistent CC, impermanent CC, and transient CC, respectively, related to different distributions of regional blood flow. Although there was the possible occurrence of peri-infarct depolarization (PID) during ischemia, there was no obvious significance about the onset time and duration of CCs between rats with and without PID.”

According to the news reporters, the research concluded: “These results suggest that the initial arising of CCs does not ensure their persistence, and that collateral flow could be varied with distribution of regional blood flow in acute ischemic stroke, which may facilitate the understanding of collateral recruitment and promote the development of collateral therapeutics in the future.”

For more information on this research see: Dynamic change of collateral flow varying with distribution of regional blood flow in acute ischemic rat cortex. *Journal of Biomedical Optics*, 2012;17(12):125001.

Our news journalists report that additional information may be obtained by contacting Z. Wang, Huazhong University of Science and Technology, Britton Chance Center for Biomedical Photonics, Wuhan National Laboratory for Optoelectronics, Wuhan 430074, People's Taiwan. (2013 Feb 06)

### **Inje University, Gimhae: A high-speed, high-performance on-chip integrated reverse transcription (RT)-microchip**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Microdevices have been published. According to news reporting from Gimhae, South Korea, by NewsRx journalists, research stated, “This report introduces an on-chip integrated reverse transcription (RT)-microchip, which includes two genetic functionalities of RNA extraction and cDNA synthesis. In the RNA extraction compartment, RNA is extracted from peripheral blood lysate within 1 min, by lateral magnetophoresis using magnetic oligo-dT beads.”

The news correspondents obtained a quote from the research from Inje University, “The extracted RNA is then collected and used directly to produce cDNA in the cDNA synthesis microchamber, which is monolithically integrated with the RNA extraction compartment. To verify the superiority of the proposed RT-microchip, RT-PCR amplification was performed using cDNA harvested from the RT-microchip, and the results were compared with those obtained using typical RNA extraction methods such as a silica matrix column and magnetic oligo-dT beads. The RT-PCR amplification results using 100 l of blood showed that the intensity of the bands in gel electrophoresis of the RT-microchip was 2-fold stronger than that of the silica matrix column and 2.65-fold stronger than that of the magnetic oligo-dT beads.”

According to the news reporters, the research concluded: “The results demonstrate that the RT-microchip technique is the most sensitive of the tested methods.”

For more information on this research see: A high-speed, high-performance on-chip integrated reverse transcription (RT)-microchip. *Biomedical Microdevices*, 2013;15(1):9-15. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting H. Lee, Dept. of Nano Engineering, Center for Nano Manufacturing, Inje University, 607 Obang-dong, Gimhae, GyeongNam, 621-749, South Korea.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2013 Feb 06)

### **Mayo Clinic, Rochester: Measuring incidence angle for through-the-objective total internal reflection fluorescence microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Optics. According to news reporting out of Rochester, Minnesota, by NewsRx editors, the research stated, “Total internal reflection fluorescence (TIRF) microscopy has the exciting laser beam incident beyond critical angle from the glass side of a glass/aqueous interface formed by the coverslip and aqueous sample. The aqueous side evanescent field decays exponentially with distance from the interface with penetration depth depending on incidence angle.”

Our news journalists obtained a quote from the research from Mayo Clinic, “Through-the-objective TIRF has the exciting laser focused at the back focal plane (BFP) creating a refracted parallel beam approaching the interface in the small gap between objective and coverslip, making incidence angle challenging to measure. Objective axial scanning does not affect incidence angle but translates beam and interface intersection detected by the fluorescence center of mass from fluorescent spheres attached to the aqueous side of the interface. Center of mass translation divided by the axial translation is the tangent of the incidence angle that is sampled repeatedly over objective trajectory to obtain a best estimate. Incidence angle is measured for progressively larger radial positions of the focused beam on the BFP. A through-the-objective TIRF microscope, utilizing a micrometer and relay lenses to position the focused beam at the BFP, is calibrated for incidence angle.”

According to the news editors, the research concluded: “Calibration depends on microscope characteristics and TIRF objective and is applicable to any interface or sample.”

For more information on this research see: Measuring incidence angle for through-the-objective total internal reflection fluorescence microscopy. *Journal of Biomedical Optics*, 2012;17(12):126007.

Our news journalists report that additional information may be obtained by contacting T.P. Burghardt, Mayo Clinic Rochester, Dept. of Biochemistry and Molecular Biology, Rochester, Minnesota 55905, United States. (2013 Feb 06)

**National Institutes of Health, Bethesda: Effects of multiple scattering on fluorescence correlation spectroscopy measurements of particles moving within optically dense media**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting from Bethesda, Maryland, by NewsRx journalists, research stated, “Fluorescence correlation spectroscopy (FCS) is increasingly being used to assess the movement of particles diffusing in complex, optically dense surroundings, in which case measurement conditions may complicate data interpretation. It is considered how a single-photon FCS measurement can be affected if the sample properties result in scattering of the incident light.”

The news correspondents obtained a quote from the research from the National Institutes of Health, “FCS autocorrelation functions of Atto 488 dye molecules diffusing in solutions of polystyrene beads are measured, which acted as scatterers. Data indicated that a scattering-linked increase in the illuminated volume, as much as two fold, resulted in minimal increase in diffusivity. To analyze the illuminated beam profile, Monte-Carlo simulations were employed, which indicated a larger broadening of the beam along the axial than the radial directions, and a reduction of the incident intensity at the focal point. The broadening of the volume in the axial direction has only negligible effect on the measured diffusion time, since intensity fluctuations due to diffusion events in the radial direction are dominant in FCS measurements.”

According to the news reporters, the research concluded: “Collectively, results indicate that multiple scattering does not result in FCS measurement artifacts and thus, when sufficient signal intensity is attainable, single-photon FCS can be a useful technique for measuring probe diffusivity in optically dense media.”

For more information on this research see: Effects of multiple scattering on fluorescence correlation spectroscopy measurements of particles moving within optically dense media. *Journal of Biomedical Optics*, 2012;17(12):125004.

Our news journalists report that additional information may be obtained by contacting S. Zustiak, Eunice Shriver National Institute of Child Health & Human Development, National Institutes of Health, Programs on Physical Biology, Bethesda, Maryland 20892, United States. (2013 Feb 06)

## **National Yang Ming University, Taipei: Investigation of lipid homeostasis in living *Drosophila* by coherent anti-Stokes Raman scattering microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Optics are discussed in a new report. According to news reporting originating from Taipei, Taiwan, by NewsRx correspondents, research stated, “To improve our understanding of lipid metabolism, *Drosophila* is used as a model animal, and its lipid homeostasis is monitored by coherent anti-Stokes Raman scattering microscopy. We are able to achieve in vivo imaging of larval fat body (analogous to adipose tissue in mammals) and oenocytes (analogous to hepatocytes) in *Drosophila* larvae at subcellular level without any labeling.”

Our news editors obtained a quote from the research from National Yang Ming University, “By overexpressing two lipid regulatory proteins—Brummer lipase (Bmm) and lipid storage droplet-2 (Lsd-2)—we found different phenotypes and responses under fed and starved conditions. Comparing with the control larva, we observed more lipid droplet accumulation by ? twofold in oenocytes of fat-body-Bmm-overexpressing (FB-Bmm-overexpressing) mutant under fed condition, and less lipid by ? fourfold in oenocytes of fat-body-Lsd-2-overexpressing (FB-Lsd-2-overexpressing) mutant under starved condition. Moreover, together with reduced size of lipid droplets, the lipid content in the fat body of FB-Bmm-overexpressing mutant decreases much faster than that of the control and FB-Lsd-2-overexpressing mutant during starvation. From long-term starvation assay, we found FB-Bmm-overexpressing mutant has a shorter lifespan, which can be attributed to faster consumption of lipid in its fat body.”

According to the news editors, the research concluded: “Our results demonstrate in vivo observations of direct influences of Bmm and Lsd-2 on lipid homeostasis in *Drosophila* larvae.”

For more information on this research see: Investigation of lipid homeostasis in living *Drosophila* by coherent anti-Stokes Raman scattering microscopy. *Journal of Biomedical Optics*, 2012;17(12):126001.

The news editors report that additional information may be obtained by contacting C.H. Chien, National Yang-Ming University, Institute of Biophotonics, Taipei 112, Taiwan. (2013 Feb 06)



**Oslo University Hospital: Simultaneous monitoring of static and dynamic intracranial pressure parameters from two separate sensors in patients with cerebral bleeds: comparison of findings**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting out of Oslo, Norway, by NewsRx editors, research stated, “We recently reported that in an experimental setting the zero pressure level of solid intracranial pressure (ICP) sensors can be altered by electrostatics discharges. Changes in the zero pressure level would alter the ICP level (mean ICP); whether spontaneous changes in mean ICP happen in clinical settings is not known.”

Our news journalists obtained a quote from the research from Oslo University Hospital, “This can be addressed by comparing the ICP parameters level and waveform of simultaneous ICP signals. To this end, we retrieved our recordings in patients with cerebral bleeds wherein the ICP had been recorded simultaneously from two different sensors. During a time period of 10 years, 17 patients with cerebral bleeds were monitored with two ICP sensors simultaneously; sensor 1 was always a solid sensor while Sensor 2 was a solid -, a fluid -or an air-pouch sensor. The simultaneous signals were analyzed with automatic identification of the cardiac induced ICP waves. The output was determined in consecutive 6-s time windows, both with regard to the static parameter mean ICP and the dynamic parameters (mean wave amplitude, MWA, and mean wave rise time, MWRT). Differences in mean ICP, MWA and MWRT between the two sensors were determined.”

According to the news editors, the research concluded: “Transfer functions between the sensors were determined to evaluate how sensors reproduce the ICP waveform.”

For more information on this research see: Simultaneous monitoring of static and dynamic intracranial pressure parameters from two separate sensors in patients with cerebral bleeds: comparison of findings. *Biomedical Engineering Online*, 2012;11():66. (BioMed Central - <http://www.biomedcentral.com/>; Biomedical Engineering Online - [www.biomedical-engineering-online.com](http://www.biomedical-engineering-online.com))

Our news journalists report that additional information may be obtained by contacting P.K. Eide, Dept. of Neurosurgery, Oslo University Hospital, Rikshospitalet, Oslo, Norway. (2013 Feb 06)

### **Philipps University, Marburg: Three-dimensional surface reconstruction within noncontact diffuse optical tomography using structured light**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news reporting originating from Marburg, Germany, by NewsRx correspondents, research stated, “A main field in biomedical optics research is diffuse optical tomography, where intensity variations of the transmitted light traversing through tissue are detected. Mathematical models and reconstruction algorithms based on finite element methods and Monte Carlo simulations describe the light transport inside the tissue and determine differences in absorption and scattering coefficients.”

Our news editors obtained a quote from the research from Philipps University, “Precise knowledge of the sample’s surface shape and orientation is required to provide boundary conditions for these techniques. We propose an integrated method based on structured light three-dimensional (3-D) scanning that provides detailed surface information of the object, which is usable for volume mesh creation and allows the normalization of the intensity dispersion between surface and camera.”

According to the news editors, the research concluded: “The experimental setup is complemented by polarization difference imaging to avoid overlaying byproducts caused by inter-reflections and multiple scattering in semitransparent tissue.”

For more information on this research see: Three-dimensional surface reconstruction within noncontact diffuse optical tomography using structured light. *Journal of Biomedical Optics*, 2012;17(12):126009.

The news editors report that additional information may be obtained by contacting K. Baum, Philipps University Marburg, Dept. of Radiology, Baldingerstrasse, 35043 Marburg, Germany. (2013 Feb 06)

### **Rice University, Houston: Fabrication and mechanical evaluation of anatomically-inspired quasilaminate hydrogel structures with layer-specific formulations**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Houston, Texas, by NewsRx correspondents, research stated, “A major tissue engineering challenge is the creation of multilaminate scaffolds with layer-specific mechanical properties representative of native tissues, such as heart valve leaflets, blood vessels, and cartilage. For this purpose, poly(ethylene glycol) diacrylate (PEGDA) hydrogels are attractive materials due to their tunable mechanical and biological properties.”

Our news journalists obtained a quote from the research from Rice University, “This study explored the fabrication of trilayer hydrogel quasilaminates. A novel sandwich method was devised to create quasilaminates with layers of varying stiffnesses. The trilayer structure was comprised of two ‘stiff’ outer layers and one ‘soft’ inner layer. Tensile testing of bilayer quasilaminates demonstrated that these scaffolds do not fail at the interface. Flexural testing showed that the bending modulus of acellular quasilaminates fell between the bending moduli of the ‘stiff’ and ‘soft’ hydrogel layers. The bending modulus and swelling of trilayer scaffolds with the same formulations were not significantly different than single layer gels of the same formulation. The encapsulation of cells and the addition of phenol red within the hydrogel layers decreased bending modulus of the trilayer scaffolds.”

According to the news editors, the research concluded: “The data presented demonstrates that this fabrication method can make quasilaminates with robust interfaces, integrating layers of different mechanical properties and biofunctionalization, and thus forming the foundation for a multilaminate scaffold that more accurately represents native tissue.”

For more information on this research see: Fabrication and mechanical evaluation of anatomically-inspired quasilaminate hydrogel structures with layer-specific formulations. *Annals of Biomedical Engineering*, 2013;41(2):398-407. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from H. Tseng, Dept. of Bioengineering, Rice University, PO Box 1892, MS 142, Houston, TX, 77251-1892, United States. (2013 Feb 06)

### **Stanford University: Microactuator device for integrated measurement of epithelium mechanics**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Microdevices are discussed in a new report. According to news reporting originating from Stanford, California, by NewsRx correspondents, research stated, “Mechanical forces are among important factors that drive cellular function and organization. We present a microfabricated device with on-chip actuation for mechanical testing of single cells.”

Our news editors obtained a quote from the research from Stanford University, “An integrated immersible electrostatic actuator system is demonstrated that applies calibrated forces to cells. We conduct stretching experiments by directly applying forces to epithelial cells adhered to device surfaces functionalized with collagen.”

According to the news editors, the research concluded: “We measure mechanical properties including stiffness, hysteresis and viscoelasticity of adherent cells.”

For more information on this research see: Microactuator device for integrated measurement of epithelium mechanics. *Biomedical Microdevices*, 2013;15(1):117-23. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news editors report that additional information may be obtained by contacting V. Mukundan, Dept. of Mechanical Engineering, Stanford University, Stanford, CA, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2013 Feb 06)

### **State University of New York, Buffalo: Understanding glycomechanics using mathematical modeling: a review of current approaches to simulate cellular glycosylation reaction networks**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Buffalo, New York, by NewsRx correspondents, research stated, “Following the footsteps of genomics and proteomics, recent years have witnessed the growth of large-scale experimental methods in the field of glycomics. In parallel, there has also been growing interest in developing Systems Biology based methods to study the glycome.”

Our news journalists obtained a quote from the research from the State University of New York, “The combined goals of these endeavors is to identify glycosylation-dependent mechanisms regulating human physiology, check points that can control the progression of pathophysiology, and modifications to reaction pathways that can result in more uniform biopharmaceutical processes. In these efforts, mathematical models of N-and O-linked glycosylation have emerged as paradigms for the field. While these are relatively few in number, nevertheless, the existing models provide a basic framework that can be used to develop more sophisticated analysis strategies for glycosylation in the future.”

According to the news editors, the research concluded: “The current review surveys these computational models with focus on the underlying mathematics and assumptions, and with respect to their ability to generate experimentally testable hypotheses.”

For more information on this research see: Understanding glycomechanics using mathematical modeling: a review of current approaches

to simulate cellular glycosylation reaction networks. *Annals of Biomedical Engineering*, 2012;40(4):816-27. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from A. Puri, Dept. of Chemical and Biological Engineering and The New York State Center for Excellence in Bioinformatics and Life Sciences, State University of New York, 906 Furnas Hall, Buffalo, NY 14260, United States. (2013 Feb 06)

### **Technical University, Lisbon: Femtosecond laser ablation of bovine cortical bone**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Optics is the subject of a report. According to news reporting out of Lisbon, Portugal, by NewsRx editors, research stated, “We study the surface topographical, structural, and compositional modifications induced in bovine cortical bone by femtosecond laser ablation. The tests are performed in air, with a Yb:KYW chirped-pulse-regenerative amplification laser system (500 fs, 1030 nm) at fluences ranging from 0.55 to 2.24 J/cm<sup>2</sup>.”

Our news journalists obtained a quote from the research from Technical University, “The ablation process is monitored by acoustic emission measurements. The topography of the laser-treated surfaces is studied by scanning electron microscopy, and their constitution is characterized by glancing incidence x-ray diffraction, x-ray photoelectron spectroscopy, Fourier transform infrared spectroscopy, and micro-Raman spectroscopy. The results show that femtosecond laser ablation allows removing bone without melting, carbonization, or cracking. The structure and composition of the remaining tissue are essentially preserved, the only constitutional changes observed being a reduction of the organic material content and a partial recrystallization of hydroxypapatite in the most superficial region of samples. The results suggest that, within this fluence range, ablation occurs by a combination of thermal and electrostatic mechanisms, with the first type of mechanism predominating at lower fluences. The associated thermal effects explain the constitutional changes observed.”

According to the news editors, the research concluded: “We show that femtosecond lasers are a promising tool for delicate orthopaedic surgeries, where small amounts of bone must be cut with negligible damage, thus minimizing surgical trauma.”

For more information on this research see: Femtosecond laser ablation of bovine cortical bone. *Journal of Biomedical Optics*, 2012;17(12):125005.

Our news journalists report that additional information may be obtained by contacting L.T. Cangueiro, Technical University of Lisbon, Instituto de Ciencia e Engenharia de Materiais e Superficies, IST, Avenida Rovisco Pais, 1049-001 Lisbon, Portugal. (2013 Feb 06)

### **University Medical Center, Gottingen: EMG-based simultaneous and proportional estimation of wrist/hand kinematics in uni-lateral trans-radial amputees**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Gottingen, Germany, by NewsRx journalists, research stated, “: We propose a method for estimating wrist kinematics during dynamic wrist contractions from multi-channel surface electromyography (EMG). The algorithm extracts features from the surface EMG and uses dedicated multi-layer perceptron networks to estimate individual joint angles of the 3 degrees of freedom (DoFs) of the wrist.”

The news reporters obtained a quote from the research from University Medical Center, “The method was designed with the aim of proportional and simultaneous control of multiple DoFs of active prostheses by unilateral amputees. Therefore, the proposed approach was tested in both unilateral transradial amputees and in intact-limbed control subjects. It was shown that the joint angles at the 3 DoFs of amputees can be estimated from surface EMG recordings, during mirrored bilateral contractions that simultaneously and proportionally articulated the 3 DoFs. The estimation accuracies of amputee subjects with long stumps were 62.5% &#177; 8.50% across all 3 DoFs, while accuracies of the intact-limbed control subjects were 72.0% &#177; 8.29%. The estimation results from intact-limbed subjects were consistent with earlier studies.”

According to the news reporters, the research concluded: “The results from the current study demonstrated the feasibility of the proposed myoelectric control approach to provide a more intuitive myoelectric control strategy for unilateral transradial amputees.”

For more information on this research see: EMG-based simultaneous and proportional estimation of wrist/hand kinematics in uni-lateral trans-radial amputees. *Journal of Neuroengineering and Rehabilitation*, 2012;9(0):42. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Neuroengineering and Rehabilitation* - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

Our news correspondents report that additional information may be obtained by contacting N. Jiang, Dept. of Neurorehabilitation Engineering, Bernstein Center for Computational Neuroscience, University Medical Center Gottingen, Georg-August University, Von-Sieblod-str, 4, Gottingen, 37075, Germany. (2013 Feb 06)

## University of Bern: Population-based design of mandibular fixation plates with bone quality and morphology considerations

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Bern, Switzerland, by NewsRx correspondents, research stated, “In this paper we present a new population-based implant design methodology, which advances the state-of-the-art approaches by combining shape and bone quality information into the design strategy. The method may enhance the mechanical stability of the fixation and reduces the intra-operative in-plane bending which might impede the functionality of the locking mechanism.”

Our news journalists obtained a quote from the research from the University of Bern, “The computational method is presented for the case of mandibular locking fixation plates, where the mandibular angle and the bone quality at screw locations are taken into account. The method automatically derives the mandibular angle and the bone thickness and intensity values at the path of every screw from a set of computed tomography images. An optimization strategy is then used to optimize the two parameters of plate angle and screw position. The method was applied to two populations of different genders. Results for the new design are presented along with a comparison with a commercially available mandibular locking fixation plate (MODUS®; TriLock®; 2.0/2.3/2.5, Medartis AG, Basel, Switzerland). The proposed designs resulted in a statistically significant improvement in the available bone thickness when compared to the standard plate. There is a higher probability that the proposed implants cover areas of thicker cortical bone without compromising the bone mineral density around the screws.”

According to the news editors, the research concluded: “The obtained results allowed us to conclude that an angle and screw separation of 129°; and 9 mm for females and 121°; and 10 mm for males are more suitable designs than the commercially available 120°; and 9 mm.”

For more information on this research see: Population-based design of mandibular fixation plates with bone quality and morphology considerations. *Annals of Biomedical Engineering*, 2013;41(2):377-84. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from H. Bousleiman, Institute for Surgical Technology and Biomechanics, University of Bern, Stauffacherstrasse 78, 3014, Bern, Switzerland. (2013 Feb 06)

### **University of California, Irvine: In vivo validation of quantitative frequency domain fluorescence tomography**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Optics is now available. According to news reporting out of Irvine, California, by NewsRx editors, research stated, “We have developed a hybrid frequency domain fluorescence tomography and magnetic resonance imaging system (MRI) for small animal imaging. The main purpose of this system is to obtain quantitatively accurate fluorescence concentration and lifetime images using a multi-modality approach.”

Our news journalists obtained a quote from the research from the University of California, “In vivo experiments are undertaken to evaluate the system. We compare the recovered fluorescence parameters with and without MRI structural a priori information. In addition, we compare two optical background heterogeneity correction methods: Born normalization and utilizing diffuse optical tomography (DOT) functional a priori information.”

According to the news editors, the research concluded: “The results show that the concentration and lifetime of a 4.2-mm diameter indocyanine green inclusion located 15 mm deep inside a rat can be recovered with less than a 5% error when functional a priori information from DOT and structural a priori information from MRI are utilized.”

For more information on this research see: In vivo validation of quantitative frequency domain fluorescence tomography. *Journal of Biomedical Optics*, 2012;17(12):126021.

Our news journalists report that additional information may be obtained by contacting Y. Lin, University of California, Tu and Yuen Center for Functional Onco-Imaging, Dept. of Radiological Sciences, 164 Irvine Hall, Irvine, California 92697, United States. (2013 Feb 06)

### **University of California, Irvine: Inflammatory response assessment of a hybrid tissue-engineered heart valve leaflet**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Irvine, California, by NewsRx journalists, research stated, “Despite substantial research in the past few decades, only slight progress has been made toward developing biocompatible, tissue-engineered scaffolds for heart valve leaflets that can withstand the dynamic pressure inside the heart. Recent progress on the development of hybrid scaffolds, which are composed of a thin metal mesh enclosed by multi-layered tissue, appear to be promising for heart valve engineering.”



The news reporters obtained a quote from the research from the University of California, “This approach retains all the advantages of biological scaffolds while developing a strong extracellular matrix backbone to withstand dynamic loading. This study aims to test the inflammatory response of hybrid tissue-engineered leaflets based on characterizing the activation of macrophage cells cultured on the surfaces of the tissue construct. The results indicate that integration of biological layers around a metal mesh core-regardless of its type-may reduce the evoked inflammatory responses by THP-1 monocyte-like cells.”

According to the news reporters, the research concluded: “This observation implies that masking a metal implant within a tissue construct prior to implantation can hide it from the immune system and may improve the implant’s biocompatibility.”

For more information on this research see: Inflammatory response assessment of a hybrid tissue-engineered heart valve leaflet. *Annals of Biomedical Engineering*, 2013;41(2):316-26. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting S.H. Alavi, The Edwards Lifesciences Center for Advanced Cardiovascular Technology, Dept. of Biomedical Engineering, University of California, Irvine, CA, 92697, United States. (2013 Feb 06)

### **University of California, Irvine: Lens-free computational imaging of capillary morphogenesis within three-dimensional substrates**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Optics is the subject of a report. According to news originating from Irvine, California, by NewsRx correspondents, research stated, “Endothelial cells cultured in three-dimensional (3-D) extracellular matrices spontaneously form microvessels in response to soluble and matrix-bound factors. Such cultures are common for the study of angiogenesis and may find widespread use in drug discovery.”

Our news journalists obtained a quote from the research from the University of California, “Vascular networks are imaged over weeks to measure the distribution of vessel morphogenic parameters. Measurements require micron-scale spatial resolution, which for light microscopy comes at the cost of limited field-of-view (FOV) and shallow depth-of-focus (DOF). Small FOVs and DOFs necessitate lateral and axial mechanical scanning, thus limiting imaging throughput. We present a lens-free holographic on-chip microscopy technique to rapidly image

microvessels within a Petri dish over a large volume without any mechanical scanning. This on-chip method uses partially coherent illumination and a CMOS sensor to record in-line holographic images of the sample. For digital reconstruction of the measured holograms, we implement a multiheight phase recovery method to obtain phase images of capillary morphogenesis over a large FOV (24 mm<sup>2</sup>) with  $\sim 1.5$   $\mu$ m spatial resolution. On average, measured capillary length in our method was within approximately 2% of lengths measured using a 10 x microscope objective.”

According to the news editors, the research concluded: “These results suggest lens-free on-chip imaging is a useful toolset for high-throughput monitoring and quantitative analysis of microvascular 3-D networks.”

For more information on this research see: Lens-free computational imaging of capillary morphogenesis within three-dimensional substrates. *Journal of Biomedical Optics*, 2012;17(12):126018.

The news correspondents report that additional information may be obtained from J. Weidling, University of California Irvine, Biomedical Engineering Department, Irvine, California, United States. (2013 Feb 06)

### **University of California, Sacramento: Complex conjugate artifact-free adaptive optics optical coherence tomography of in vivo human optic nerve head**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in *Biomedical Optics*. According to news originating from Sacramento, California, by NewsRx correspondents, research stated, “We acquired in vivo images of the human optic nerve head (ONH) using an adaptive optics-optical coherence tomography (AO-OCT) system. In order to improve imaging of the lamina cribrosa in the ONH with high lateral resolution and sensitivity, we implemented a complex conjugate artifact-free Fourier domain OCT (Fd-OCT) acquisition scheme with a reference arm-based phase shifting method.”

Our news journalists obtained a quote from the research from the University of California, “This allowed positioning of the lamina cribrosa structures near the zero path length difference where AO-OCT imaging achieves highest sensitivity. Implementation of our complex conjugate artifact removal (CCR) method required constant phase shifts between consecutive axial scans (A-scans), generated by continuous beam path-length changes from offsetting the pivot point of the scanning mirror placed in the reference arm. Fourier transform along the transverse axis and a filtering algorithm allowed reconstruction of CCR AO-OCT images. The suppression ratio of the mirror artifact was

approximately 22 dB (at 18,000 A-scans per second acquisition speed) with a paperboard test target and an optimum phase-shift value.”

According to the news editors, the research concluded: “Finally, we reconstructed the three-dimensional structure of human ONH with enhanced depth range and sensitivity using CCR AO-OCT.”

For more information on this research see: Complex conjugate artifact-free adaptive optics optical coherence tomography of in vivo human optic nerve head. *Journal of Biomedical Optics*, 2012;17(12):126005.

The news correspondents report that additional information may be obtained from D.Y. Kim, University of California Davis Eye Center, Vision Science and Advanced Retinal Imaging Laboratory, 4860 Y Street, Suite 2400, Sacramento, California 95817, United States. (2013 Feb 06)

### **University of Connecticut, Storrs: A miniaturized transcutaneous system for continuous glucose monitoring**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Microdevices is now available. According to news reporting originating from Storrs, Connecticut, by NewsRx correspondents, research stated, “Implantable sensors for continuous glucose monitoring hold great potential for optimal diabetes management. This is often undermined by a variety of issues associated with: (1) negative tissue response; (2) poor sensor performance; and (3) lack of device miniaturization needed to reduce implantation trauma.”

Our news editors obtained a quote from the research from the University of Connecticut, “Herein, we report our initial results towards constructing an implantable device that simultaneously address all three aforementioned issues. In terms of device miniaturization, a highly miniaturized CMOS (complementary metal-oxide-semiconductor) potentiostat and signal processing unit was employed (with a combined area of 0.665 mm<sup>2</sup>). The signal processing unit converts the current generated by a transcutaneous, Clark-type amperometric sensor to output frequency in a linear fashion. The Clark-type amperometric sensor employs stratification of five functional layers to attain a well-balanced mass transfer which in turn yields a linear sensor response from 0 to 25 mM of glucose concentration, well beyond the physiologically observed (2 to 22 mM) range. In addition, it is coated with a thick polyvinyl alcohol (PVA) hydrogel with embedded poly(lactic-co-glycolic acid) (PLGA) microspheres intended to provide continuous, localized delivery of dexamethasone to suppress inflammation and fibrosis. In vivo evaluation in rat model has shown that the transcutaneous sensor system reproducibly tracks repeated glycemic events.

Clarke's error grid analysis on the as-obtained glycemic data has indicated that all of the measured glucose readings fell in the desired Zones A & B and none fell in the erroneous Zones C, D and E."

According to the news editors, the research concluded: "Such reproducible operation of the transcutaneous sensor system, together with low power (140 W) consumption and capability for current-to-frequency conversion renders this a versatile platform for continuous glucose monitoring and other biomedical sensing devices."

For more information on this research see: A miniaturized transcutaneous system for continuous glucose monitoring. *Biomedical Microdevices*, 2013;15(1):151-60. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news editors report that additional information may be obtained by contacting R.A. Croce, Electrical & Computer Engineering, University of Connecticut, Storrs, CT, 06269, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2013 Feb 06)

### **University of Nebraska, Omaha: Stroke survivors control the temporal structure of variability during reaching in dynamic environments**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Omaha, Nebraska, by NewsRx journalists, research stated, "Learning to control forces is known to reduce the amount of movement variability (e.g., standard deviation; SD) while also altering the temporal structure of movement variability (e.g., approximate entropy; ApEn). Such variability control has not been explored in stroke survivors during reaching movements in dynamic environments."

The news correspondents obtained a quote from the research from the University of Nebraska, "Whether augmented feedback affects such variability control, is also unknown. Chronic stroke survivors, assigned randomly to a control/experimental group, learned reaching movements in a dynamically changing environment while receiving either true feedback of their movement (control) or augmented visual feedback (experimental). Hand movement variability was analyzed using SD and ApEn. A significant change in variability was determined for both SD and ApEn. Post hoc tests revealed that the significant decrease in SD was not retained after a week. However, the significant increase in ApEn, determined on both days of training, showed significant retention effects. In dynamically changing environments, chronic stroke

survivors reduced the amount of movement variability and made their movement patterns less repeatable and possibly more flexible. These changes were not affected by augmented visual feedback. Moreover, the learning patterns characteristically involved the control of the nonlinear dynamics rather than the amount of hand movement variability.”

According to the news reporters, the research concluded: “The absence of transfer effects demonstrated that variability control of hand movement after a stroke is specific to the task and the environment.”

For more information on this research see: Stroke survivors control the temporal structure of variability during reaching in dynamic environments. *Annals of Biomedical Engineering*, 2013;41(2):366-76. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting M. Mukherjee, Nebraska Biomechanics Core Facility, University of Nebraska at Omaha, Omaha, NE, 68182-0216, United States. (2013 Feb 06)

### **University of Southern California, Los Angeles: A MEMS electrochemical bellows actuator for fluid metering applications**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Microdevices. According to news reporting from Los Angeles, California, by NewsRx journalists, research stated, “We present a high efficiency wireless MEMS electrochemical bellows actuator capable of rapid and repeatable delivery of boluses for fluid metering and drug delivery applications. Nafion®-coated Pt electrodes were combined with Parylene bellows filled with DI water to form the electrolysis-based actuator.”

The news correspondents obtained a quote from the research from the University of Southern California, “The performance of actuators with several bellows configurations was compared for a range of applied currents (1-10 mA). Up to 75 boluses were delivered with an average pumping flow rate of 114.40±1.63 L/min. Recombination of gases into water, an important factor in repeatable and reliable actuation, was studied for uncoated and Nafion®-coated actuators. Real-time pressure measurements were conducted and the effects of temperature, physiological back pressure, and drug viscosity on delivery performance were investigated.”

According to the news reporters, the research concluded: “Lastly, we present wireless powering of the actuator using a class D inductive powering system that allowed for repeatable delivery with less than 2 % variation in flow rate values.”

For more information on this research see: A MEMS electrochemical bellows actuator for fluid metering applications. *Biomedical Microdevices*, 2013;15(1):37-48. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting R. Sheybani, Dept. of Biomedical Engineering, Viterbi School of Engineering, University of Southern California, 1042 Downey Way, DRB-140, Los Angeles, CA, 90089-1111, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2013 Feb 06)

### **University of Toronto: In-vitro detection of artificial caries on vertical dental cavity walls using infrared photothermal radiometry and modulated luminescence**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Optics is the subject of a report. According to news reporting out of Toronto, Canada, by NewsRx editors, research stated, “The main objective of the study was to investigate the ability of frequency-domain photothermal radiometry (PTR) and modulated luminescence (LUM) to detect secondary caries lesions on the walls of restorations (wall lesions). Changes in experimental PTR-LUM signals due to sequential demineralization on entire vertical walls of sectioned tooth samples were investigated.”

Our news journalists obtained a quote from the research from the University of Toronto, “In addition, transverse micro-radiography (TMR) analysis (used as a gold standard) was conducted to measure the degree of demineralization that occurred in each sample. Statistical correlation between TMR results and PTR-LUM signals was determined using Pearson’s correlation coefficient. LUM signals were found to be dominated by the scattered component of the incident laser beam. The more clinically relevant cases of localized demineralization and remineralization on vertical walls were also investigated to examine whether PTR-LUM signals are sensitive to demineralization and remineralization of much smaller areas.”

According to the news editors, the research concluded: “The overall results demonstrated that PTR-LUM is sensitive to progressive demineralization and remineralization on vertical walls of sectioned tooth samples.”

For more information on this research see: In-vitro detection of artificial caries on vertical dental cavity walls using infrared photothermal

radiometry and modulated luminescence. *Journal of Biomedical Optics*, 2012;17(12):127001.

Our news journalists report that additional information may be obtained by contacting J. Kim, University of Toronto, Center for Advanced Diffusion-Wave Technologies, Dept. of Mechanical and Industrial Engineering, 5 King's College Road, Toronto, Ontario M5S 3G8, Canada. (2013 Feb 06)

### **University of Zaragoza: Understanding the passive mechanical behavior of the human abdominal wall**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Zaragoza, Spain, by NewsRx correspondents, research stated, “The aim of this work is to present a methodology to model the passive mechanical behavior of the human abdomen during physiological movements. From a mechanical point of view, it is possible to predict where hernia formation is likely to occur since the areas that support higher stresses can be identified as the most vulnerable ones.”

Our news editors obtained a quote from the research from the University of Zaragoza, “For this purpose, a realistic geometry of the human abdomen is obtained from magnetic resonance imaging. The model defines different anatomical structures of the abdomen, including muscles and aponeuroses, and anisotropic mechanical properties are assigned. The finite element model obtained from the geometric human model, which includes initial strains, is used to simulate the anisotropic passive behavior of the healthy human abdomen under intra-abdominal pressure. This study demonstrates that the stiffest structures, namely aponeuroses and particularly the linea alba, are the structures that perform the most work in the abdomen.”

According to the news editors, the research concluded: “Thus, the linea alba is the most important unit contributing to the mechanical stability of the abdominal wall.”

For more information on this research see: Understanding the passive mechanical behavior of the human abdominal wall. *Annals of Biomedical Engineering*, 2013;41(2):433-44. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting B. Hernandez-Gascon, Mechanical Engineering Department, Aragon Institute of Engineering Research (I3A), University of Zaragoza, Maria de Luna, 3, 50018, Zaragoza, Spain. (2013 Feb 06)

### **Washington University, St. Louis: Effects of light scattering on optical-resolution photoacoustic microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Optics. According to news reporting out of St. Louis, Missouri, by NewsRx editors, research stated, “The imaging depth of ballistic optical imaging technologies is limited by light scattering. To study the effects of scattering on optical-resolution photoacoustic microscopy (OR-PAM), the signals were divided into target and background signals.”

Our news journalists obtained a quote from the research from Washington University, “A method to simulate the point spread function (PSF) of the PAM system considering both optical illumination and acoustic detection was proposed, then the PSF was used to calculate the contribution of each class of signal at different depths of the focal plane ( $z_f$ ). How image contrast is degraded when there is a uniformly absorbing background as well as when there are small targets densely packed in the acoustic resolution cell were studied. By using the hyperboloid-focusing-based Monte Carlo method, optical focusing into a scattering medium was simulated. It was found that the lateral resolution provided by optical focusing is degraded by only 14% when  $z_f=1.1$  transport mean free path ( $l_t$ ), compared with the case of no scattering. When  $z_f=1.7 l_t$ , the fluence at 50 m radial distance away from the focal point is 93% of that at the focal point, which shows optical focusing is very weak at this depth.”

According to the news editors, the research concluded: “The method to simulate the PSF of PAM can be used in the future to optimize parameters so as to improve the system performance.”

For more information on this research see: Effects of light scattering on optical-resolution photoacoustic microscopy. *Journal of Biomedical Optics*, 2012;17(12):126014.

Our news journalists report that additional information may be obtained by contacting Y. Liu, Washington University in St Louis, Dept. of Biomedical Engineering, Optical Imaging Laboratory, One Brookings Drive, Saint Louis, Missouri 63130, United States. (2013 Feb 06)

### **Yonsei University, Seoul: An optimized hollow microneedle for minimally invasive blood extraction**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Microdevices have been presented. According to news originating from Seoul, South Korea, by NewsRx correspondents, research stated, “The healthcare system relies widely on biochemical information obtained from blood sample extracted via hypodermic needles, despite the invasiveness and pain associated with this procedure.



Therefore, an alternative micro-scale needle for minimally invasive blood sampling is highly desirable.”

Our news journalists obtained a quote from the research from Yonsei University, “Traditional fabrication techniques to create microneedles do not generate needles with the combined features of a sharp tip, long length, and hollow structure concurrently. Here, we report the fabrication of a microneedle long enough to reach blood vessels and sharp enough to minimize nerve contact for minimally invasive blood extraction. The microneedle structure was precisely controlled using a drawing lithography technique, and a sharp tip angle was introduced using a laser-cutting system. We investigated the characteristics of a microneedle with a length of 1,800  $\mu\text{m}$  length, an inner diameter of 60  $\mu\text{m}$ , a tip diameter of 120  $\mu\text{m}$ , and a 15° bevel angle through in-vitro liquid extraction and mechanical strength analysis. We demonstrated that the proposed structure results in blood extraction at a reasonable rate, and that a microneedle with this geometry can reliably penetrate skin without breaking. We integrated this microneedle into a blood extraction device to extract a 20  $\mu\text{l}$  volume of mouse blood in-vivo.”

According to the news editors, the research concluded: “Our optimized, hollow microneedle can potentially be incorporated with other cutting-edge technologies such as microactuators, biosensors, and microfluidic chips to create blood analysis systems for point-of-care diagnostics.”

For more information on this research see: An optimized hollow microneedle for minimally invasive blood extraction. *Biomedical Microdevices*, 2013;15(1):17-25. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news correspondents report that additional information may be obtained from C.G. Li, Dept. of Biotechnology, Yonsei University, 50 Yonsei-ro, Seodaemun-gu, Seoul, 120-749, South Korea.

The publisher’s contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2013 Feb 06)

### **Colorado School of Mines, Golden: High content evaluation of shear dependent platelet function in a microfluidic flow assay**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Golden, Colorado, by NewsRx journalists, research stated, “The high blood volume requirements and low throughput of conventional flow assays for measuring platelet function are unsuitable

for drug screening and clinical applications. In this study, we describe a microfluidic flow assay that uses 50 L of whole blood to measure platelet function on ~300 micropatterned spots of collagen over a range of physiologic shear rates (50-920 s(-1)).”

The news correspondents obtained a quote from the research from the Colorado School of Mines, “Patterning of collagen thin films (CTF) was achieved using a novel hydrated microcontact stamping method. CTF spots of 20, 50, and 100  $\mu\text{m}$  were defined on glass substrates and consisted of a dense mat of nanoscale collagen fibers (3.74  $\pm$  0.75 nm). We found that a spot size of greater than 20  $\mu\text{m}$  was necessary to support platelet adhesion under flow, suggesting a threshold injury size is necessary for stable platelet adhesion. Integrating 50  $\mu\text{m}$  CTF microspots into a multishear microfluidic device yielded a high content assay from which we extracted platelet accumulation metrics (lag time, growth rate, total accumulation) on the spots using Hoffman modulation contrast microscopy.”

According to the news reporters, the research concluded: “This method has potential broad application in identifying platelet function defects and screening, monitoring, and dosing antiplatelet agents.”

For more information on this research see: High content evaluation of shear dependent platelet function in a microfluidic flow assay. *Annals of Biomedical Engineering*, 2013;41(2):250-62. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting R.R. Hansen, Dept. of Chemical and Biological Engineering, Colorado School of Mines, Golden, CO, 80401, United States. (2013 Feb 05)

### **Cornell University, Ithaca: Culture of primary rat hippocampal neurons: design, analysis, and optimization of a microfluidic device for cell seeding, coherent growth, and solute delivery**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Biomedical Microdevices have been published. According to news originating from Ithaca, New York, by NewsRx correspondents, research stated, “We present the design, analysis, construction, and culture results of a microfluidic device for the segregation and chemical stimulation of primary rat hippocampal neurons. Our device is designed to achieve spatio-temporal solute delivery to discrete sections of neurons with mitigated mechanical stress.”

Our news journalists obtained a quote from the research from Cornell University, “We implement a geometric guidance technique to direct axonal processes of the neurons into specific areas of the device

to achieve solute segregation along routed cells. Using physicochemical modeling, we predict flows, concentration profiles, and mechanical stresses within pertinent sections of the device. We demonstrate cell viability and growth within the closed device over a period of 11 days.”

According to the news editors, the research concluded: “Additionally, our modeling methodology may be generalized and applied to other device geometries.”

For more information on this research see: Culture of primary rat hippocampal neurons: design, analysis, and optimization of a microfluidic device for cell seeding, coherent growth, and solute delivery. *Biomedical Microdevices*, 2013;15(1):97-108. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news correspondents report that additional information may be obtained from A.C. Barbati, Sibley School of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY, United States.

The publisher’s contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2013 Feb 05)

### **Department of Medical Instruments Technology, Athens: Optical diffusion performance of nanophosphor-based materials for use in medical imaging**

By a News Reporter-Staff News Editor at Telemedicine Week – Investigators publish new report on Biomedical Optics. According to news reporting from Athens, Greece, by NewsRx editors, the research stated, “Recent technologies, such as nanotechnology, provide new opportunities for next generation scintillation devices and instruments. New nanophosphor-based materials seem to be promising for further improvements in optical diffusion studies.”

The news correspondents obtained a quote from the research from the Department of Medical Instruments Technology, “In medical imaging, detector technology has found widespread use, offering improved signal capabilities. However, in spite of many spectacular innovations and the significant research in chemical synthesis on the detective material, improvement in signal quality is still an issue requiring further progress. Here, a sophisticated analysis is shown within the framework of Mie scattering theory and Monte Carlo simulation which demonstrates the optimum structural and optical properties of nanophosphors that are significantly promising in manufacture for further signal modulation improvement. A variety of structural and optical properties were examined: (1) phosphors of grain size (1 to 1000 nm), (2) packing density (50% to 99%), (3) light wavelength (400 to 700 nm), and (4)

refractive index of nanophosphor (real part: 1.4-2.0, imaginary part: 10(-6)). Results showed that for a specific thickness of nanophosphor layer, the compromise between spatial resolution and sensitivity can be achieved by optimizing the structural (200 nm=grain diameter=800 nm) and optical properties of the nanophosphor (1.7=refractive index=2.0)."

According to the news reporters, the research concluded: "Finally, high optical modulation was accomplished employing grains of high refractive index and size above 200 nm."

For more information on this research see: Optical diffusion performance of nanophosphor-based materials for use in medical imaging. *Journal of Biomedical Optics*, 2012;17(12):126013.

Our news journalists report that additional information may be obtained by contacting P.F. Liaparinos, Technological Educational Institute, Dept. of Medical Instruments Technology, 122 10 Athens, Greece. (2013 Feb 05)

### **Shenzhen Institutes of Advanced Technology, Guangdong: Multimodal optical microscopy in combination with gold nanorods for cancer cell imaging**

By a News Reporter-Staff News Editor at Cancer Weekly – Current study results on Biomedical Optics have been published. According to news reporting out of Guangdong, People's Republic of China, by NewsRx editors, research stated, "The multimodal optical imaging technique, which utilizes nonlinear and linear optical processes, plays an important role in biological and biomedical research. As second-order nonlinear phenomenon, the two-photon luminescence (TPL) results from the nonlinear excitation of fluorescent molecules, while the second harmonic generation (SHG) depends on the second order nonlinear polarization, orientation, and noncentrosymmetric properties of molecules."

Our news journalists obtained a quote from the research from the Shenzhen Institutes of Advanced Technology, "In contrast, the linear resonance light scattering (RLS) occurs when the molecules are excited by a light beam with a wavelength close to their absorption bands. Since SHG, TPL, and RLS involve different kinds of optical processes, they might be used in parallel to provide complementary information about the structure and function of cells and tissues. Herein, we develop for the first time a multimodal optical microscopy with the capability of simultaneous SHG, TPL, and RLS imaging. We analyze theoretically and demonstrate experimentally the near-infrared irradiation-induced SHG, TPL, and RLS from the gold nanorods with nanometer spatial resolution. With the gold nanorods as the contrast agents, we further demonstrate the simultaneous SHG, TPL, and RLS imaging of A431 human epithelial skin cancer cells."

According to the news editors, the research concluded: “This multimodal optical microscopy might provide a reliable and complementary approach for biological and biomedical research.”

For more information on this research see: Multimodal optical microscopy in combination with gold nanorods for cancer cell imaging. *Journal of Biomedical Optics*, 2012;17(12):126002.

Our news journalists report that additional information may be obtained by contacting C.J. Cao, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Single-Molecule Detection and Imaging Laboratory, Guangdong 518055, People’s Taiwan. (2013 Feb 05)

### **Tulane University, New Orleans: Structural and molecular micropatterning of dual hydrogel constructs for neural growth models using photochemical strategies**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Microdevices are presented in a new report. According to news reporting out of New Orleans, Louisiana, by NewsRx editors, research stated, “Chemotactic and haptotactic cues guide neurite growth toward appropriate targets by eliciting attractive or repulsive responses from the neurite growth cones. Here we present an integrated system allowing both structural and molecular micropatterning in dual hydrogel 3D tissue culture constructs for directing in vitro neuronal growth via structural, immobilized, and soluble guidance cues.”

Our news journalists obtained a quote from the research from Tulane University, “These tissue culture constructs were fabricated into specifiable geometries using UV light reflected from a digital micromirror device acting as a dynamic photomask, resulting in dual hydrogel constructs consisting of a cell growth-restrictive polyethylene glycol (PEG) boundary with a cell growth-permissive interior of photolabile  $\alpha$ -carboxy-2-nitrobenzyl cysteine agarose (CNBC-A). This CNBC-A was irradiated in discrete areas and subsequently tagged with maleimide-conjugated biomolecules. Fluorescent microscopy showed biomolecule binding only at the sites of irradiation in CNBC-A, and confocal microscopy confirmed 3D binding through the depth of the construct. Neurite outgrowth studies showed contained growth throughout CNBC-A. The diffusion rate of soluble fluorescein-bovine serum albumin through the dual hydrogel construct was controlled by PEG concentration and the distance between the protein source and the agarose interior; the timescale for a transient protein gradient changed with these parameters.”

According to the news editors, the research concluded: “These findings suggest the dual hydrogel system is a useful platform for manipulating a 3D in vitro microenvironment with patterned structural and molecular guidance cues for modeling neural growth and guidance.”

For more information on this research see: Structural and molecular micropatterning of dual hydrogel constructs for neural growth models using photochemical strategies. *Biomedical Microdevices*, 2013;15(1):49-61. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting E.L. Horn-Ranney, Dept. of Biomedical Engineering, Tulane University, New Orleans, LA, 70118, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2013 Feb 05)

### **University of California, Riverside: An overview of three promising mechanical, optical, and biochemical engineering approaches to improve selective photothermolysis of refractory port wine stains**

By a News Reporter-Staff News Editor at Life Science Weekly – New research on Biochemistry is the subject of a report. According to news reporting originating from Riverside, California, by NewsRx correspondents, research stated, “During the last three decades, several laser systems, ancillary technologies, and treatment modalities have been developed for the treatment of port wine stains (PWSs). However, approximately half of the PWS patient population responds suboptimally to laser treatment.”

Our news editors obtained a quote from the research from the University of California, “Consequently, novel treatment modalities and therapeutic techniques/strategies are required to improve PWS treatment efficacy. This overview therefore focuses on three distinct experimental approaches for the optimization of PWS laser treatment.”

According to the news editors, the research concluded: “The approaches are addressed from the perspective of mechanical engineering (the use of local hypobaric pressure to induce vasodilation in the laser-irradiated dermal microcirculation), optical engineering (laser-speckle imaging of post-treatment flow in laser-treated PWS skin), and biochemical engineering (light-and heat-activatable liposomal drug delivery systems to enhance the extent of post-irradiation vascular occlusion).”

For more information on this research see: An overview of three promising mechanical, optical, and biochemical engineering approaches to improve selective photothermolysis of refractory port wine stains. *Annals of Biomedical Engineering*, 2012;40(2):486-506. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting G. Aguilar, Dept. of Mechanical Engineering, University of California, Riverside, CA, United States. (2013 Feb 05)

### **Washington University, St. Louis: Photoacoustic microscopy of bilirubin in tissue phantoms**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Optics are presented in a new report. According to news reporting originating from St. Louis, Missouri, by NewsRx correspondents, research stated, “Determining both bilirubin’s concentration and its spatial distribution are important in disease diagnosis. Here, for the first time, we applied quantitative multiwavelength photoacoustic microscopy (PAM) to detect bilirubin concentration and distribution simultaneously.”

Our news editors obtained a quote from the research from Washington University, “By measuring tissue-mimicking phantoms with different bilirubin concentrations, we showed that the root-mean-square error of prediction has reached 0.52 and 0.83 mg/dL for pure bilirubin and for blood-mixed bilirubin detection (with 100% oxygen saturation), respectively. We further demonstrated the capability of the PAM system to image bilirubin distribution both with and without blood. Finally, by underlaying bilirubin phantoms with mouse skins, we showed that bilirubin can be imaged with consistent accuracy down to &400 m in depth.”

According to the news editors, the research concluded: “Our results show that PAM has potential for noninvasive bilirubin monitoring in vivo, as well as for further clinical applications.”

For more information on this research see: Photoacoustic microscopy of bilirubin in tissue phantoms. *Journal of Biomedical Optics*, 2012;17(12):126019.

The news editors report that additional information may be obtained by contacting Y. Zhou, Washington University in St Louis, Dept. of Biomedical Engineering, Optical Imaging Laboratory, One Brookings Drive, St Louis, Missouri 63130, United States. (2013 Feb 05)

## **Johns Hopkins University, Baltimore: Longitudinal in vivo monitoring of rodent glioma models through thinned skull using laser speckle contrast imaging**

By a News Reporter-Staff News Editor at Clinical Oncology Week – Investigators publish new report on Biomedical Optics. According to news reporting from Baltimore, Maryland, by NewsRx journalists, research stated, “Laser speckle contrast imaging (LSCI) is a contrast agent free imaging technique suited for longitudinal assessment of vascular remodeling that accompanies brain tumor growth. We report the use of LSCI to monitor vascular changes in a rodent glioma model.”

The news correspondents obtained a quote from the research from Johns Hopkins University, “Ten rats are inoculated with 9L gliosarcoma cells, and the angiogenic response is monitored five times over two weeks through a thinned skull imaging window. We are able to visualize neovascularization and measure the number of vessels per unit area to assess quantitatively the microvessel density (MVD). Spatial spread of MVD reveals regions of high MVD that may correspond to tumor location. Whole-field average MVD values increase with time in the tumor group but are fairly stable in the control groups. Statistical analysis shows significant differences in MVD values between the tumor group and both saline-receiving and unperturbed control groups over the two-week period ( $p < 0.05$ ).”

According to the news reporters, the research concluded: “LSCI is suitable for investigation of tumor angiogenesis in rodent models. In addition, the statistical difference ( $p < 0.02$ ) between MVD values of the tumor ( $24.40 \pm 1.41$ ) and control groups ( $15.40 \pm 1.60$ ) on the 14th day after inoculation suggests a potential use of LSCI in the clinic in distinguishing tumor environments from normal vasculature.”

For more information on this research see: Longitudinal in vivo monitoring of rodent glioma models through thinned skull using laser speckle contrast imaging. *Journal of Biomedical Optics*, 2012;17(12):126017.

Our news journalists report that additional information may be obtained by contacting A. Rege, Johns Hopkins University, Dept. of Biomedical Engineering, Baltimore, Maryland, United States. (2013 Feb 04)



## **Stanford University: Sacrificial layer technique for axial force post assay of immature cardiomyocytes**

By a News Reporter-Staff News Editor at Cardiovascular Week – Researchers detail new data in Biomedical Microdevices. According to news reporting originating in Stanford, California, by NewsRx journalists, research stated, “Immature primary and stem cell-derived cardiomyocytes provide useful models for fundamental studies of heart development and cardiac disease, and offer potential for patient specific drug testing and differentiation protocols aimed at cardiac grafts. To assess their potential for augmenting heart function, and to gain insight into cardiac growth and disease, tissue engineers must quantify the contractile forces of these single cells.”

The news reporters obtained a quote from the research from Stanford University, “Currently, axial contractile forces of isolated adult heart cells can only be measured by two-point methods such as carbon fiber techniques, which cannot be applied to neonatal and stem cell-derived heart cells because they are more difficult to handle and lack a persistent shape. Here we present a novel axial technique for measuring the contractile forces of isolated immature cardiomyocytes. We overcome cell manipulation and patterning challenges by using a thermoresponsive sacrificial support layer in conjunction with arrays of widely separated elastomeric microposts. Our approach has the potential to be high-throughput, is functionally analogous to current gold-standard axial force assays for adult heart cells, and prescribes elongated cell shapes without protein patterning. Finally, we calibrate these force posts with piezoresistive cantilevers to dramatically reduce measurement error typical for soft polymer-based force assays. We report quantitative measurements of peak contractile forces up to 146 nN with post stiffness standard error (26 nN) far better than that based on geometry and stiffness estimates alone.”

According to the news reporters, the research concluded: “The addition of sacrificial layers to future 2D and 3D cell culture platforms will enable improved cell placement and the complex suspension of cells across 3D constructs.”

For more information on this research see: Sacrificial layer technique for axial force post assay of immature cardiomyocytes. *Biomedical Microdevices*, 2013;15(1):171-81. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news correspondents report that additional information may be obtained by contacting R.E. Taylor, Dept. of Mechanical Engineering and Stanford Cardiovascular Institute, Stanford University, Stanford, CA, 94305, United States.

The publisher of the journal *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (2013 Feb 04)

### **University of Manchester: High-precision calibration of MRS thermometry using validated temperature standards: effects of ionic strength and protein content on the calibration**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators publish new report on Biomedicine. According to news reporting originating from Manchester, United Kingdom, by NewsRx correspondents, research stated, “Currently, there is very limited ability to measure the temperature of the brain, but a direct technique for its estimation in vivo could improve the detection of patients at risk of temperature-related brain damage, help in the diagnosis of stroke and tumour, and provide useful information on the mechanisms of thermoregulation of the brain. In this article, new calibrations in vitro of MRS thermometry using temperature-stabilised reference phantoms are reported.”

Our news editors obtained a quote from the research from the University of Manchester, “The phantoms comprise two concentric glass spheres: the inner sphere contains the phantom material to be measured by MRS, and the outer sphere contains a substance with a known temperature stable to within 0.2 °C. The substances were freezing organic fixed-point compounds (diphenyl ether and ethylene carbonate, freezing at 26.3 and 35.8 °C, respectively) or temperature-controlled circulating water. The phantom temperature was continuously monitored with a fluoroptic probe calibrated at the National Physical Laboratory with traceability to the International Temperature Scale 1990 (ITS-90). The MRS temperature calibration was obtained by measuring the chemical shift of water relative to N-acetylaspartate (NAA) in a single voxel as a function of temperature using a 1.5-T Philips Intera scanner. Measurements were made for several phantom materials to assess the effect of tissue composition on the water-NAA chemical shift against temperature calibration. The phantom mixtures contained 25 mm of NAA buffered to pH 6.5 or 7.5 and several ionic salts or bovine serum albumin (BSA). Spectra were acquired from 25 to 45 °C. The correlation between frequency differences and phantom temperature was very linear with small residuals. However, the linear fitting parameters varied with ionic composition and BSA concentration.”

According to the news editors, the research concluded: “The ‘apparent’ temperature (calibrated using the water-NAA frequency differences) decreased by approximately 1 °C for every 100 mm increase in ionic concentration and increased proportionally to the concentration of BSA.”

For more information on this research see: High-precision calibration of MRS thermometry using validated temperature standards: effects of ionic strength and protein content on the calibration. *Nmr In Biomedicine*, 2013;26(2):213-23. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

The news editors report that additional information may be obtained by contacting E. Vescovo, Imaging, Proteomics and Genomics Research Group, Manchester Academic Health Sciences Centre, University of Manchester, Manchester, UK. (2013 Feb 04)

### **Ecole Nationale Supérieure des Mines, St. Etienne: A numerical parametric study of the mechanical action of pulsatile blood flow onto axisymmetric stenosed arteries**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Medical Engineering and Physics. According to news reporting originating from St. Etienne, France, by NewsRx correspondents, research stated, “In the present paper, a fluid-structure interaction model is developed, questioning how the mechanical action of the blood onto an atheromatous plaque is affected by the length and the severity of the stenosis. An axisymmetric model is considered.”

Our news editors obtained a quote from the research from Ecole Nationale Supérieure des Mines, “The fluid is assumed Newtonian. The plaque is modelled as a heterogeneous hyperelastic anisotropic solid composed of the arterial wall, the lipid core and the fibrous cap. Transient velocity and pressure conditions of actual pulsatile blood flow are prescribed. The simulation is achieved using the Arbitrary Lagrangian Eulerian scheme in the COMSOL commercial Finite Element package. The results reveal different types of behavior in function of the length (denoted  $L$ ) and severity (denoted  $S$ ) of the stenosis. Whereas large plaques ( $L \geq 10$  mm) are mostly deformed under the action of the blood pressure, it appears that shorter plaques ( $L < 10$  mm) are significantly affected by the shear stresses. The shear stresses tend to deform the plaque by pinching it. This effect is called: ‘the pinching effect’. It has an essential influence on the mechanical response of the plaque. For two plaques having the same radius severity  $S=45\%$ , the maximum stress in the fibrous cap is 50% larger for the short plaque

( $L=5$  mm) than for a larger plaque ( $L=10$  mm), and the maximum wall shear stress is increased by 100%.”

According to the news editors, the research concluded: “Provided that they are confirmed by experimental investigations, these results may offer some new perspectives for understanding the vulnerability of short plaques.”

For more information on this research see: A numerical parametric study of the mechanical action of pulsatile blood flow onto axisymmetric stenosed arteries. *Medical Engineering & Physics*, 2012;34(10):1483-95. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting T. Belzacq, Ecole Nationale Supérieure des Mines, Centre Ingénierie et Santé, CNRS UMR 5146, Saint-Etienne, France. (2013 Feb 01)

### **Orthopedic Biomechanics Laboratory, Rochester: The effect of tendon surface treatment on cell attachment for potential enhancement of tendon graft healing: an ex vivo model**

By a News Reporter-Staff News Editor at Health & Medicine Week – Fresh data on Medical Engineering and Physics are presented in a new report. According to news reporting originating from Rochester, Minnesota, by NewsRx correspondents, research stated, “For both tendon allografts and autografts, the surface, initially optimized for gliding, may not be ideal to facilitate tissue integration for graft healing to host tendon or bone. As a prelude to studying tendon-bone integration, we investigated the effect of surface treatments with trypsin or mechanical abrasion on cell attachment to the tendon surface in a canine ex vivo intrasynovial tendon tissue culture model.”

Our news editors obtained a quote from the research from Orthopedic Biomechanics Laboratory, “Intrasynovial tendon allograft surfaces were seeded with cells after the following treatments: (1) no treatment, (2) mechanical abrasion, (3) trypsin, and (4) abrasion and trypsin. The area covered by cells was determined using confocal laser microscopy at one and two weeks. Results were compared to untreated extrasynovial tendon. Additional tendons were characterized with scanning electron microscopy. Tendons with trypsin treatment had significantly more surface coverage with cells than the other groups, after both one and two weeks of culture. In terms of the cellular shape and size, cells on tendons with trypsin treatment spread more and were more polygonal in shape, whereas tendons with mechanical abrasion with/without

trypsin treatment contained smaller, more spindle-like cells. Surface roughening can affect cell behavior with topographical stimulation.”

According to the news editors, the research concluded: “Trypsin surface digestion exposes a mesh-like structure on the tendon surface, which could enhance cell adherence and, possibly, tendon/bone healing.”

For more information on this research see: The effect of tendon surface treatment on cell attachment for potential enhancement of tendon graft healing: an ex vivo model. *Medical Engineering & Physics*, 2012;34(10):1387-93. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting T. Hashimoto, Orthopedic Biomechanics Laboratory, Division of Orthopedic Research, Mayo Clinic, Rochester, MN 55905, United States. (2013 Feb 01)

### **Pennsylvania State University, University Park: A Thrombus Susceptibility Comparison of Two Pulsatile Penn State 50 cc Left Ventricular Assist Device Designs**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Biomedical Engineering. According to news reporting from University Park, Pennsylvania, by NewsRx journalists, research stated, “Left ventricular assist devices (LVADs) have proven successful as bridge to transplant devices for patients awaiting donor organs. While survival rates continue to increase, destination therapy remains hindered by thrombus formation within the device.”

The news correspondents obtained a quote from the research from Pennsylvania State University, “Research has shown that thrombosis is correlated to the fluid dynamics within the device and may be a result of sustained shear rates below 500 s(-1) on the polyurethane blood sac used in the Penn State pulsatile LVAD. Particle image velocimetry is used to compare flow within two 50 cc LVAD designs to assess fluid patterns and quantify wall shear rates in regions known from in vivo studies to be susceptible to thrombus formation. The two designs differ in their front face geometry. The V-1 model has an outward-facing ‘dome’ whereas the face of the V-2 model is flat. A thrombus susceptibility metric, which uses measured wall shear rates and exposure times, was applied to objectively compare pump designs over the entire cardiac cycle. For each design, there are regions where wall shear rates remained below 500 s(-1) for the entire cardiac cycle resulting in high thrombus susceptibility potential.”

According to the news reporters, the research concluded: “Results of this study indicate that the V-2 device had an overall lower propensity for thrombus formation in the current region of interest.”

For more information on this research see: A Thrombus Susceptibility Comparison of Two Pulsatile Penn State 50 cc Left Ventricular Assist Device Designs. *Annals of Biomedical Engineering*, 2013;41(1):4-16. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting M.A. Navitsky, Pennsylvania State University, Dept. of Bioengn, University Park, PA 16802, United States. (2013 Feb 01)

### **Baylor University College of Medicine, Houston: Hemodynamics of small aneurysm pairs at the internal carotid artery**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news originating from Houston, Texas, by NewsRx correspondents, research stated, “Cerebral aneurysms carry significant risks because rupture-related subarachnoid hemorrhage leads to serious and often fatal consequences. The rupture risk increases considerably for multiple aneurysms.”

Our news journalists obtained a quote from the research from the Baylor University College of Medicine, “Multiple aneurysms can grow from the same location of an artery, and the interaction between these aneurysms raises the rupture risk even higher. Four aneurysm pair cases at the internal carotid artery are investigated for their hemodynamic behaviors using patient-specific modeling. For each case, aneurysms are separated from the parent artery and three models are reconstructed, one with two aneurysms and the other two models with only one of the two aneurysms. Results show that the relative anatomic location of one aneurysm to the other may determine the hemodynamic environment of an aneurysm. The presence of a proximal aneurysm reduces the intra-aneurysmal flow into the distal aneurysm; the proximal aneurysm and larger aneurysm have a greater area under low wall shear stress. The average intra-aneurysmal inflow ratio ranges from 16% to 41%, and reduction of the inflow ratio by an aneurysm pair varies from 6% to 15%. The maximum wall shear stress increases for serial aneurysms, but decreases for parallel aneurysms.”

According to the news editors, the research concluded: “Interaction between parallel aneurysms is not significant; however, the proximal aneurysm in serial aneurysms may be subject to a greater rupture risk.”

For more information on this research see: Hemodynamics of small aneurysm pairs at the internal carotid artery. *Medical Engineering & Physics*, 2012;34(10):1454-1461. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from L.D. Jou, Baylor College of Medicine, Dept. of Radiol, Houston, TX 77030, United States. (2013 Jan 30)

### **Department of Orthopedic Surgery, Paris: Robust femur condyle disambiguation on biplanar X-rays**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting out of Paris, France, by NewsRx editors, research stated, “Three-dimensional (3D) reconstruction of the skeleton from biplanar X-rays relies on scarce information digitalised by an operator on both frontal and lateral radiographs. In clinical routine, difficulties occur for non-skilled operators to discriminate the medial from the lateral femur condyle on the lateral view.”

Our news journalists obtained a quote from the research from the Department of Orthopedic Surgery, “Our study proposes an algorithm able to detect automatically a possible inversion of the two condyles by the operator at an early stage of the reconstruction process. It relies on the computation of two 3D femur surfaces, one directly from the operator digitalisation and the other from the same digitalisation with medial and lateral condyles automatically swapped. Pairs of virtual biplanar X-rays are computed for both reconstructions and the closest pair to the original X-rays is selected on the basis of similarity measures, pointing the correct 3D surface. The algorithm shows a success rate higher than 85% for both asymptomatic and pathological femurs whatever the initial condyle digitalisation of the operator, bringing automatically non-skilled operators acting in clinical routine to the level of skilled operators.”

According to the news editors, the research concluded: “This study validates moreover the proof-of-concept of automatic shape adjustments of a 3D surface on the basis of similarity measures in the process of 3D reconstruction from biplanar X-rays.”

For more information on this research see: Robust femur condyle disambiguation on biplanar X-rays. *Medical Engineering & Physics*,

2012;34(10):1433-1440. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting A. Serrurier, Hopital Lariboisiere, AP HP, Dept. of Orthopaed Surg, F-75010 Paris, France. (2013 Jan 30)

### **Development and validation of LC-MS/MS method for the estimation of 223;-hydroxy-223;-methylbutyrate in rat plasma and its application to pharmacokinetic studies**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Chromatography are discussed in a new report. According to news reporting out of Bangalore, India, by NewsRx editors, research stated, “A simple, sensitive and specific high-performance liquid chromatography mass spectrometry (LC-MS/MS) method was developed and validated for the quantification of 223;-hydroxy-223;-methyl butyrate (HMB) in small volumes of rat plasma using warfarin as an internal standard (IS). The API-4000 LC-MS/MS was operated under the multiple reaction-monitoring mode using the electrospray ionization technique.”

Our news journalists obtained a quote from the research, “A simple liquid-liquid extraction process was used to extract HMB and IS from rat plasma. The total run time was 3 min and the elution of HMB and IS occurred at 1.48 and 1.75 min respectively; this was achieved with a mobile phase consisting of 0.1% formic acid in a water-acetonitrile mixture (15:85, v/v) at a flow rate of 1.0 mL/min on a Agilent Eclipse XDB C(8) (150 x 4.6, 5 m) column. The developed method was validated in rat plasma with a lower limit of quantitation of 30.0 ng/mL for HMB. A linear response function was established for the range of concentrations 30-4600 ng/mL ( $r^2 > 0.998$ ) for HMB. The intra-and inter-day precision values for HMB were acceptable as per Food and Drug Administration guidelines. HMB was stable in the battery of stability studies, viz. bench-top, autosampler freeze-thaw cycles and long-term stability for 30 days in plasma.”

According to the news editors, the research concluded: “The developed assay method was applied to a bioavailability study in rats.”

For more information on this research see: Development and validation of LC-MS/MS method for the estimation of 223;-hydroxy-223;-methylbutyrate in rat plasma and its application to pharmacokinetic studies. *Biomedical Chromatography*, 2013;27(2):142-7. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography



- <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-0801)

Our news journalists report that additional information may be obtained by contacting P. Deshpande, Syngene International Limited Biocon Park, Jigani Link Road, Bangalore, 560099, India. (2013 Jan 30)

### **Duke University, Durham: The Effects of a Valgus Collapse Knee Position on In Vivo ACL Elongation**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news originating from Durham, North Carolina, by NewsRx correspondents, research stated, “There are conflicting data regarding what motions increase ACL injury risk. More specifically, the mechanical role of valgus collapse positions during ACL injury remains controversial.”

Our news journalists obtained a quote from the research from Duke University, “Our objective was to evaluate ACL elongation in a model that mimics knee movements thought to occur during ACL injury. Eight healthy male subjects were imaged using MR and biplanar fluoroscopy to measure the in vivo elongation of the ACL and its functional bundles during three static knee positions: full extension, 30A degrees of flexion, and a position intended to mimic a valgus collapse position described in the literature. For this study, the valgus collapse position consisted of 30A degrees of knee flexion, internal rotation of the hip, and 10A degrees of external tibial rotation. ACL length decreased significantly from full extension (30.2 +/- A 2.6 mm) to 30A degrees of flexion (27.1 +/- A 2.2 mm). ACL length further decreased in the valgus collapse position (25.6 +/- A 2.4 mm). Both functional bundles of the ACL followed similar trends with regards to decreases in length in each of the three positions. Since strain would follow patterns of ACL length, landing on an extended knee may be a more relevant risk factor for ACL injuries than the valgus collapse position in males.”

According to the news editors, the research concluded: “Future studies should evaluate the effects of dynamic motion patterns on in vivo ACL strains.”

For more information on this research see: The Effects of a Valgus Collapse Knee Position on In Vivo ACL Elongation. *Annals of Biomedical Engineering*, 2013;41(1):123-130. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from G.M. Utturkar, Duke University, Dept. of Biomed Engrn, Durham, NC 27710, United States. (2013 Jan 30)

## **Ghent University, Zwijnaarde: Development of a sensitive GC-C-IRMS method for the analysis of androgens**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Chromatography is now available. According to news reporting originating from Zwijnaarde, Belgium, by NewsRx correspondents, research stated, “The administration of anabolic steroids is one of the most important issues in doping control and is detectable through a change in the carbon isotopic composition of testosterone and/or its metabolites. Gas chromatography-combustion-isotope ratio mass spectrometry (GC-C-IRMS), however, remains a very laborious and expensive technique and substantial amounts of urine are needed to meet the sensitivity requirements of the IRMS.”

Our news editors obtained a quote from the research from Ghent University, “This can be problematic because only a limited amount of urine is available for anti-doping analysis on a broad spectrum of substances. In this work we introduce a new type of injection that increases the sensitivity of GC-C-IRMS by a factor of 13 and reduces the limit of detection, simply by using solvent vent injections instead of splitless injection. This drastically reduces the amount of urine required.”

According to the news editors, the research concluded: “On top of that, by only changing the injection technique, the detection parameters of the IRMS are not affected and there is no loss in linearity.”

For more information on this research see: Development of a sensitive GC-C-IRMS method for the analysis of androgens. *Biomedical Chromatography*, 2013;27(2):259-66. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-0801)

The news editors report that additional information may be obtained by contacting M. Polet, Doping Control Laboratory, Ghent University, Technologiepark 30, Zwijnaarde, Belgium. (2013 Jan 30)

## **Kwangwoon University, Seoul: Pulse Inversion Chirp Coded Tissue Harmonic Imaging (PI-CTHI) of Zebrafish Heart Using High Frame Rate Ultrasound Biomicroscopy**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Seoul, South Korea, by NewsRx journalists, research stated, “This paper reports a pulse inversion chirp coded tissue harmonic imaging (PI-CTHI) method for visualizing small animal hearts that provides fine spatial resolution at a high frame rate without sacrificing the echo signal to noise ratio (eSNR). A 40 MHz lithium niobate (LiNbO<sub>3</sub>) single element transducer is employed to evaluate the

performance of PI-CTHI by scanning tungsten wire targets, spherical anechoic voids, and zebrafish hearts.”

The news reporters obtained a quote from the research from Kwangwoon University, “The wire phantom results show that PI-CTHI improves the eSNR by 4 dB from that of conventional pulse inversion tissue harmonic imaging (PI-THI), while still maintaining a spatial resolution of 88 and 110  $\mu\text{m}$  in the axial and lateral directions, respectively. The range side lobe level of PI-CTHI is 11 dB lower than that of band-pass filtered CTHI (or F-CTHI). In the anechoic sphere phantom study, the contrast-to-noise ratio of PI-CTHI is found to be 2.7, indicating a 34% enhancement over conventional PI-THI. Due to such improved eSNR and contrast resolution, blood clots in zebrafish hearts can be readily visualized throughout heart regeneration after 20% of the ventricle is removed.”

According to the news reporters, the research concluded: “Disappearance of the clots in the early stages of the regeneration has been observed for 7 days without sacrificing the fish.”

For more information on this research see: Pulse Inversion Chirp Coded Tissue Harmonic Imaging (PI-CTHI) of Zebrafish Heart Using High Frame Rate Ultrasound Biomicroscopy. *Annals of Biomedical Engineering*, 2013;41(1):41-52. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting J. Park, Kwangwoon Univ, Dept. of Elect Engn, Seoul, South Korea. (2013 Jan 30)

### **Leiden University: The quality of bone surfaces may govern the use of model based fluoroscopy in the determination of joint laxity**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating from Leiden, Netherlands, by NewsRx correspondents, research stated, “The assessment of knee joint laxity is clinically important but its quantification remains elusive. Calibrated, low dosage fluoroscopy, combined with registered surfaces and controlled external loading may offer possible solutions for quantifying relative tibiofemoral motion without soft tissue artefact, even in native joints.”

Our news editors obtained a quote from the research from Leiden University, “The aim of this study was to determine the accuracy of registration using CT and MRI derived 3D bone models, as well as metallic implants, to 2D single-plane fluoroscopic datasets, to assess their suitability for examining knee joint laxity. Four cadaveric knees and one

knee implant were positioned using a micromanipulator. After fluoroscopy, the accuracy of registering each surface to the 2D fluoroscopic images was determined by comparison against known translations from the micromanipulator measurements. Dynamic measurements were also performed to assess the relative tibio-femoral error. For CT and MRI derived 3D femur and tibia models during static testing, the in-plane error was 0.4 mm and 0.9 mm, and out-of-plane error 2.6 mm and 9.3 mm respectively. For metallic implants, the in-plane error was 0.2 mm and out-of-plane error 1.5 mm. The relative tibio-femoral error during dynamic measurements was 0.9 mm, 1.2 mm and 0.7 mm in-plane, and 3.9 mm, 10.4 mm and 2.5 mm out-of-plane for CT and MRI based models and metallic implants respectively. The rotational errors ranged from 0.5 degrees to 1.9 degrees for CT, 0.5-4.3 degrees for MRI and 0.1-0.8 degrees for metallic implants. The results of this study indicate that single-plane fluoroscopic analysis can provide accurate information in the investigation of knee joint laxity, but should be limited to static or quasi-static evaluations when assessing native bones, where possible.”

According to the news editors, the research concluded: “With this knowledge of registration accuracy, targeted approaches for the determination of tibio-femoral laxity could now determine objective in vivo measures for the identification of ligament reconstruction candidates as well as improve our understanding of the consequences of knee joint instability in TKA.”

For more information on this research see: The quality of bone surfaces may govern the use of model based fluoroscopy in the determination of joint laxity. *Medical Engineering & Physics*, 2012;34(10):1427-1432. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting P. Moewis, Leiden University, Medical Center, NL-2300 RC Leiden, Netherlands. (2013 Jan 30)

### **National Cheng Kung University, Tainan: Mechanical models of the cellular cytoskeletal network for the analysis of intracellular mechanical properties and force distributions: A review**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to

news reporting originating from Tainan, Taiwan, by NewsRx correspondents, research stated, “The cytoskeleton, which is the major mechanical component of cells, supports the cell body and regulates the cellular motility to assist the cell in performing its biological functions. Several cytoskeletal network models have been proposed to investigate the mechanical properties of cells.”

Our news editors obtained a quote from the research from National Cheng Kung University, “This review paper summarizes these models with a focus on the prestressed cable network, the semi-flexible chain network, the open-cell foam, the tensegrity, and the granular models. The components, material parameters, types of connection joints, tension conditions, and the advantages and disadvantages of each model are evaluated from a structural and biological point of view. The underlying mechanisms that are associated with the morphological changes of spreading cells are expected to be simulated using a cytoskeletal model; however, it is still paid less attention most likely due to the lack of a suitable cytoskeletal model that can accurately model the spreading process.”

According to the news editors, the research concluded: “In this review article, the established cytoskeletal models are hoped to provide useful information for the development of future cytoskeletal models with different degrees of cell attachment for the study of the mechanical mechanisms underlying the cellular behaviors in response to external stimulations.”

For more information on this research see: Mechanical models of the cellular cytoskeletal network for the analysis of intracellular mechanical properties and force distributions: A review. *Medical Engineering & Physics*, 2012;34(10):1375-1386. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - <http://www.elsevier.com/locate/medengphys>)

The news editors report that additional information may be obtained by contacting T.J. Chen, National Cheng Kung University, Medical Device Innovat Center, Tainan 701, Taiwan. (2013 Jan 30)

### **School of Engineering, Lausanne: Two-photon microscopy of the mouse cochlea in situ for cellular diagnosis**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting out of Lausanne, Switzerland, by NewsRx editors, research stated, “Sensorineural hearing loss is the most common type of hearing loss worldwide, yet the underlying cause is typically unknown because the

inner ear cannot be biopsied today without destroying hearing, and intracochlear cells have not been imaged with resolution sufficient to establish diagnosis. Intracochlear imaging has been technologically challenging because of the cochlea's small size and encasement in bone."

Our news journalists obtained a quote from the research from the School of Engineering, "We report, for the first time, imaging of the mouse cochlea in situ without exogenous dyes, through a membranous round window, using a near-infrared femtosecond laser as the excitation and endogenous two-photon excitation fluorescence (TPEF) and second harmonic generation as the contrast mechanisms. We find that TPEF exhibits strong contrast allowing cellular, and even subcellular resolution, and detection of specific, noise-induced pathologic changes."

According to the news editors, the research concluded: "Our results demonstrate that the round window provides a useful access to the cochlea through the middle ear, and they motivate future development of a new and efficient diagnostic tool based on two-photon microendoscopy."

For more information on this research see: Two-photon microscopy of the mouse cochlea in situ for cellular diagnosis. *Journal of Biomedical Optics*, 2013;18(3):31104.

Our news journalists report that additional information may be obtained by contacting X. Yang, Ecole Polytechnique Federale de Lausanne, School of Engineering, Optics Laboratory, BM 4107, Station 17, CH-1015 Lausanne, Switzerland. (2013 Jan 30)

### **Shenyang Pharmaceutical University: Ultra-performance liquid chromatography-tandem mass spectrometry method for the determination of febuxostat in dog plasma and its application to a pharmacokinetic study**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Chromatography have been presented. According to news reporting out of Shenyang, People's Republic of China, by NewsRx editors, research stated, "A rapid, sensitive and selective ultra-performance liquid chromatography-tandem mass spectrometry (UPLC-MS/MS) method was developed and validated for the determination of febuxostat in dog plasma. Using paclitaxel as an internal standard (IS), a simple liquid-liquid extraction method with ethyl acetate was adopted for plasma sample pretreatment."

Our news journalists obtained a quote from the research from Shenyang Pharmaceutical University, "Separation was carried out on an Acquity UPLC BEH C(18) column with a mobile phase consisting of acetonitrile and water (containing 0.2% formic acid). The assay was linear in the concentration ranged from 5 to 5000 ng/mL with a lower limit

of quantification of 5 ng/mL for febuxostat. The single run analysis was as short as 2.0 min.”

According to the news editors, the research concluded: “Finally, the developed method was successfully applied to the pharmacokinetic study of febuxostat tablets following oral administration at a single dose of 40 mg in beagle dogs.”

For more information on this research see: Ultra-performance liquid chromatography-tandem mass spectrometry method for the determination of febuxostat in dog plasma and its application to a pharmacokinetic study. *Biomedical Chromatography*, 2013;27(2):137-41. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news journalists report that additional information may be obtained by contacting T. Zhang, School of Pharmacy, Shenyang Pharmaceutical University, No 103, Wenhua Road, Shenyang, 110016, People's Taiwan. (2013 Jan 30)

### **University College of Pharmaceutical Sciences, Hyderabad: Liquid chromatography-tandem mass spectrometric assay for the non-nucleoside reverse transcriptase inhibitor rilpivirine in human plasma**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in *Biomedical Chromatography*. According to news reporting originating from Hyderabad, India, by NewsRx correspondents, research stated, “An analytical method based on liquid chromatographic-tandem mass spectrometry (LC-MS/MS) was developed for the determination of the non-nucleoside reverse transcriptase inhibitor rilpivirine in human plasma using nevirapine as an internal standard. Analyte and the internal standard were extracted from human plasma by liquid-liquid extraction.”

Our news editors obtained a quote from the research from the University College of Pharmaceutical Sciences, “The reconstituted samples were chromatographed on a C(18) column using a mixture of acetonitrile and 0.1% formic acid buffer (80:20, v/v) as the mobile phase at a flow rate of 0.5 mL/min. The linearity was confirmed in the concentration range 0.51-200 ng/mL in human plasma. Multiple reaction monitoring mode was used for quantification of ion transitions at m/z 367.2/195.1 and 267.1/226.1 for the drug and the internal standard, respectively. The results of the intra-and inter-day precision and accuracy studies were well within the acceptable limits. Extraction recoveries of drug from plasma were >69.5%. A run time of 2.50 min for each sample made it possible to analyze more than 300 plasma samples per day.”

According to the news editors, the research concluded: “The developed method is simple, rapid and sensitive for the determination of rilpivirine concentrations in real-time plasma samples obtained from pharmacokinetic studies.”

For more information on this research see: Liquid chromatography-tandem mass spectrometric assay for the non-nucleoside reverse transcriptase inhibitor rilpivirine in human plasma. *Biomedical Chromatography*, 2013;27(2):172-8. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-0801)

The news editors report that additional information may be obtained by contacting L. Burugula, University College of Pharmaceutical Sciences, Jawaharlal Nehru Technological University, Kukatpally, Hyderabad, 500085, India. (2013 Jan 30)

### **University Hospital, Bern: Energy Harvesting from the Beating Heart by a Mass Imbalance Oscillation Generator**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Bern, Switzerland, by NewsRx journalists, research stated, “Energy-harvesting devices attract wide interest as power supplies of today’s medical implants. Their long lifetime will spare patients from repeated surgical interventions.”

The news reporters obtained a quote from the research from University Hospital, “They also offer the opportunity to further miniaturize existing implants such as pacemakers, defibrillators or recorders of bio signals. A mass imbalance oscillation generator, which consists of a clockwork from a commercially available automatic wrist watch, was used as energy harvesting device to convert the kinetic energy from the cardiac wall motion to electrical energy. An MRI-based motion analysis of the left ventricle revealed basal regions to be energetically most favorable for the rotating unbalance of our harvester. A mathematical model was developed as a tool for optimizing the device’s configuration. The model was validated by an in vitro experiment where an arm robot accelerated the harvesting device by reproducing the cardiac motion.”

According to the news reporters, the research concluded: “Furthermore, in an in vivo experiment, the device was affixed onto a sheep heart for 1 h. The generated power in both experiments-in vitro (30  $\mu$ W) and in vivo (16.7  $\mu$ W)-is sufficient to power modern pacemakers.”

For more information on this research see: Energy Harvesting from the Beating Heart by a Mass Imbalance Oscillation Generator. *Annals of Biomedical Engineering*, 2013;41(1):131-141. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring



St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting A. Zurbuchen, University Hospital Bern, Dept. of Cardiol, CH-3010 Bern, Switzerland. (2013 Jan 30)

### **University of Alberta, Edmonton: Time-Frequency Approaches for the Detection of Interactions and Temporal Properties in Renal Autoregulation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Edmonton, Canada, by NewsRx journalists, research stated, “We compare the influence of time-frequency methods on analysis of time-varying renal autoregulation properties. Particularly, we examine if detection probabilities are similar for amplitude and frequency modulation for a modulated simulation signal among five time-frequency approaches, and if time-varying changes in system gain are detected using four approaches for estimating time-varying transfer functions.”

The news correspondents obtained a quote from the research from the University of Alberta, “Detection of amplitude and frequency modulation varied among methods and was dependent upon background noise added to the simulated data. Three non-parametric time-frequency methods accurately detected modulation at low frequencies across noise levels but not high frequencies; while the converse was true for a fourth, and a fifth non-parametric approach was not capable of modulation detection. When applied to estimation of time-varying transfer functions, the parametric approach provided the most accurate estimations of system gain changes, detecting a 1 dB step increase. Application of the appropriate methods to laser Doppler recordings of cortical blood flow and arterial pressure data in anesthetized rats reaffirm the presence of time-varying dynamics in renal autoregulation.”

According to the news reporters, the research concluded: “An increase in the peak system gain and detection of amplitude modulation of the Myogenic mechanism both occurred after inhibition of nitric oxide synthase, suggesting a connection between the operation of underlying regulators and system performance.”

For more information on this research see: Time-Frequency Approaches for the Detection of Interactions and Temporal Properties in Renal Autoregulation. *Annals of Biomedical Engineering*, 2013;41(1):172-184. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer -

[www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting C.G. Scully, University of Alberta, Dept. of Physiol, Edmonton, AB, Canada. (2013 Jan 30)

### **University of Auckland: An intrinsically compliant robotic orthosis for treadmill training**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Auckland, New Zealand, by NewsRx journalists, research stated, “A new intrinsically compliant robotic orthosis powered by pneumatic muscle actuators (PMA) was developed for treadmill training of neurologically impaired subjects. The robotic orthosis has hip and knee sagittal plane rotations actuated by antagonistic configuration of PMA.”

The news correspondents obtained a quote from the research from the University of Auckland, “The orthosis has passive mechanisms to allow vertical and lateral translations of the trunk and a passive hip abduction/adduction joint. A foot lifter having a passive spring mechanism was used to ensure sufficient foot clearance during swing phase. A trajectory tracking controller was implemented to evaluate the performance of the robotic orthosis on a healthy subject. The results show that the robotic orthosis is able to perform the treadmill training task by providing sufficient torques to achieve physiological gait patterns and a realistic stepping experience.”

According to the news reporters, the research concluded: “The orthosis is a new addition to the rapidly advancing field of robotic orthoses for treadmill training.”

For more information on this research see: An intrinsically compliant robotic orthosis for treadmill training. *Medical Engineering & Physics*, 2012;34(10):1448-1453. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting S. Hussain, University of Auckland, Sch Nursing, Auckland 1, New Zealand. (2013 Jan 30)

## **University of California, Davis: Microfluidic System for Facilitated Quantification of Nanoparticle Accumulation to Cells Under Laminar Flow**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting from Davis, California, by NewsRx journalists, research stated, “The identification of novel, synthetic targeting ligands to endothelial receptors has led to the rapid development of targeted nanoparticles for drug, gene and imaging probe delivery. Central to development and optimization are effective models for assessing particle binding in vitro.”

The news correspondents obtained a quote from the research from the University of California, “Here, we developed a simple and cost effective method to quantitatively assess nanoparticle accumulation under physiologically-relevant laminar flow. We designed reversibly vacuum-sealed PDMS microfluidic chambers compatible with 35 mm petri dishes, which deliver uniform or gradient shear stress. These chambers have sufficient surface area for facile cell collection for particle accumulation quantitation through FACS. We tested this model by synthesizing and flowing liposomes coated with APN (K (D) similar to 300  $\mu$ M) and VCAM-1-targeting (K (D) similar to 30  $\mu$ M) peptides over HUVEC. Particle binding significantly increased with ligand concentration (up to 6 mol%) and decreased with excess PEG. While the accumulation of particles with the lower affinity ligand decreased with shear, accumulation of those with the higher affinity ligand was highest in a low shear environment (2.4 dyne/cm<sup>2</sup>), as compared with greater shear or the absence of shear.”

According to the news reporters, the research concluded: “We describe here a robust flow chamber model that is applied to optimize the properties of 100 nm liposomes targeted to inflamed endothelium.”

For more information on this research see: Microfluidic System for Facilitated Quantification of Nanoparticle Accumulation to Cells Under Laminar Flow. *Annals of Biomedical Engineering*, 2013;41(1):89-99. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting J. Kusunose, University of California, Dept. of Biomed Engrn, Davis, CA 95616, United States. (2013 Jan 30)

## **University of California, Los Angeles: Design and Testing of a Percutaneously Implantable Fetal Pacemaker**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Los Angeles, California, by NewsRx correspondents, research stated, “We are developing a cardiac pacemaker with a small, cylindrical shape that permits percutaneous implantation into a fetus to treat complete heart block and consequent hydrops fetalis, which can otherwise be fatal. The device uses off-the-shelf components including a rechargeable lithium cell and a highly efficient relaxation oscillator encapsulated in epoxy and glass.”

Our news editors obtained a quote from the research from the University of California, “A corkscrew electrode made from activated iridium can be screwed into the myocardium, followed by release of the pacemaker and a short, flexible lead entirely within the chest of the fetus to avoid dislodgement from fetal movement. Acute tests in adult rabbits demonstrated the range of electrical parameters required for successful pacing and the feasibility of successfully implanting the device percutaneously under ultrasonic imaging guidance.”

According to the news editors, the research concluded: “The lithium cell can be recharged inductively as needed, as indicated by a small decline in the pulsing rate.”

For more information on this research see: Design and Testing of a Percutaneously Implantable Fetal Pacemaker. *Annals of Biomedical Engineering*, 2013;41(1):17-27. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting G.E. Loeb, University of California, Keck Sch Med, Dept. of Obstet & Gynecol, Div Maternal Fetal Med, Los Angeles, CA 90027, United States. (2013 Jan 30)

## **University of Jordan, Amman: Construction, in vitro and in vivo evaluation of an in-house conductance meter for measurement of skin hydration**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating in Amman, Jordan, by NewsRx journalists, research stated, “Different probes are used in dermato-cosmetic research to measure the electrical properties of the skin. The principle governing the choice of the geometry and material of the measuring probe is not

well defined in the literature and some device's measuring principles are not accessible for the scientific community.”

The news reporters obtained a quote from the research from the University of Jordan, “The purpose of this work was to develop a simple inexpensive conductance meter for the objective in vivo evaluation of skin hydration. The conductance meter probe was designed using the basic equation governing wave propagation along Transverse Electromagnetic transmission lines. It consisted of two concentric copper circular electrodes printed on FR4 dielectric material. The performance of the probe was validated by evaluating its measurement depth, its ability to monitor in vitro water sorption-desorption and in vivo skin hydration effect in comparison to that of the Corneometer CM 825. The measurement depth of the probe, 15  $\mu\text{m}$ , was comparable to that of CM 825. The in vitro readings of the probe correlated strongly with the amount of water adsorbed on filter paper. Skin hydration after application of a moisturizer was monitored effectively by the new probe with good correlation to the results of CM 825.”

According to the news reporters, the research concluded: “A simple probe for evaluating skin hydration was made from off-the-shelf materials and its performance was validated in comparison to a commercially available probe.”

For more information on this research see: Construction, in vitro and in vivo evaluation of an in-house conductance meter for measurement of skin hydration. *Medical Engineering & Physics*, 2012;34(10):1471-1476. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting S.H. Hamed, University of Jordan, Fac Pharm, Amman, Jordan. (2013 Jan 30)

### **University of Toronto: Biomechanical stress maps of an artificial femur obtained using a new infrared thermography technique validated by strain gages**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Toronto, Canada, by NewsRx correspondents, research stated, “Femurs are the heaviest, longest, and strongest long bones in the human body and are routinely subjected to cyclic forces. Strain gages are commonly employed to experimentally validate finite element models of the femur in order to generate 3D stresses, yet

there is little information on a relatively new infrared (IR) thermography technique now available for biomechanics applications.”

Our news journalists obtained a quote from the research from the University of Toronto, “In this study, IR thermography validated with strain gages was used to measure the principal stresses in the artificial femur model from Sawbones (Vashon, WA, USA) increasingly being used for biomechanical research. The femur was instrumented with rosette strain gages and mechanically tested using average axial cyclic forces of 1500 N, 1800 N, and 2100 N, representing 3 times body weight for a 50 kg, 60 kg, and 70 kg person. The femur was oriented at 7 degrees of adduction to simulate the single-legged stance phase of walking. Stress maps were also obtained using an IR thermography camera. Results showed good agreement of IR thermography vs. strain gage data with a correlation of  $R^2 = 0.99$  and a slope = 1.08 for the straight line of best fit. IR thermography detected the highest principal stresses on the superior-posterior side of the neck, which yielded compressive values of -91.2 MPa (at 1500 N), -96.0 MPa (at 1800 N), and -103.5 MPa (at 2100 N). There was excellent correlation between IR thermography principal stress vs. axial cyclic force at 6 locations on the femur on the lateral ( $R^2 = 0.89-0.99$ ), anterior ( $R^2 = 0.87-0.99$ ), and posterior ( $R^2 = 0.81-0.99$ ) sides.”

According to the news editors, the research concluded: “This study shows IR thermography’s potential for future biomechanical applications.”

For more information on this research see: Biomechanical stress maps of an artificial femur obtained using a new infrared thermography technique validated by strain gages. *Medical Engineering & Physics*, 2012;34(10):1496-1502. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from S. Shah, University of Toronto, Fac Med, Dept. of Surg, Toronto, ON M5S 1A8, Canada. (2013 Jan 30)

### **University of Ulm: A computational method for determining tissue material properties in ovine fracture calluses using electronic speckle pattern interferometry and finite element analysis**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating in Ulm, Germany, by NewsRx journalists, research

stated, “For numerical simulations of biological processes the assignment of reliable material properties is essential. Since literature data show huge variations for each parameter, this study presents a method for determining tissue properties straight from the investigated specimens by combining electronic speckle pattern interferometry (ESPI) with finite element (FE) analysis in a two-step parameter analysis procedure.”

The news reporters obtained a quote from the research from the University of Ulm, “ESPI displacement data from two mid-sagittal ovine fracture callus slices under 5 N compressive load were directly compared to data from FE simulations of the respective experimental setup. In the first step a parameter sensitivity analysis quantified the influence of single tissues on the mechanical behavior of the callus specimens. In the second step, material properties (i.e. Young’s moduli and Poisson’s ratios) for the most dominant material of each callus specimen were determined through a parameter sampling procedure minimizing the mean local deviations between the simulated (FE) and measured (ESPI) equivalent element strains. The resulting material properties showed reasonable ranges downsizing the variability of previous published values, especially for Young’s modulus which was 1881 MPa for woven bone and 16 MPa for cartilage in average.”

According to the news reporters, the research concluded: “A numerical method was developed to determine material properties straight from independent fracture callus specimens based on experimentally derived local mechanical conditions.”

For more information on this research see: A computational method for determining tissue material properties in ovine fracture calluses using electronic speckle pattern interferometry and finite element analysis. *Medical Engineering & Physics*, 2012;34(10):1521-1525. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting M. Steiner, Univ Ulm, Sci Comp Center Ulm, D-89069 Ulm, Germany. (2013 Jan 30)

### **University of Wisconsin, Madison: Impact of Acute Pulmonary Embolization on Arterial Stiffening and Right Ventricular Function in Dogs**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to

news reporting from Madison, Wisconsin, by NewsRx journalists, research stated, “Pulmonary hypertension (PH) can impact right ventricular (RV) function and alter pulmonary artery (PA) stiffness. The response of the RV to an acute increase in pulmonary pressure is unclear.”

The news correspondents obtained a quote from the research from the University of Wisconsin, “In addition, the relation between total pulmonary arterial compliance and local PA stiffness has not been investigated. We used a combination of right heart catheterization (RHC) and magnetic resonance imaging (MRI) to assess PA stiffening and RV function in dogs before and after acute embolization. We hypothesized that in moderate, acute PH the RV is able to compensate for increased afterload, maintaining adequate coupling. Also, we hypothesized that in the absence of PA remodeling the relative area change in the proximal PA (RAC, a noninvasive index of local area strain) correlates with the total arterial compliance (stroke volume-to-pulse pressure ratio). Our results indicate that, after embolization, RV function is able to accommodate the demand for increased stroke work without uncoupling, albeit at the expense of a reduction of efficiency. In this acute model, RAC showed excellent correlation with total arterial compliance. We used this correlation to assess PA pulse pressure (PP) from noninvasive MRI measurements of stroke volume and RAC. We demonstrated that in acute pulmonary embolism MRI estimates of PP are remarkably close to measurements from RHC.”

According to the news reporters, the research concluded: “These results, if confirmed in chronic PH and clinically, suggest that monitoring of PH progression by noninvasive methods may be possible.”

For more information on this research see: Impact of Acute Pulmonary Embolization on Arterial Stiffening and Right Ventricular Function in Dogs. *Annals of Biomedical Engineering*, 2013;41(1):195-204. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting A. Bellofiore, University of Wisconsin, Sch Vet Med, Madison, WI 53706, United States. (2013 Jan 30)

### **Veterans Affairs Medical Center, Cleveland: Effect of Material Properties on Predicted Vesical Pressure During a Cough in a Simplified Computational Model of the Bladder and Urethra**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. Accord-



ing to news reporting originating in Cleveland, Ohio, by NewsRx journalists, research stated, “Stress urinary incontinence is a condition that affects mainly women and is characterized by the involuntary loss of urine in conjunction with an increase in abdominal pressure but in the absence of a bladder contraction. In spite of the large number of women affected by this condition, little is known regarding the mechanics associated with the maintenance of continence in women.”

The news reporters obtained a quote from the research from Veterans Affairs Medical Center, “Urodynamic measurements of the pressure acting on the bladder and the pressures developed within the bladder and the urethra offer a potential starting point for constructing computational models of the bladder and urethra during stress events. The measured pressures can be utilized in these models to provide information to specify loads and validate the models. The main goals of this study were to investigate the feasibility of incorporating human urodynamic pressure data into a computational model of the bladder and the urethra during a cough and determine if the resulting model could be validated through comparison of predicted and measured vesical pressure. The results of this study indicated that simplified models can predict vesical pressures that differ by less than 5 cmH(2)O (< 10%) compared to urodynamic pressure measurements. In addition, varying material properties had a minimal impact on the vesical pressure and displacements predicted by the model. The latter finding limits the use of vesical pressure as a validation criterion since different parameters can yield similar results in the same model.”

According to the news reporters, the research concluded: “However, the insensitivity of vesical pressure predictions to material properties ensures that the outcome of our models is not highly sensitive to tissue material properties, which are not well characterized.”

For more information on this research see: Effect of Material Properties on Predicted Vesical Pressure During a Cough in a Simplified Computational Model of the Bladder and Urethra. *Annals of Biomedical Engineering*, 2013;41(1):185-194. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting T. Spirka, Louis Stokes Cleveland VA Med Center, Dept. of Vet Affairs, Cleveland, OH, United States. (2013 Jan 30)

## **Veterans Affairs Medical Center, Omaha: External work is deficient in both limbs of patients with unilateral PAD**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Omaha, Nebraska, by NewsRx journalists, research stated, “External work was utilized to measure differences between the unaffected and the affected limb in patients with unilateral peripheral arterial disease compared to healthy controls. Patients with unilateral peripheral arterial disease have shown deficits in peak joint powers during walking in the unaffected and affected legs.”

The news correspondents obtained a quote from the research from Veterans Affairs Medical Center, “However, no research has detailed the amount of work that is being performed by each leg compared to healthy controls even though such an analysis would provide valuable information on the energy output from the affected and the unaffected legs. Two hypotheses were tested: (a) the unaffected and affected leg would perform less work than healthy controls in a pain-free state, and (b) the onset of symptomatic claudication pain would result in further changes in the external work. Results showed that during a pain-free state, both the unaffected and affected legs perform less work than the healthy controls. After onset of claudication pain, the work output by the affected limb becomes further decreased while the unaffected limb experiences changes in negative external work.”

According to the news reporters, the research concluded: “These findings combined with recent evidence of decreased peak powers in both legs in unilateral peripheral arterial disease patients reflects altered pathomechanics in both limbs compared to healthy controls.”

For more information on this research see: External work is deficient in both limbs of patients with unilateral PAD. *Medical Engineering & Physics*, 2012;34(10):1421-1426. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting S.R. Wurdeman, Vet Affairs Med Center, Omaha, NE, United States. (2013 Jan 30)

## **Ghent University, Zwijnaarde: Doping control analysis of desmopressin in human urine by LC-ESI-MS/MS after urine delipidation**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedical Chromatography. According to news reporting from Zwijnaarde, Belgium, by NewsRx journalists, research stated, “The World Anti-Doping Agency (WADA) has recently added desmopressin, a synthetic analogue of the endogenous peptide hormone arginine vasopressin, to the Prohibited List, owing to the potential masking effects of this drug on hematic parameters useful to detect blood doping. A qualitative method for detection of desmopressin in human urine by high-performance liquid chromatography-electrospray tandem mass spectrometry (LC-ESI-MS/MS) has been developed and validated.”

The news correspondents obtained a quote from the research from Ghent University, “Desmopressin purification from urine was achieved by means of delipidation with a 60:40 di-isopropyl ether/n-butanol and solid-phase extraction with WCX cartridges. The lower limit of detection was 25?pg/mL. Extraction recovery was determined as 59.3% (SD 29.4), and signal reduction owing to ion suppression was estimated to be 42.7% (SD 12.9).”

According to the news reporters, the research concluded: “The applicability of the method was proven by the analysis of real urine samples obtained after intravenous, oral and intranasal administration of desmopressin, achieving unambiguous detection of the peptide in all the cases.”

For more information on this research see: Doping control analysis of desmopressin in human urine by LC-ESI-MS/MS after urine delipidation. *Biomedical Chromatography*, 2013;27(2):240-5. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news journalists report that additional information may be obtained by contacting S. Esposito, Doping Control Laboratory, Dept. of Clinical Chemistry, Microbiology and Immunology, Ghent University, Technologiepark 30, 9052, Zwijnaarde, Belgium. (2013 Jan 29)

## **University of Toronto: Evaluation of mesh morphing and mapping techniques in patient specific modeling of the human pelvis**

By a News Reporter-Staff News Editor at Journal of Technology – Fresh data on Technology are presented in a new report. According to news reporting out of Toronto, Canada, by VerticalNews editors, research stated, “Robust generation of pelvic finite element models is necessary to understand the variation in mechanical behaviour resulting from differences in gender, aging, disease and injury. The objective of this study was to apply and evaluate mesh morphing and mapping techniques to facilitate the creation and structural analysis of specimen-specific finite element (FE) models of the pelvis.”

Our news journalists obtained a quote from the research from the University of Toronto, “A specimen-specific pelvic FE model (source?mesh) was generated following a traditional user-intensive meshing scheme. The source mesh was morphed onto a computed tomography scan generated target surface of a second pelvis using a landmarked-based approach, in which exterior source nodes were shifted to target surface vertices, while constrained along a normal. A second copy of the morphed model was further refined through mesh mapping, in which surface nodes of the initial morphed model were selected in patches and remapped onto the surfaces of the target model. Computed tomography intensity based material properties were assigned to each model. The source, target, morphed and mapped models were analyzed under axial compression using linear static FE analysis and their strain distributions evaluated. Morphing and mapping techniques were effectively applied to generate good quality geometrically complex specimen-specific pelvic FE models.”

According to the news editors, the research concluded: “Mapping significantly improved strain concurrence with the target pelvis FE model.”

For more information on this research see: Evaluation of mesh morphing and mapping techniques in patient specific modeling of the human pelvis. *International Journal for Numerical Methods In Biomedical Engineering*, 2013;29(1):104-13. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods In Biomedical Engineering* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2040-7947](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2040-7947))

Our news journalists report that additional information may be obtained by contacting Z. Salo, University of Toronto, Institute of Biomaterials and Biomedical Engineering, Toronto, Ontario, Canada. (2013 Jan 29)

### **Emory University, Atlanta: Numerical treatment of boundary conditions to replace lateral branches in hemodynamics**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting from Atlanta, Georgia, by NewsRx journalists, research stated, “In this paper, we discuss a technique for weakly enforcing flow rate conditions in computational hemodynamics.”

The news correspondents obtained a quote from the research from Emory University, “In particular, we study the effectiveness of cutting lateral branches from the computational domain and replacing them with non-perturbing boundary conditions to simplify the geometrical reconstruction and the numerical simulation. All these features are investigated both in the case of rigid and compliant walls.”

According to the news reporters, the research concluded: “Several numerical results are presented to discuss the reliability of the proposed method.C.”

For more information on this research see: Numerical treatment of boundary conditions to replace lateral branches in hemodynamics. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(12):1165-1183. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2040-7947](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2040-7947))

Our news journalists report that additional information may be obtained by contacting A. Porpora, Emory University, Dept. of Math & Comp Sci, Atlanta, GA 30322, United States. (2013 Jan 23)

### **Harvard University School of Medicine, Boston: An automatic 2D-3D image matching method for reproducing spatial knee joint positions using single or dual fluoroscopic images**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Boston, Massachusetts, by NewsRx editors, research stated, “Fluoroscopic image technique, using either a single image or dual images, has been widely applied to measure in vivo human knee joint kinematics. However, few studies have compared the advantages of using single and dual fluoroscopic images.”

Our news journalists obtained a quote from the research from the Harvard University School of Medicine, “Furthermore, due to the size

limitation of the image intensifiers, it is possible that only a portion of the knee joint could be captured by the fluoroscopy during dynamic knee joint motion. In this paper, we presented a systematic evaluation of an automatic 2D-3D image matching method in reproducing spatial knee joint positions using either single or dual fluoroscopic image techniques. The data indicated that for the femur and tibia, their spatial positions could be determined with an accuracy and precision less than 0.2 mm in translation and less than 0.4°; in orientation when dual fluoroscopic images were used. Using single fluoroscopic images, the method could produce satisfactory accuracy in joint positions in the imaging plane (in average up to 0.5 mm in translation and 1.3°; in rotation), but large variations along the out-plane direction (in average up to 4.0 mm in translation and 2.2°; in rotation). The precision of using single fluoroscopic images to determine the actual knee positions was worse than its accuracy obtained.”

According to the news editors, the research concluded: “The data also indicated that when using dual fluoroscopic image technique, if the knee joint outlines in one image were incomplete by 80%, the algorithm could still reproduce the joint positions with high precisions.”

For more information on this research see: An automatic 2D-3D image matching method for reproducing spatial knee joint positions using single or dual fluoroscopic images. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(11):1245-56.

Our news journalists report that additional information may be obtained by contacting Z. Zhu, Bioengineering Laboratory, Dept. of Orthopaedic Surgery, Harvard Medical School and Massachusetts General Hospital, Boston, MA, United States. (2013 Jan 23)

### **Laboratory of Biomechanics, Athens: Multiaxial mechanical behaviour of the passive ureteral wall: experimental study and mathematical characterisation**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting from Athens, Greece, by NewsRx editors, the research stated, “There is a scarcity of data regarding the mechanical properties of the ureter, although this would facilitate our understanding of its physiology and pathophysiology, and the development of suitable biomaterials for replacement. There is hence an urgent need for multiaxial experimental data and methodical constitutive formulations, which we aim at presenting through this report.”

The news correspondents obtained a quote from the research from the Laboratory of Biomechanics, “The zero-stress state of wall tissue,

serving as the starting geometry for biomechanical analyses, was accordingly determined and the 3D passive behaviour of ureteral specimens, isolated from healthy rabbits, was studied under a physiologic range of finite inflation and longitudinal extension. Two most commonly employed descriptors of soft tissue behaviour were chosen to fit the material response: the Fung-type strain-energy function (SEF) and its combination with a quadratic function. Both SEFs were tested in the thick-walled setting, with incompressibility enforced explicitly or via a Lagrange multiplier. The deformational response of the ureter exhibited an exponential and not the sigmoidal dependency on pressure that requests implementation of two-term SEFs. Indeed, the four-parameter Fung-type SEF resulted in reasonable fit of both the external radius and longitudinal force vs. lumen pressure data, and fitting accuracy was not improved when attempting the seven-parameter Fung-type or biphasic SEFs. There were also serious over-parameterisation problems with those models, favouring the implementation of the SEF with the smallest number of parameters. The material parameters optimised revealed significant mechanical anisotropy, with longitudinal properties being stiffer than circumferential ones under equibiaxial stress states.”

According to the news reporters, the research concluded: “We conclude that ureter displays a nonlinear anisotropic mechanical response that is well-characterised by the four-parameter Fung-type SEF.”

For more information on this research see: Multiaxial mechanical behaviour of the passive ureteral wall: experimental study and mathematical characterisation. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(11):1145-56.

Our news journalists report that additional information may be obtained by contacting D.P. Sokolis, Laboratory of Biomechanics, Foundation of Biomedical Research, Academy of Athens, Soranou Ephesiou 4, Athens, 11527, Greece. (2013 Jan 23)

### **National Central University, Taoyuan: Improved execution efficiency of model-based roentgen stereophotogrammetric analysis: simplification and segmentation of model meshes**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news originating from Taoyuan, Taiwan, by NewsRx correspondents, research stated, “Recently, the model-based roentgen stereophotogrammetric analysis (RSA) method has been developed as an in vivo tool to estimate static pose and dynamic motion of the instrumented prostheses. The two essential inputs for the RSA method are prosthetic models and roentgen images.”

Our news journalists obtained a quote from the research from National Central University, “During RSA calculation, the implants are often reversely scanned and input in the form of meshes to estimate the outline error between prosthetic projection and roentgen images. However, the execution efficiency of the RSA iterative calculation may limit its clinical practicability, and one reason for inefficiency may be very large number of meshes in the model. This study uses two methods of mesh manipulation to improve the execution efficiency of RSA calculation. The first is to simplify the model meshes and the other is to segment and delete the meshes of insignificant regions. An index (i.e. critical percentage) of an optimal element number is defined as the trade-off between execution efficiency and result accuracy. The predicted results are numerically validated by total knee prosthetic system. The outcome shows that the optimal strategy of the mesh manipulation is simplification and followed by segmentation. On average, the element number can even be reduced to 1% of the original models. After the mesh manipulation, the execution efficiency can be increased about 75% without compromising the accuracy of the predicted RSA results (the increment of rotation and translation error: 0.06° and 0.02 mm).”

According to the news editors, the research concluded: “Prosthetic models should be manipulated by simplification and segmentation methods prior to the RSA calculation to increase the execution efficiency and then to improve clinical applicability of the RSA method.”

For more information on this research see: Improved execution efficiency of model-based roentgen stereophotogrammetric analysis: simplification and segmentation of model meshes. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(12):1347-57.

The news correspondents report that additional information may be obtained from C.B. Syu, Dept. of Mechanical Engineering, National Central University, Taoyuan, Taiwan. (2013 Jan 23)

### **National University, Bogota: Comparative analysis of numerical integration schemes of density equation for a computational model of bone remodelling**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Bogota, Colombia, by NewsRx journalists, research stated, “In this study, a computational model of bone remodelling problem as proposed by Weinans et al. (1992) is described and solved by other temporal integration techniques different from the Euler scheme. This model considers three types of numerical integration schemes of the evolution of the material density during the remodelling: Euler, Heun and Runge-Kutta methods.”



The news reporters obtained a quote from the research from National University, “Also the strain and the density field are obtained inside each element, at Gauss points or at the nodes of the mesh. A square plate with 1.00 m of side subjected to non-uniform pressure is simulated with two meshes of quadrilateral element with size [Formula: see text] and [Formula: see text] m. Two increments time size: [Formula: see text] and [Formula: see text] days are used. The results show that Euler, Heun and Runge-Kutta’s methods correctly approached the problem of bone remodelling and that there were no appreciable differences in the patterns obtained by the mesh and time step used. In contrast, using an element-based approach and node-based approach, substantial differences were produced in bone remodelling density pattern. ‘Chess board’ type discontinuities were found in the element approach near the applied pressure area, as were well-defined columns away from this. The node-based approach showed continuity in density distribution. These patterns were well represented by the methods for resolving the density equation.”

According to the news reporters, the research concluded: “This study concluded that any method of time integration could be used for these meshes and time steps size.”

For more information on this research see: Comparative analysis of numerical integration schemes of density equation for a computational model of bone remodelling. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(11):1189-96.

Our news correspondents report that additional information may be obtained by contacting D.A. Garzon-Alvarado, Group of Mathematical Modeling and Numerical Methods GNUM-UN, National University of Colombia, Bogota, Colombia. (2013 Jan 23)

### **National University, Salta: An inverse approach for the mechanical characterisation of vascular tissues via a generalised rule of mixtures**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating from Salta, Argentina, by NewsRx correspondents, research stated, “Mechanical factors such as stresses and strains play a major role in the growth and remodelling of soft biological tissues. The main constituents of tissue undergo different processes reacting to mechanical stimulus.”

Our news editors obtained a quote from the research from National University, “Thereby, the characterisation of growth and remodelling requires an accurate estimation of the stresses and strains of their main components. Many soft tissues can be considered as composite materials and can be analysed using an appropriate rule of mixtures.

Particularly, arterial tissue can be modelled as an isotropic soft matrix reinforced with preferentially oriented collagen fibres. An inverse approach to obtain the mechanical characterisation of each main component is proposed in this work. The procedure is based on a rule of mixtures raised in a finite deformation framework and generalised to include kinematics and compatibility equations for serial-parallel behaviour.”

According to the news editors, the research concluded: “This methodology allows obtaining the stress-strain relationship of the components fitting experimental data.”

For more information on this research see: An inverse approach for the mechanical characterisation of vascular tissues via a generalised rule of mixtures. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(12):1257-62.

The news editors report that additional information may be obtained by contacting F.J. Bellomo, Facultad de Ingenieria, ICMASa, INIQUI-CONICET, Universidad Nacional de Salta, Av Bolivia 5150, 4400 Salta, Argentina. (2013 Jan 23)

### **Technical University, Lisbon: Biomechanical analysis of the anterior cervical fusion**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Lisbon, Portugal, by NewsRx correspondents, research stated, “This paper presents a biomechanical analysis of the cervical C5-C6 functional spine unit before and after the anterior cervical discectomy and fusion. The aim of this work is to study the influence of the medical procedure and its instrumentation on range of motion and stress distribution.”

Our news journalists obtained a quote from the research from Technical University, “First, a three-dimensional finite element model of the lower cervical spine is obtained from computed tomography images using a pipeline of image processing, geometric modelling and mesh generation software. Then, a finite element study of parameters’ influence on motion and a stress analysis at physiological and different post-operative scenarios were made for the basic movements of the cervical spine. It was confirmed that the results were very sensitive to intervertebral disc properties. The insertion of an anterior cervical plate influenced the stress distribution at the vertebral level as well as in the bone graft.”

According to the news editors, the research concluded: “Additionally, stress values in the graft decreased when it is used together with a cage.”

For more information on this research see: Biomechanical analysis of the anterior cervical fusion. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(12):1337-46.

The news correspondents report that additional information may be obtained from P.C. Fernandes, IDMEC-Instituto Superior Tecnico, Technical University of Lisbon, Avenida Rovisco Pais, 1049-001 Lisbon, Portugal. (2013 Jan 23)

### **University of Colorado, Aurora: Validation of a sensitive LC/MS/MS method for the determination of zidovudine and lamivudine in human plasma**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Chromatography is the subject of a report. According to news reporting out of Aurora, Colorado, by NewsRx editors, research stated, “A sensitive LC/MS/MS assay for determining zidovudine (ZDV) and lamivudine (3TC) in human plasma was validated to support antiretroviral pharmacology research programs. After addition of stable labeled isotopic zidovudine (ZDV-IS) and lamivudine (3TC-IS) as internal standard, a solid-phase extraction was performed with an Oasis HLB 1 cm(3) cartridge, with recoveries of 92.3% for ZDV and 93.9% for 3TC.”

Our news journalists obtained a quote from the research from the University of Colorado, “A Phenomenex Synergi Hydro-RP (2.0 x 150 mm) reversed-phase analytical column was utilized for chromatographic separation. The mobile phase consisted of an aqueous solution of 15% acetonitrile and 0.1% acetic acid. Detection was accomplished by ESI/MS/MS in the positive ion mode, monitoring 268/127, 271/130, 230/112 and 233/115 transitions, for ZDV, ZDV-IS, 3TC and 3TC-IS, respectively. The method was linear from 1 to 3000?ng/mL with a minimum quantifiable limit of 1 ng/mL when 100 L of plasma was analyzed. Validation results demonstrated high accuracy (=8.3% deviation) and high precision (=10% CV) for the quality control samples. The method was also shown to be specific and reproducible.”

According to the news editors, the research concluded: “The value of the high sensitivity was demonstrated by quantitation of approximately 100 existing samples that had ZDV below the limit of quantitation using a previously validated, less sensitive HPLC-UV method utilized in the laboratory.”

For more information on this research see: Validation of a sensitive LC/MS/MS method for the determination of zidovudine and lamivudine in human plasma. *Biomedical Chromatography*, 2012;26(1):12-20. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-0801](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-0801))

Our news journalists report that additional information may be obtained by contacting J.E. Rower, School of Pharmacy, Dept. of Pharmaceutical Sciences, University of Colorado Denver, Aurora, CO 80045, United States. (2013 Jan 23)

### **University of Nebraska, Lincoln: Role of helmet in the mechanics of shock wave propagation under blast loading conditions**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Lincoln, Nebraska, by NewsRx journalists, research stated, “The effectiveness of helmets in extenuating the primary shock waves generated by the explosions of improvised explosive devices is not clearly understood. In this work, the role of helmet on the over-pressurisation and impulse experienced by the head were examined.”

The news correspondents obtained a quote from the research from the University of Nebraska, “The shock wave-head interactions were studied under three different cases: (i) unprotected head, (ii) head with helmet but with varying head-helmet gaps and (iii) head covered with helmet and tightly fitting foam pads. The intensification effect was discussed by examining the shock wave flow pattern and verified with experiments.”

According to the news reporters, the research concluded: “A helmet with a better protection against shock wave is suggested.”

For more information on this research see: Role of helmet in the mechanics of shock wave propagation under blast loading conditions. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(11):1233-44.

Our news journalists report that additional information may be obtained by contacting S. Ganpule, Dept. of Engineering Mechanics, University of Nebraska-Lincoln, Lincoln, NE 68588-0526, United States. (2013 Jan 23)

## **University of Pittsburgh: Automated measurement of neural foramen cross-sectional area during in vivo functional movement**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Pittsburgh, Pennsylvania, by NewsRx editors, the research stated, “An automated technique to measure neural foramen cross-sectional area during in vivo, multi-planar movements is presented. This method combines three-dimensional (3D) models of each vertebra obtained from CT scans with in vivo movement data collected using high-speed biplane radiography.”

The news correspondents obtained a quote from the research from the University of Pittsburgh, “A novel computer algorithm that automatically traces a path around the bony boundary that defines the neural foramen at every frame of X-ray data is described. After identifying the neural foramen boundary, the cross-sectional area is calculated. The technique is demonstrated using data collected from a patient with cervical radiculopathy who is tested before and after conservative treatment. The technique presented here can be applied when 3D, dynamic, functional movements are performed. Neural foramen cross-sectional area can be quantified at specific angles of intervertebral rotation, allowing for matched comparisons between two trials or two test sessions.”

According to the news reporters, the research concluded: “The present technique is ideal for longitudinal studies involving subjects who receive conservative or surgical treatments that may affect spine motion.”

For more information on this research see: Automated measurement of neural foramen cross-sectional area during in vivo functional movement. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(12):1313-21.

Our news journalists report that additional information may be obtained by contacting W.J. Anderst, Orthopaedic Research Laboratories, Dept. of Orthopaedic Surgery, University of Pittsburgh, 3820 South Water Street, Pittsburgh, PA 15203, United States. (2013 Jan 23)

### **University of Porto: Towards an efficient and robust foot classification from pedobarographic images**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Porto, Portugal, by NewsRx correspondents, research stated, “This paper presents a new computational framework for automatic foot classification from digital plantar pressure images. It classifies the foot as left or right and simultaneously calculates two well-known footprint indices: the Cavanagh’s arch index (AI) and the modified AI.”

Our news editors obtained a quote from the research from the University of Porto, “The accuracy of the framework was evaluated using a set of plantar pressure images from two common pedobarographic devices. The results were outstanding, as all feet under analysis were correctly classified as left or right and no significant differences were observed between the footprint indices calculated using the computational solution and the traditional manual method.”

According to the news editors, the research concluded: “The robustness of the proposed framework to arbitrary foot orientations and to the acquisition device was also tested and confirmed.”

For more information on this research see: Towards an efficient and robust foot classification from pedobarographic images. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(11):1181-8.

The news editors report that additional information may be obtained by contacting F.P. Oliveira, Faculdade de Engenharia da Universidade do Porto (FEUP), Instituto de Engenharia Mecanica e Gestao Industrial (INEGI), Rua Dr Roberto Frias, 4200-465, Porto, Portugal. (2013 Jan 23)

### **University of Warsaw, Warszawa: Ab initio predictions of structural and elastic properties of struvite: contribution to urinary stone research**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Warszawa, Poland, by NewsRx correspondents, research stated, “In the present work, we carried out density functional calculations of struvite—the main component of the so-called infectious urinary stones—to study its structural and elastic properties. Using a local density approximation and a generalised gradient approximation, we calculated the equilibrium structural parameters and elastic constants  $C_{ijkl}$ .”

Our news editors obtained a quote from the research from the University of Warsaw, “At present, there is no experimental data for these elastic constants  $C_{ijkl}$  for comparison. Besides the elastic constants, we also present the calculated macroscopic mechanical parameters, namely the bulk modulus ( $K$ ), the shear modulus ( $G$ ) and Young’s modulus ( $E$ ). The values of these moduli are found to be in good agreement with available experimental data. Our results imply that the mechanical stability of struvite is limited by the shear modulus,  $G$ .”

According to the news editors, the research concluded: “The study also explores the energy-band structure to understand the obtained values of the elastic constants.”

For more information on this research see: Ab initio predictions of structural and elastic properties of struvite: contribution to urinary stone research. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(12):1329-36.

The news editors report that additional information may be obtained by contacting J. Piechota, Interdisciplinary Centre for Materials Modelling, University of Warsaw, ul Pawinskiego 5a, 02-106 Warszawa, Poland. (2013 Jan 23)

### **Yonsei University, Gangwon Do: Verification of accuracy and validity of gait phase detection system using motion sensors for applying walking assistive FES**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Gangwon Do, South Korea, by NewsRx correspondents, research stated, “In this study, we have analysed heel strike (HS) and toe off (TO) of normal individuals and hemiplegic patients, taking advantage of output curves acquired from various sensors, and verified the validity of sensor detection methods and their effectiveness when they were used for hemiplegic gaits. Gait phase detections using three different motion sensors were valid, since they all had reliabilities more than 95%, when compared with foot velocity algorithm.”

Our news editors obtained a quote from the research from Yonsei University, “Results showed that the tilt sensor and the gyrosensor could detect gait phase more accurately in normal individuals. Vertical acceleration could detect HS most accurately in hemiplegic patient group A. The gyrosensor could detect HS and TO most accurately in hemiplegic patient groups A and B. The detection of TO from all sensor signals was valid in both the patient groups A and B.”

According to the news editors, the research concluded: “However, the vertical acceleration detected HS validly in patient group A and the gyrosensor detected HS validly in patient group B.”

For more information on this research see: Verification of accuracy and validity of gait phase detection system using motion sensors for applying walking assistive FES. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(11):1129-35.

The news editors report that additional information may be obtained by contacting S. Park, Dept. of Biomedical Engineering, Institute of Medical Engineering, Yonsei University, Wonju, Gangwon, South Korea. (2013 Jan 23)

### **University of Minnesota, Minneapolis: Regional neurochemical profiles in the human brain measured by $^1\text{H}$ MRS at 7 T using local B1 shimming**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Central Nervous System. According to news reporting originating in Minneapolis, Minnesota, by NewsRx journalists, research stated, “Increased sensitivity and chemical shift dispersion at ultra-high magnetic fields enable the precise quantification of an extended range of brain metabolites from  $(1)\text{H}$  MRS. However, all previous neurochemical profiling studies using single-voxel MRS at 7 T have been limited to data acquired from the occipital lobe with half-volume coils.”

The news reporters obtained a quote from the research from the University of Minnesota, “The challenges of  $(1)\text{H}$  MRS of the human brain at 7 T include short  $T(2)$  and complex  $B(1)$  distribution that imposes limitations on the maximum achievable  $B(1)$  strength. In this study, the feasibility of acquiring and quantifying short-echo ( $TE=8$  ms), single-voxel  $(1)\text{H}$  MR spectra from multiple brain regions was demonstrated by utilizing a 16-channel transceiver array coil with 16 independent transmit channels, allowing local transmit  $B(1)$  ( $B(1)(+)$ ) shimming. Spectra were acquired from volumes of interest of 1-8 mL in brain regions that are of interest for various neurological disorders: frontal white matter, posterior cingulate, putamen, substantia nigra, pons and cerebellar vermis. Local  $B(1)(+)$  shimming substantially increased the transmit efficiency, especially in the peripheral and ventral brain regions. By optimizing a STEAM sequence for utilization with a 16-channel coil, artifact-free spectra were acquired with a small chemical shift displacement error ( $<5\%$  /ppm/direction) from all regions. The high signal-to-noise ratio enabled the quantification of neurochemical profiles consisting of at least nine metabolites, including  $\gamma$ -aminobutyric acid, glutamate and glutathione, in all brain regions. Significant differences in neurochemical profiles were observed between brain regions. For example,  $\gamma$ -aminobutyric acid levels were highest in the substantia nigra, total creatine was highest in the cerebellar vermis and total choline was



highest in the pons, consistent with the known biochemistry of these regions.”

According to the news reporters, the research concluded: “These findings demonstrate that single-voxel (1)H MRS at ultra-high field can reliably detect region-specific neurochemical patterns in the human brain, and has the potential to objectively detect alterations in neurochemical profiles associated with neurological diseases.”

For more information on this research see: Regional neurochemical profiles in the human brain measured by  $^1\text{H}$  MRS at 7 T using local B1 shimming. *Nmr In Biomedicine*, 2012;25(1):152-60. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news correspondents report that additional information may be obtained by contacting U.E. Emir, Center for Magnetic Resonance Research, Dept. of Radiology, School of Medicine, University of Minnesota, Minneapolis, MN 55455, United States. (2013 Jan 22)

### **Beijing Institute of Technology: High efficiency motility of bacteria-driven liposome with raft domain binding method**

By a News Reporter-Staff News Editor at Biotech Business Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Beijing, People’s Republic of China, by NewsRx correspondents, research stated, “From the viewpoint of energy efficiency and size reduction, many people have proposed the use of microbes as actuators. Some bacteria can swim in an aqueous environment.”

Our news editors obtained a quote from the research from the Beijing Institute of Technology, “Therefore, flagellated chemotactic bacteria have been utilized as actuators for the propulsion of micro-objects by randomly attaching several bacteria to their surface. A liposome is a well-known component used for drug delivery that can contain biologically active compounds. In the present study, we used an antibody and biotin-streptavidin binding technique to combine bacteria and liposomes and create bacteria-driven liposomes. Furthermore, a novel raft domain binding technique was developed and used to limit the attachment of bacteria to small areas of the liposome surface. The effect of the number and configuration of the attached bacteria on propulsion speed was then studied experimentally. The motility of the raft domain liposome with bacteria was higher than that of the normal liposome with bacteria.”

According to the news editors, the research concluded: “This method could be used to create bacteria-driven liposomes with highly efficient

motility and could lead to the development of microrobots as drug delivery systems.”

For more information on this research see: High efficiency motility of bacteria-driven liposome with raft domain binding method. *Biomedical Microdevices*, 2012;14(6):1027-1032. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news editors report that additional information may be obtained by contacting M. Kojima, Beijing Inst Technol, Sch Mechatron Engrn, Beijing 100081, People's Republic of China. (2013 Jan 21)

### **Carnegie Mellon University, Pittsburgh: Chemotactic steering of bacteria propelled microbeads**

By a News Reporter-Staff News Editor at Biotech Business Week – Investigators publish new report on Biotechnology. According to news reporting originating in Pittsburgh, Pennsylvania, by NewsRx journalists, research stated, “Flagellated bacteria have been embraced by the micro-robotics community as a highly efficient microscale actuation method, capable of converting chemical energy into mechanical actuation for microsystems that require a small payload and high rate of actuation. Along with being highly motile, *Serratia marcescens* (*S. marcescens*), our bacterium species of interest, is a highly agile biomotor capable of being steered via chemotaxis.”

The news reporters obtained a quote from the research from Carnegie Mellon University, “In this paper, we attached *S. marcescens* bacteria to polystyrene microbeads towards creating biohybrid that can propel themselves towards an attractive chemical source. Using a three-channel microfluidic device, linear chemical gradients are generated to compare the behavior of bacteria-propelled beads in the presence and absence of a chemoattractant, L-aspartate. We tested and compared the behavior of three different bacteria-attached bead sizes (5, 10 and 20  $\mu$  m diameter) using a visual particle-tracking algorithm, and noted their behavioral differences. The results indicate that in the presence of a chemoattractant, the *S. marcescens*-attached polystyrene beads exhibit a clear indication of directionality and steering control through the coordination of the bacteria present on each bead.”

According to the news reporters, the research concluded: “This directionality is observed in all bead size cases, suggesting potential for targeted payload delivery using such a biohybrid micro-robotic approach.”

For more information on this research see: Chemotactic steering of bacteria propelled microbeads. *Biomedical Microdevices*, 2012;14(6):1009-1017. *Biomedical Microdevices* can be contacted at:

Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news correspondents report that additional information may be obtained by contacting D. Kim, Carnegie Mellon University, Dept. of Biomed Engn, Pittsburgh, PA 15213, United States. (2013 Jan 21)

### **Lebanese University, Tripoli: Theoretical study of the flow rate toward the right heart territory in case of total occlusion of the right coronary artery**

By a News Reporter-Staff News Editor at Health & Medicine Week – Fresh data on Medical Engineering and Physics are presented in a new report. According to news reporting originating in Tripoli, Lebanon, by NewsRx journalists, research stated, “In this work, patients with severe coronary disease and chronic occlusion of the right coronary artery (RCA) are studied. In this clinical situation, the collateral circulation is an important factor in the preservation of the myocardium until reperfusion of the area at risk.”

The news reporters obtained a quote from the research from Lebanese University, “An accurate estimation of collateral flow is crucial in surgical bypass planning as it can influence the outcome of a given treatment for a given patient. The evaluation of collateral flow is frequently achieved using an index (CFI, Collateral Flow Index) based on pressure measurements.”

According to the news reporters, the research concluded: “Using a model of the coronary circulation based on hydraulic/electric analogy, we demonstrate, through theoretical simulations, that a wide range of fractional collateral flow values can be obtained for any given distal pressure difference depending on the values of the capillary and collateral resistances.”

For more information on this research see: Theoretical study of the flow rate toward the right heart territory in case of total occlusion of the right coronary artery. *Medical Engineering & Physics*, 2013;35(1):103-7. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting M. Maasrani, Faculty of Sciences, Lebanese University, Tripoli, Lebanon. (2013 Jan 18)

**Queensland University of Technology, Brisbane:  
Application of near infrared (NIR) spectroscopy for  
determining the thickness of articular cartilage**

By a News Reporter-Staff News Editor at Health & Medicine Week – Research findings on Medical Engineering and Physics are discussed in a new report. According to news reporting from Brisbane, Australia, by NewsRx journalists, research stated, “The determination of the characteristics of articular cartilage such as thickness, stiffness and swelling, especially in the form that can facilitate real-time decisions and diagnostics is still a matter for research and development. This paper correlates near infrared spectroscopy with mechanically measured cartilage thickness to establish a fast, non-destructive, repeatable and precise protocol for determining this tissue property.”

The news correspondents obtained a quote from the research from the Queensland University of Technology, “Statistical correlation was conducted between the thickness of bovine cartilage specimens ( $n=97$ ) and regions of their near infrared spectra. Nine regions were established along the full absorption spectrum of each sample and were correlated with the thickness using partial least squares (PLS) regression multivariate analysis. The coefficient of determination ( $R^2$ ) varied between 53 and 93%, with the most predictive region ( $R^2=93.1\%$ ,  $p<0.0001$ ) for cartilage thickness lying in the region (wavenumber) 5350-8850 $\text{cm}^{-1}$ ). Our results demonstrate that the thickness of articular cartilage can be measured spectroscopically using NIR light.”

According to the news reporters, the research concluded: “This protocol is potentially beneficial to clinical practice and surgical procedures in the treatment of joint disease such as osteoarthritis.”

For more information on this research see: Application of near infrared (NIR) spectroscopy for determining the thickness of articular cartilage. *Medical Engineering & Physics*, 2013;35(1):88-95. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting I. Afara, School of Engineering Systems, Institute of Health and Biomedical Innovation, Faculty of Built Environment, Queensland University of Technology, Brisbane, Australia. (2013 Jan 18)

## **University of Waterloo: Characterization of the protective capacity of flooring systems using force-deflection profiling**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Medical Engineering and Physics. According to news reporting originating from Waterloo, Canada, by NewsRx correspondents, research stated, “Safety floors’ aim to decrease the risk of fall-related injuries by absorbing impact energy during falls. Ironically, excessive floor deflection during walking or standing may increase fall risk.”

Our news editors obtained a quote from the research from the University of Waterloo, “In this study we used a materials testing system to characterize the ability of a range of floors to absorb energy during simulated head and hip impacts while resisting deflection during simulated single-leg stance. We found that energy absorption for all safety floors (mean (SD)=14.8 (4.9)J) and bedside mats (25.1 (9.3)J) was 3.2-to 5.4-fold greater than the control condition (commercial carpet). While footfall deflections were not significantly different between safety floors (1.8 (0.7)mm) and the control carpet (3.7 (0.6)mm), they were significantly higher for two bedside mats. Finally, all of the safety floors, and two bedside mats, displayed 3-10 times the energy-absorption-to-deflection ratios observed for the baseline carpet. Overall, these results suggest that the safety floors we tested effectively addressed two competing demands required to reduce fall-related injury risk; namely the ability to absorb substantial impact energy without increasing footfall deflections.”

According to the news editors, the research concluded: “This study contributes to the literature suggesting that safety floors are a promising intervention for reducing fall-related injury risk in older adults.”

For more information on this research see: Characterization of the protective capacity of flooring systems using force-deflection profiling. *Medical Engineering & Physics*, 2013;35(1):108-15. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting M.N. Glinka, Injury Biomechanics and Aging Laboratory, Dept. of Kinesiology, University of Waterloo, Waterloo, ON, Canada. (2013 Jan 18)

**Central Research Laboratory, Tokyo: Simultaneous measurement of neuronal activity and cortical hemodynamics by unshielded magnetoencephalography and near-infrared spectroscopy**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news originating from Tokyo, Japan, by NewsRx correspondents, research stated, “The correlation between neuronal activity and cortical hemodynamics, namely, neurovascular coupling (NVC), is important to shed light on the mechanism of a variety of brain functions or neuronal diseases. NVC can be studied by simultaneously measuring neuronal activity and cortical hemodynamics.”

Our news journalists obtained a quote from the research from Central Research Laboratory, “Consequently, noninvasive measurements of the NVC have been widely studied using both electroencephalography (EEG) and functional magnetic resonance imaging (fMRI). However, electromagnetic interference between EEG and fMRI is still a major problem. On the other hand, near-infrared spectroscopy (NIRS) is another promising tool for detecting cortical hemodynamics because it can be combined with EEG or magnetoencephalography (MEG) without any electromagnetic interference. Accordingly, in the present study, a simultaneous measurement system-combining an unshielded MEG using a two-dimensional gradiometer based on a low-T<sub>c</sub> superconducting quantum interference device (SQUID) and an NIRS using nonmagnetic thin probes-was developed. This combined system was used to simultaneously measure both an auditory-evoked magnetic field and blood flow change in the auditory cortex.”

According to the news editors, the research concluded: “It was experimentally demonstrated that the combined unshielded MEG/NIRS system can simultaneously measure neuronal activity and cortical hemodynamics.”

For more information on this research see: Simultaneous measurement of neuronal activity and cortical hemodynamics by unshielded magnetoencephalography and near-infrared spectroscopy. *Journal of Biomedical Optics*, 2012;17(10):107001.

The news correspondents report that additional information may be obtained from Y. Seki, Central Research Laboratory, Hitachi Ltd, 1-280 Higashi-Koigakubo, Kokubunji-shi, Tokyo 185-8601, Japan. (2013 Jan 16)

## National Research Council, Pisa: Finite Element Strategies to Satisfy Clinical and Engineering Requirements in the Field of Percutaneous Valves

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news originating from Pisa, Italy, by NewsRx correspondents, research stated, “Finite element (FE) modelling can be a very resourceful tool in the field of cardiovascular devices. To ensure result reliability, FE models must be validated experimentally against physical data.”

Our news journalists obtained a quote from the research from National Research Council, “Their clinical application (e.g., patients’ suitability, morphological evaluation) also requires fast simulation process and access to results, while engineering applications need highly accurate results. This study shows how FE models with different mesh discretisations can suit clinical and engineering requirements for studying a novel device designed for percutaneous valve implantation. Following sensitivity analysis and experimental characterisation of the materials, the stent-graft was first studied in a simplified geometry (i.e., compliant cylinder) and validated against in vitro data, and then in a patient-specific implantation site (i.e., distensible right ventricular out-flow tract). Different meshing strategies using solid, beam and shell elements were tested. Results showed excellent agreement between computational and experimental data in the simplified implantation site. Beam elements were found to be convenient for clinical applications, providing reliable results in less than one hour in a patient-specific anatomical model. Solid elements remain the FE choice for engineering applications, albeit more computationally expensive (> 100 times).”

According to the news editors, the research concluded: “This work also showed how information on device mechanical behaviour differs when acquired in a simplified model as opposed to a patient-specific model.”

For more information on this research see: Finite Element Strategies to Satisfy Clinical and Engineering Requirements in the Field of Percutaneous Valves. *Annals of Biomedical Engineering*, 2012;40(12):2663-2673. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from C. Capelli, CNR Reg Toscana, Fdn G Monasterio, Pisa, Italy. (2013 Jan 16)

## National Tsing Hua University, Hsinchu: Retention of Features on a Mapped *Drosophila* Brain Surface Using a Bezier-Tube-Based Surface Model Averaging Technique

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting from Hsinchu, Taiwan, by NewsRx journalists, research stated, “Model averaging is a widely used technique in biomedical applications. Two established model averaging methods, iterative shape averaging (ISA) method and virtual insect brain (VIB) method, have been applied to several organisms to generate average representations of their brain surfaces.”

The news correspondents obtained a quote from the research from National Tsing Hua University, “However, without sufficient samples, some features of the average *Drosophila* brain surface obtained using the above methods may disappear or become distorted. To overcome this problem, we propose a Bezier-tube-based surface model averaging strategy. The proposed method first compensates for disparities in position, orientation, and dimension of input surfaces, and then evaluates the average surface by performing shape-based interpolation. Structural features with larger individual disparities are simplified with half-ellipsoid-shaped Bezier tubes, and are unified according to these tubes to avoid distortion during the averaging process. Experimental results show that the average model yielded by our method could preserve fine features and avoid structural distortions even if only a limit amount of input samples are used. Finally, we qualitatively compare our results with those obtained by ISA and VIB methods by measuring the surface-to-surface distances between input surfaces and the averaged ones.”

According to the news reporters, the research concluded: “The comparisons show that the proposed method could generate a more representative average surface than both ISA and VIB methods.”

For more information on this research see: Retention of Features on a Mapped *Drosophila* Brain Surface Using a Bezier-Tube-Based Surface Model Averaging Technique. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3314-3326. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting G.Y. Chen, Natl Tsing Hua Univ, Dept. of Life Sci, Hsinchu 30013, Taiwan. (2013 Jan 16)



## Seoul National University: Conductive Polymer Foam Surface Improves the Performance of a Capacitive EEG Electrode

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Seoul, South Korea, by NewsRx journalists, research stated, “In this paper, a new conductive polymer foam surfaced electrode was proposed for use as a capacitive EEG electrode for noninvasive EEG measurements in out-of-hospital environments. The current capacitive electrode has a rigid surface that produces an undefined contact area due to its stiffness, which renders it unable to conform to head curvature and locally isolates hairs between the electrode surface and scalp skin, making EEG measurement through hair difficult.”

The news correspondents obtained a quote from the research from Seoul National University, “In order to overcome this issue, a conductive polymer foam was applied to the capacitive electrode surface to provide a cushioning effect. This enabled EEG measurement through hair without any conductive contact with bare scalp skin. Experimental results showed that the new electrode provided lower electrode-skin impedance and higher voltage gains, signal-to-noise ratios, signal-to-error ratios, and correlation coefficients between EEGs measured by capacitive and conventional resistive methods compared to a conventional capacitive electrode. In addition, the new electrode could measure EEG signals, while the conventional capacitive electrode could not.”

According to the news reporters, the research concluded: “We expect that the new electrode presented here can be easily installed in a hat or helmet to create a noninvasive wearable EEG apparatus that does not make users look strange for real-world EEG applications.”

For more information on this research see: Conductive Polymer Foam Surface Improves the Performance of a Capacitive EEG Electrode. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3422-3431. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting H.J. Baek, Seoul National University, Grad Program Bioengn, Seoul 110799, South Korea. (2013 Jan 16)

## **University Hospital Cleveland: MEMS Capacitive Accelerometer-Based Middle Ear Microphone**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Cleveland, Ohio, by NewsRx journalists, research stated, “The design, implementation, and characterization of a microelectromechanical systems (MEMS) capacitive accelerometer-based middle ear microphone are presented in this paper. The microphone is intended for middle ear hearing aids as well as future fully implantable cochlear prosthesis.”

The news correspondents obtained a quote from the research from University Hospital Cleveland, “Human temporal bones acoustic response characterization results are used to derive the accelerometer design requirements. The prototype accelerometer is fabricated in a commercial silicon-on-insulator (SOI) MEMS process. The sensor occupies a sensing area of 1 mm x 1 mm with a chip area of 2 mm x 2.4 mm and is interfaced with a custom-designed low-noise electronic IC chip over a flexible substrate. The packaged sensor unit occupies an area of 2.5 mm x 6.2 mm with a weight of 25 mg. The sensor unit attached to umbo can detect a sound pressure level (SPL) of 60 dB at 500 Hz, 35 dB at 2 kHz, and 57 dB at 8 kHz. An improved sound detection limit of 34-dB SPL at 150 Hz and 24-dB SPL at 500 Hz can be expected by employing start-of-the-art MEMS fabrication technology, which results in an articulation index of approximately 0.76.”

According to the news reporters, the research concluded: “Further micro/nanofabrication technology advancement is needed to enhance the microphone sensitivity for improved understanding of normal conversational speech.”

For more information on this research see: MEMS Capacitive Accelerometer-Based Middle Ear Microphone. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3283-3292. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting D.J. Young, University Hospital Cleveland, Dept. of Otolaryngol Head & Neck Surg, Cleveland, OH 44106, United States. (2013 Jan 16)

## **University of Arkansas, Little Rock: Breathing Resistance and Ultrafine Particle Deposition in Nasal-Laryngeal Airways of a Newborn, an Infant, a Child, and an Adult**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Little Rock, Arkansas, by NewsRx journalists, research stated, “As a human grows from birth to adulthood, both airway anatomy and breathing conditions vary, altering the deposition rate and pattern of inhaled aerosols. However, deposition studies have typically focused on adult subjects, results of which may not be readily extrapolated to children.”

The news correspondents obtained a quote from the research from the University of Arkansas, “This study numerically evaluated the age-related effects on the airflow and aerosol dynamics in image-based nose-throat models of a 10-day-old newborn, a 7-month-old infant, a 5-year-old child, and a 53-year-old adult. Differences in airway physiology, breathing resistance, and aerosol filtering efficiency among the four models were quantified and compared. A high-fidelity fluid-particle transport model was employed to simulate the multi-regime airflows and particle transport within the nasal-laryngeal airways. Ultrafine particles were evaluated under breathing conditions ranging from sedentary to heavy activities. Results of this study indicate that the nasal-laryngeal airways at different ages, albeit differ significantly in morphology and dimension, do not significantly affect the total deposition fractions or maximum local deposition enhancement for ultrafine aerosols. Further, the deposition partitioning in the sub-regions of interest is different among the four models. Results of this study corroborate the use of the in vivo-based diffusion parameter ( $D(0.5)Q(-0.28)$ ) over the replica-based parameter in correlating nasal-laryngeal depositions of ultrafine aerosols.”

According to the news reporters, the research concluded: “Improved correlations have been developed for the four age groups by implementing this in vivo-based diffusion parameter as well as the Cunningham correction factor.”

For more information on this research see: Breathing Resistance and Ultrafine Particle Deposition in Nasal-Laryngeal Airways of a Newborn, an Infant, a Child, and an Adult. *Annals of Biomedical Engineering*, 2012;40(12):2579-2595. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting J.X. Xi, University of Arkansas, Dept. of Radiol, Little Rock, AR 72205, United States. (2013 Jan 16)

## **University of Burgundy, Dijon: Estimation of Muscular Fatigue Under Electromyostimulation Using CWT**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Dijon, France, by NewsRx journalists, research stated, “The aim of this study is to investigate muscular fatigue and to propose a new fatigue index based on the continuous wavelet transform (CWT) which is compared to the standard fatigue indexes from literature.”

The news correspondents obtained a quote from the research from the University of Burgundy, “Fatigue indexes are all based on the electrical activity of muscles [electromyogram (EMG)] acquired during an electrically stimulated contraction thanks to two modules (electromyostimulation + electromyography recording) that can analyze EMG signals in real time during electromyostimulation. The extracted parameters are compared with each other and their sensitivity to noise is studied.”

According to the news reporters, the research concluded: “The effect of truncation of M waves is then investigated, enlightening the robustness of the index obtained using CWT.”

For more information on this research see: Estimation of Muscular Fatigue Under Electromyostimulation Using CWT. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3372-3378. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting M. Yochum, Univ Burgundy, Lab INSERM U887, F-21078 Dijon, France. (2013 Jan 16)

## **University of California, Irvine: In vivo spatial frequency domain spectroscopy of two layer media**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news reporting originating in Irvine, California, by NewsRx journalists, research stated, “Monitoring of tissue blood volume and local oxygen saturation can inform the assessment of tissue health, healing, and dysfunction. These quantities can be estimated from the contribution of oxyhemoglobin and deoxyhemoglobin to the absorption spectrum of the dermis.”

The news reporters obtained a quote from the research from the University of California, “However, estimation of blood related absorption in skin can be confounded by the strong absorption of melanin in the epidermis and epidermal thickness and pigmentation varies with anatomic location, race, gender, and degree of disease progression. Therefore, a method is desired that decouples the effect of melanin absorption in the epidermis from blood absorption in the dermis for a large range of skin types and thicknesses. A previously developed inverse method based on a neural network forward model was applied to simulated spatial frequency domain reflectance of skin for multiple wavelengths in the near infrared. It is demonstrated that the optical thickness of the epidermis and absorption and reduced scattering coefficients of the dermis can be determined independently and with minimal coupling. Then, the same inverse method was applied to reflectance measurements from a tissue simulating phantom and in vivo human skin.”

According to the news reporters, the research concluded: “Oxygen saturation and total hemoglobin concentrations were estimated from the volar forearms of weakly and strongly pigmented subjects using a standard homogeneous model and the present two layer model.”

For more information on this research see: In vivo spatial frequency domain spectroscopy of two layer media. *Journal of Biomedical Optics*, 2012;17(10):107006.

Our news correspondents report that additional information may be obtained by contacting D. Yudovsky, Laser Microbeam and Medical Program, Beckman Laser Institute, University of California, Irvine, 1002 Health Sciences Road, Irvine, California 92612, United States. (2013 Jan 16)

### **University of Canterbury, Christchurch: Structural Identifiability and Practical Applicability of an Alveolar Recruitment Model for ARDS Patients**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Christchurch, New Zealand, by NewsRx correspondents, research stated, “Specific mathematical models of respiratory mechanics can offer substantial insight into patient state and pulmonary dynamics that are not directly measurable. Thus, they offer significant potential to evaluate and guide patient-specific lung protective ventilator strategies for acute respiratory distress syndrome (ARDS) patients.”

Our news journalists obtained a quote from the research from the University of Canterbury, “To assure bedside applicability, the model must be computationally efficient and identifiable from the limited

available data, while also capturing dominant dynamics and trends observed in ARDS patients. In this study, an existing static recruitment model is enhanced by considering alveolar distension and implemented in a novel time-continuous dynamic respiratory mechanics model. The model was tested for structural identifiability and a hierarchical gradient descent approach was used to fit the model to low-flow test responses of 12 ARDS patients. Finally, a comprehensive practical identifiability analysis was performed to evaluate the impact of data quality on the model parameters. Identified parameter values were physiologically plausible and very accurately reproduced the measured pressure responses. Structural identifiability of the model was proven, but practical identifiability analysis of the results showed a lack of convexity on the error surface indicating that successful parameter identification is currently not assured in all test sets. Overall, the model presented is physiologically and clinically relevant, captures ARDS dynamics, and uses clinically descriptive parameters. The patient-specific models show the ability to capture pulmonary dynamics directly relevant to patient condition and clinical guidance.”

According to the news editors, the research concluded: “These characteristics currently cannot be directly measured or established without such a validated model.”

For more information on this research see: Structural Identifiability and Practical Applicability of an Alveolar Recruitment Model for ARDS Patients. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3396-3404. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from C. Schranz, University of Canterbury, Dept. of Mech Engn, Christchurch 8140, New Zealand. (2013 Jan 16)

### **Veterans General Hospital, Taipei: Interactive wiimote gaze stabilization exercise training system for patients with vestibular hypofunction**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Taipei, Taiwan, by NewsRx correspondents, research stated, “Peripheral vestibular hypofunction is a major cause of dizziness. When complicated with postural imbalance, this condition can lead to an increased incidence of falls.”

Our news editors obtained a quote from the research from Veterans General Hospital, “In traditional clinical practice, gaze stabilization exercise is commonly used to rehabilitate patients. In this study, we established a computer-aided vestibular rehabilitation system by coupling infrared LEDs to an infrared receiver.”

According to the news editors, the research concluded: “This system enabled the subjects’ head-turning actions to be quantified, and the training was performed using vestibular exercise combined with computer games and interactive video games that simulate daily life activities.”

For more information on this research see: Interactive wiimote gaze stabilization exercise training system for patients with vestibular hypofunction. *Journal of Neuroengineering and Rehabilitation*, 2012;9(0):77. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Neuroengineering and Rehabilitation* - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

The news editors report that additional information may be obtained by contacting P.Y. Chen, Dept. of Physical Medicine & Rehabilitation, Taipei Veterans General Hospital, Taipei, Taiwan. (2013 Jan 16)

### **Yang Ming National University, Taipei: Retinal Vascular Tree Reconstruction With Anatomical Realism**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Taipei, Taiwan, by NewsRx correspondents, research stated, “Motivated by the goals of automatically extracting vessel segments and constructing retinal vascular trees with anatomical realism, this paper presents and analyses an algorithm that combines vessel segmentation and grouping of the extracted vessel segments. The proposed method aims to restore the topology of the vascular trees with anatomical realism for clinical studies and diagnosis of retinal vascular diseases, which manifest abnormalities in either venous and/or arterial vascular systems.”

Our news journalists obtained a quote from the research from Yang Ming National University, “Vessel segments are grouped using extended Kalman filter which takes into account continuities in curvature, width, and intensity changes at the bifurcation or crossover point. At a junction, the proposed method applies the minimum-cost matching algorithm to resolve the conflict in grouping due to error in tracing. The system was trained with 20 images from the DRIVE dataset, and tested using the remaining 20 images. The dataset contained a mixture of normal and pathological images. In addition, six pathological fluorescein angiogram sequences were also included in this study.”

According to the news editors, the research concluded: “The results were compared against the groundtruth images provided by a physician, achieving average success rates of 88.79% and 90.09%, respectively.”

For more information on this research see: Retinal Vascular Tree Reconstruction With Anatomical Realism. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3337-3347. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from K.S. Lin, Yang Ming National University, Taipei Veterans General Hospital, Taipei 112, Taiwan. (2013 Jan 16)

### **Hunan University, Changsha: Group-Sparse Representation With Dictionary Learning for Medical Image Denoising and Fusion**

By a News Reporter-Staff News Editor at Telemedicine Week – Data detailed on Biomedical Engineering have been presented. According to news originating from Changsha, People’s Republic of China, by NewsRx correspondents, research stated, “Recently, sparse representation has attracted a lot of interest in various areas. However, the standard sparse representation does not consider the intrinsic structure, i.e., the nonzero elements occur in clusters, called group sparsity.”

Our news journalists obtained a quote from the research from Hunan University, “Furthermore, there is no dictionary learning method for group sparse representation considering the geometrical structure of space spanned by atoms. In this paper, we propose a novel dictionary learning method, called Dictionary Learning with Group Sparsity and Graph Regularization (DL-GSGR). First, the geometrical structure of atoms is modeled as the graph regularization. Then, combining group sparsity and graph regularization, the DL-GSGR is presented, which is solved by alternating the group sparse coding and dictionary updating. In this way, the group coherence of learned dictionary can be enforced small enough such that any signal can be group sparse coded effectively. Finally, group sparse representation with DL-GSGR is applied to 3-D medical image denoising and image fusion. Specifically, in 3-D medical image denoising, a 3-D processing mechanism (using the similarity among nearby slices) and temporal regularization (to perverse the correlations across nearby slices) are exploited.”

According to the news editors, the research concluded: “The experimental results on 3-D image denoising and image fusion demonstrate the superiority of our proposed denoising and fusion approaches.”



For more information on this research see: Group-Sparse Representation With Dictionary Learning for Medical Image Denoising and Fusion. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3450-3459. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from S.T. Li, Hunan Univ, Coll Elect & Informat Engn, Changsha 410082, Hunan, People's Republic of China. (2013 Jan 15)

### **University of Texas, Austin: Automatic Feature Extraction and Statistical Shape Model of the AIDS Virus Spike**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Austin, Texas, by NewsRx journalists, research stated, “We introduce a method to automatically extract spike features of the AIDS virus imaged through an electron microscope. The AIDS virus spike is the primary target of drug design as it is directly involved in infecting host cells.”

The news reporters obtained a quote from the research from the University of Texas, “Our method detects the location of these spikes and extracts a subvolume enclosing the spike. We have achieved a sensitivity of 80% for our best operating range. The extracted spikes are further aligned and combined to build a 4-D statistical shape model, where each voxel in the shape model is assigned a probability density function. Our method is the first fully automated technique that can extract subvolumes of the AIDS virus spike and be used to build a statistical model without the need for any user supervision. We envision that this new tool will significantly enhance the overall process of shape analysis of the AIDS virus spike imaged through the electron microscope.”

According to the news reporters, the research concluded: “Accurate models of the virus spike will help in the development of better drug design strategies.”

For more information on this research see: Automatic Feature Extraction and Statistical Shape Model of the AIDS Virus Spike. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3386-3395. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical

Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting A. Gopinath, Univ Texas Austin, Dept. of Elect & Comp Engn, Austin, TX 78712, United States. (2013 Jan 15)

### **Oregon Health and Science University, Portland: Multireference Level Set for the Characterization of Nuclear Morphology in Glioblastoma Multiforme**

By a News Reporter-Staff News Editor at Clinical Oncology Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating in Portland, Oregon, by NewsRx journalists, research stated, “Histological tissue sections provide rich information and continue to be the gold standard for the assessment of tissue neoplasm. However, there are a significant amount of technical and biological variations that impede analysis of large histological datasets.”

The news reporters obtained a quote from the research from Oregon Health and Science University, “In this paper, we have proposed a novel approach for nuclear segmentation in tumor histology sections, which addresses the problem of technical and biological variations by incorporating information from both manually annotated reference patches and the original image. Subsequently, the solution is formulated within a multireference level set framework. This approach has been validated on manually annotated samples and then applied to the TCGA glioblastoma multiforme (GBM) dataset consisting of 440 whole mount tissue sections scanned with either a 20x or 40x objective, in which, each tissue section varies in size from 40k x 40k pixels to 100k x 100k pixels.”

According to the news reporters, the research concluded: “Experimental results show a superior performance of the proposed method in comparison with present state of art techniques.”

For more information on this research see: Multireference Level Set for the Characterization of Nuclear Morphology in Glioblastoma Multiforme. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3460-3467. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting H. Chang, Oregon Health Sciences University, Center Spatial Syst Biomed, Portland, OR 97239, United States. (2013 Jan 14)

## Aristotle University, Thessaloniki: Toward an EEG-Based Recognition of Music Liking Using Time-Frequency Analysis

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Thessaloniki, Greece, by NewsRx journalists, research stated, “Affective phenomena, as reflected through brain activity, could constitute an effective index for the detection of music preference. In this vein, this paper focuses on the discrimination between subjects’ electroencephalogram (EEG) responses to self-assessed liked or disliked music, acquired during an experimental procedure, by evaluating different feature extraction approaches and classifiers to this end.”

The news correspondents obtained a quote from the research from Aristotle University, “Feature extraction is based on time-frequency (TF) analysis by implementing three TF techniques, i.e., spectrogram, Zhao-Atlas-Marks distribution and Hilbert-Huang spectrum (HHS). Feature estimation also accounts for physiological parameters that relate to EEG frequency bands, reference states, time intervals, and hemispheric asymmetries. Classification is performed by employing four classifiers, i.e., support vector machines, k-nearest neighbors (k-NN), quadratic and Mahalanobis distance-based discriminant analyses. According to the experimental results across nine subjects, best classification accuracy {86.52 (+/-0.76)%} was achieved using k-NN and HHS-based feature vectors (FVs) representing a bilateral average activity, referred to a resting period, in beta (13-30 Hz) and gamma (30-49 Hz) bands. Activity in these bands may point to a connection between music preference and emotional arousal phenomena. Furthermore, HHS-based FVs were found to be robust against noise corruption.”

According to the news reporters, the research concluded: “The outcomes of this study provide early evidence and pave the way for the development of a generalized brain computer interface for music preference recognition.”

For more information on this research see: Toward an EEG-Based Recognition of Music Liking Using Time-Frequency Analysis. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3498-3510. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting S.K. Hadjidimitriou, Aristotle University, Dept. of Elect & Comp Engn, GR-54124 Thessaloniki, Greece. (2013 Jan 09)

### **Beckman Laser Institute and Medical Clinic, Irvine: Effects of motion on optical properties in the spatial frequency domain**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Optics. According to news reporting from Irvine, California, by NewsRx journalists, research stated, “Spatial frequency domain imaging (SFDI) is a noncontact and wide-field optical imaging technology currently being used to study the optical properties and chromophore concentrations of in vivo skin including skin lesions of various types. Part of the challenge of developing a clinically deployable SFDI system is related to the development of effective motion compensation strategies, which in turn, is critical for recording high fidelity optical properties.”

The news correspondents obtained a quote from the research from Beckman Laser Institute and Medical Clinic, “Here we present a two-part strategy for SFDI motion correction. After verifying the effectiveness of the motion correction algorithm on tissue-simulating phantoms, a set of skin-imaging data was collected in order to test the performance of the correction technique under real clinical conditions. Optical properties were obtained with and without the use of the motion correction technique. The results indicate that the algorithm presented here can be used to render optical properties in moving skin surfaces with fidelities within 1.5% of an ideal stationary case and with up to 92.63% less variance.”

According to the news reporters, the research concluded: “Systematic characterization of the impact of motion variables on clinical SFDI measurements reveals that until SFDI instrumentation is developed to the point of instantaneous imaging, motion compensation is necessary for the accurate localization and quantification of heterogeneities in a clinical setting.”

For more information on this research see: Effects of motion on optical properties in the spatial frequency domain. *Journal of Biomedical Optics*, 2011;16(12):126009.

Our news journalists report that additional information may be obtained by contacting J.Q. Nguyen, Beckman Laser Institute and Medical Clinic, 1002 Health Sciences Road, Irvine, California 92617-3010, United States. (2013 Jan 09)

**China University of Science and Technology, Hefei:  
Conformal Hyperthermia of Superficial Tumor With  
Left-Handed Metamaterial Lens Applicator**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting out of Hefei, People's Republic of China, by NewsRx editors, research stated, "With proper source spacing, low loss left-handed metamaterial (LHM) lens should be useful for hyperthermia treatment of large area tumors. With a flat LHM lens applicator, conformal hyperthermia can be performed by joint heating of multiple microwave sources (antennas)."

Our news journalists obtained a quote from the research from the China University of Science and Technology, "In the hyperthermia, we restrict distance of two neighboring sources within a critical source interval, arrange the sources in a specific array of general shape in accord with the tumor, and adjust the source-to-lens distance to acquire desired inclination of the heating zone for better fit to tumor region. It is shown that inclination can also be adjusted by the phases of microwave sources."

According to the news editors, the research concluded: "A maneuverable LHM-based hyperthermia scheme is thus proposed to generate a relatively large and even tilted heating pattern in tissue."

For more information on this research see: Conformal Hyperthermia of Superficial Tumor With Left-Handed Metamaterial Lens Applicator. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3525-3530. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting Y.H. Tao, China University of Science & Technology, Dept. of Elect Engrn & Informat Sci, Hefei 230027, People's Republic of China. (2013 Jan 09)

## **Columbia University, New York City: Dynamic contrast-enhanced optical imaging of in vivo organ function**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting from New York City, New York, by NewsRx journalists, research stated, “Conventional approaches to optical small animal molecular imaging suffer from poor resolution, limited sensitivity, and unreliable quantitation, often reducing their utility in practice. We previously demonstrated that the in vivo dynamics of an injected contrast agent could be exploited to provide high-contrast anatomical registration, owing to the temporal differences in each organ’s response to the circulating fluorophore.”

The news correspondents obtained a quote from the research from Columbia University, “This study extends this approach to explore whether dynamic contrast-enhanced optical imaging (DyCE) can allow noninvasive, in vivo assessment of organ function by quantifying the differing cellular uptake or wash-out dynamics of an agent in healthy and damaged organs. Specifically, we used DyCE to visualize and measure the organ-specific uptake dynamics of indocyanine green before and after induction of transient liver damage. DyCE imaging was performed longitudinally over nine days, and blood samples collected at each imaging session were analyzed for alanine aminotransferase (ALT), a liver enzyme assessed clinically as a measure of liver damage. We show that changes in DyCE-derived dynamics of liver and kidney dye uptake caused by liver damage correlate linearly with ALT concentrations, with an  $r^2$  value of 0.91.”

According to the news reporters, the research concluded: “Our results demonstrate that DyCE can provide quantitative, in vivo, longitudinal measures of organ function with inexpensive and simple data acquisition.”

For more information on this research see: Dynamic contrast-enhanced optical imaging of in vivo organ function. *Journal of Biomedical Optics*, 2012;17(9):96003-1.

Our news journalists report that additional information may be obtained by contacting C.B. Amoozegar, Columbia University, Dept. of Biomedical Engineering and Radiology, Laboratory for Functional Optical Imaging, 351 Engineering Terrace, 1210 Amsterdam Avenue, New York, New York 10027, United States. (2013 Jan 09)

## **Dalhousie University, Halifax: Improved Localization Accuracy in Magnetic Source Imaging Using a 3-D Laser Scanner**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Halifax, Canada, by NewsRx correspondents, research stated, “Brain source localization accuracy in magnetoencephalography (MEG) requires accuracy in both digitizing anatomical landmarks and coregistering to anatomical magnetic resonance images (MRI). We compared the source localization accuracy and MEG-MRI coregistration accuracy of two head digitization systems—a laser scanner and the current standard electromagnetic digitization system (Polhemus)—using a calibrated phantom and human data.”

Our news editors obtained a quote from the research from Dalhousie University, “When compared using the calibrated phantom, surface and source localization accuracy for data acquired with the laser scanner improved over the Polhemus by 141% and 132%, respectively. Laser scan digitization reduced MEG source localization error by 1.38 mm on average. In human participants, a laser scan of the face generated a 1000-fold more points per unit time than the Polhemus head digitization. An automated surface-matching algorithm improved the accuracy of MEG-MRI coregistration over the equivalent manual procedure. Simulations showed that the laser scan coverage could be reduced to an area around the eyes only while maintaining coregistration accuracy, suggesting that acquisition time can be substantially reduced.”

According to the news editors, the research concluded: “Our results show that the laser scanner can both reduce setup time and improve localization accuracy, in comparison to the Polhemus digitization system.”

For more information on this research see: Improved Localization Accuracy in Magnetic Source Imaging Using a 3-D Laser Scanner. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3491-3497. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting T. Bardouille, Dalhousie University, Halifax, NS B3K 6R8, Canada. (2013 Jan 09)

### **Dartmouth School of Medicine, Hanover: Clinical Microwave Tomographic Imaging of the Calcaneus: A First-in-Human Case Study of Two Subjects**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Hanover, New Hampshire, by NewsRx correspondents, research stated, “We have acquired 2-D and 3-D microwave tomographic images of the calcaneus bones of two patients to assess correlation of the microwave properties with X-ray density measures. The two volunteers were selected because each had one leg immobilized for at least six weeks during recovery from a lower leg injury.”

Our news editors obtained a quote from the research from the Dartmouth School of Medicine, “A soft-prior regularization technique was incorporated with the microwave imaging to quantitatively assess the bulk dielectric properties within the bone region. Good correlation was observed between both permittivity and conductivity and the computed tomography-derived density measures.”

According to the news editors, the research concluded: “These results represent the first clinical examples of microwave images of the calcaneus and some of the first 3-D tomographic images of any anatomical site in the living human.”

For more information on this research see: Clinical Microwave Tomographic Imaging of the Calcaneus: A First-in-Human Case Study of Two Subjects. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3304-3313. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting P.M. Meaney, Dartmouth Med Sch, Hanover, NH 03755, United States. (2013 Jan 09)

### **Dartmouth-Hitchcock Medical Center, Lebanon: A Real-Time Electrical Impedance Sensing Biopsy Needle**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting from Lebanon, New Hampshire, by NewsRx journalists, research stated, “Diagnostic confirmation of cancer in solid organs is based on biopsy findings. In a standard 12-core prostate biopsy protocol, conventional biopsy needles sample only 0.95% (similar to 0.228 cm(3)) of a typical 24-cm(3) prostate gland.”



The news correspondents obtained a quote from the research from Dartmouth-Hitchcock Medical Center, “The primary objective of this study was to enhance the sensitivity of standard biopsy protocol by gauging electrical properties of tissue simultaneously with tissue extraction for histopathology analysis. A conventional biopsy (Bx) needle was instrumented with an electrical impedance spectroscopy (EIS) sensor to interrogate the tissue volume surrounding the needle tip. The EIS-Bx device was evaluated in a series of saline bath and ex vivo porcine experiments. It was found to sense a volume of 0.286 cm(3) of tissue around the needle tip. EIS measurements were recorded from three ex vivo human prostates using the device, and the extracted biopsy cores were histologically assessed. Prostate conductivity sigma ranged from 0.179 to 0.3310 S/m for benign tissues and 0.0746 to 0.0837 S/m for malignant tissues at frequencies ranging from 1 to 100 kHz. Relative permittivity epsilon(r) ranged from  $2.1 \times 10^6$  to  $2.9 \times 10^4$  for benign and  $6.63 \times 10^5$  to  $5.3 \times 10^3$  for cancer tissues over the same frequency range.”

According to the news reporters, the research concluded: “Both are found to be significantly higher in normal prostate tissues than in malignant tissue ( $p < 0.00001$ ).”

For more information on this research see: A Real-Time Electrical Impedance Sensing Biopsy Needle. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3327-3336. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting V. Mishra, Dartmouth Hitchcock Med Center, Lebanon, NH 03766, United States. (2013 Jan 09)

### **Department of Vascular Surgery, St. Etienne: Severe Bending of Two Aortic Stent-Grafts: An Experimental and Numerical Mechanical Analysis**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from St. Etienne, France, by NewsRx correspondents, research stated, “Stent-grafts (SGs) are commonly used for treating abdominal aortic aneurysms (AAAs) and numerical models tend to be developed for predicting the biomechanical behavior of these devices. However, due to the complexity of SGs, it is important to validate the models.”

Our news editors obtained a quote from the research from the Department of Vascular Surgery, “In this work, a validation of the numerical model developed in Demanget et al. (J. Mech. Behav. Biomed. Mater. 5:272-282, 2012) is presented. Two commercially available SGs were subjected to severe bending tests and their 3D geometries in undeformed and bent configurations were imaged from X-ray microtomography. Dedicated image processing subroutines were used in order to extract the stent centerlines from the 3D images. These skeletons in the undeformed configurations were used to set up SG numerical models that are subjected to the boundary conditions measured experimentally. Skeletons of imaged and deformed stents were then quantitatively compared to the numerical simulations. A good agreement is found between experiments and simulations.”

According to the news editors, the research concluded: “This validation offers promising perspectives to implementing the numerical models in a computer-aided tool and simulating the endovascular treatments.”

For more information on this research see: Severe Bending of Two Aortic Stent-Grafts: An Experimental and Numerical Mechanical Analysis. *Annals of Biomedical Engineering*, 2012;40(12):2674-2686. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting N. Demanget, CHU Hopital Nord, Dept. of Vasc Surg, F-42055 St Etienne, France. (2013 Jan 09)

### **Johns Hopkins University, Baltimore: Reconstruction of High-Resolution Tongue Volumes From MRI**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Baltimore, Maryland, by NewsRx journalists, research stated, “Magnetic resonance images of the tongue have been used in both clinical studies and scientific research to reveal tongue structure. In order to extract different features of the tongue and its relation to the vocal tract, it is beneficial to acquire three orthogonal image volumes-e. g., axial, sagittal, and coronal volumes.”

The news correspondents obtained a quote from the research from Johns Hopkins University, “In order to maintain both low noise and high visual detail and minimize the blurred effect due to involuntary motion artifacts, each set of images is acquired with an in-plane resolution that is much better than the through-plane resolution. As a result, any one dataset, by itself, is not ideal for automatic volumetric

analyses such as segmentation, registration, and atlas building or even for visualization when oblique slices are required. This paper presents a method of superresolution volume reconstruction of the tongue that generates an isotropic image volume using the three orthogonal image volumes. The method uses preprocessing steps that include registration and intensity matching and a data combination approach with the edge-preserving property carried out by Markov random field optimization.”

According to the news reporters, the research concluded: “The performance of the proposed method was demonstrated on 15 clinical datasets, preserving anatomical details and yielding superior results when compared with different reconstruction methods as visually and quantitatively assessed.”

For more information on this research see: Reconstruction of High-Resolution Tongue Volumes From MRI. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3511-3524. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting J. Woo, Johns Hopkins University, Baltimore, MD 21218, United States. (2013 Jan 09)

### **Military Hospital, Brussels: Modeling the Impact of Partial Hepatectomy on the Hepatic Hemodynamics Using a Rat Model**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating from Brussels, Belgium, by NewsRx correspondents, research stated, “Due to the growing shortage of donor livers, more patients are waiting for transplantation. Living donor liver transplantation may help expanding the donor pool, but is often confronted with the small-for-size syndrome.”

Our news editors obtained a quote from the research from Military Hospital, “Since the hemodynamic effects of partial hepatectomy are not fully understood, we developed an electrical rat liver model to compare normal with resected liver hemodynamics. Detailed geometrical data and 3-D reconstructions of the liver vasculature of two rats were gathered by combining vascular corrosion casting, micro-CT scanning, and image processing. Data extrapolations allowed obtaining a total liver pressure-and flow-driven electrical analog. Subsequently, virtual resections led to 70%, 80%, or 90% partial hepatectomy models. Results

demonstrated hyperperfusion effects such as portal hypertension and elevated lobe-specific portal venous flows (11, 12, and 24 mmHg, and 1.0-3.0, 1.8-3.5, and 7.4 ml/min for 70%, 80%, and 90% hepatectomy, respectively). Comparison of two 90% resection techniques demonstrated different total arterial flows (0.28 ml/min versus 0.61 ml/min), portal (24 mmHg versus 21 mmHg), and sinusoidal pressures (14 mmHg versus 9.5-12 mmHg), probably leading to better survival for lower portal and sinusoidal pressures.”

According to the news editors, the research concluded: “Toward the future, the models may be extrapolated to human livers and help us to optimize hepatectomy planning.”

For more information on this research see: Modeling the Impact of Partial Hepatectomy on the Hepatic Hemodynamics Using a Rat Model. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3293-3303. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting C. Debbaut, Military Hosp Queen Astrid, Int Assoc, European Homograft Bank, B-1120 Brussels, Belgium. (2013 Jan 09)

### **National Institutes of Health, Bethesda: Predicting Polyp Location on Optical Colonoscopy From CT Colonography by Minimal-Energy Curve Modeling of the Colonoscope Path**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Bethesda, Maryland, by NewsRx correspondents, research stated, “The ability to accurately locate a polyp found on computed tomographic colonography (CTC) at subsequent optical colonoscopy (OC) is an important task in colorectal cancer screening. We present a method to more accurately match polyp locations at CTC and OC.”

Our news editors obtained a quote from the research from the National Institutes of Health, “A colonoscope was modeled as a flexible tube with negligible stretch and minimal strain. The path of the colonoscope was estimated using a minimal-energy curve method. The energy function was defined and optimized by a subdivision scheme. The prediction of polyp locations at OC from CTC was converted to an optimization problem. The prediction performance was evaluated on 134

polyps by comparing the predicted with the true polyp locations at OC. The method can accurately predict polyp locations at OC to within  $\pm 0.5$  colonoscope mark (5 cm) for more than 58% of polyps and to within  $\pm 1$  colonoscope mark (10 cm) for more than 96% of polyps, significantly improving upon previously published methods.”

According to the news editors, the research concluded: “This method can be easily incorporated into routine OC practice and allow the colonoscopist to begin the examination by targeting locations of potential polyps found at CTC.”

For more information on this research see: Predicting Polyp Location on Optical Colonoscopy From CT Colonography by Minimal-Energy Curve Modeling of the Colonoscope Path. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3531-3540. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting J.M. Liu, National Institutes of Health, Dept. of Radiol & Imaging Sci, Bethesda, MD 20892, United States. (2013 Jan 09)

### **National Taiwan University, Taipei: Multimedia-Assisted Breathwalk-Aware System**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on *Biomedical Engineering* have been presented. According to news reporting from Taipei, Taiwan, by NewsRx journalists, research stated, “Breathwalk is a science of combining specific patterns of footsteps synchronized with the breathing. In this study, we developed a multimedia-assisted Breathwalk-aware system which detects user’s walking and breathing conditions and provides appropriate multimedia guidance on the smartphone.”

The news correspondents obtained a quote from the research from National Taiwan University, “Through the mobile device, the system enhances user’s awareness of walking and breathing behaviors. As an example application in slow technology, the system could help meditator beginners learn ‘walking meditation,’ a type of meditation which aims to be as slow as possible in taking pace, to synchronize footstep with breathing, and to land every footstep with toes first. In the pilot study, we developed a walking-aware system and evaluated whether multimedia-assisted mechanism is capable of enhancing beginner’s walking awareness while walking meditation. Experimental results show that it could effectively assist beginners in slowing down

the walking speed and decreasing incorrect footsteps. In the second experiment, we evaluated the Breathwalk-aware system to find a better feedback mechanism for learning the techniques of Breathwalk while walking meditation.”

According to the news reporters, the research concluded: “The experimental results show that the visual-auditory mechanism is a better multimedia-assisted mechanism while walking meditation than visual mechanism and auditory mechanism.”

For more information on this research see: Multimedia-Assisted Breathwalk-Aware System. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3276-3282. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting M.C. Yu, National Taiwan University, Dept. of Comp Sci & Informat Engn, Taipei 10617, Taiwan. (2013 Jan 09)

### **Polytechnic University, Barcelona: On the Effect of Body Capacitance to Ground in Tetrapolar Bioimpedance Measurements**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of Barcelona, Spain, by NewsRx editors, research stated, “Tetrapolar bioimpedance measurements on subjects have long been suspected of being affected by stray capacitance between the subjects’ body and ground. This paper provides a circuit model to analyze that effect in the frequency range from 100 Hz to 1 MHz in order to identify the relevant parameters when impedance is measured by applying a voltage and measuring both the resulting current and the potential difference between two points on the surface of the volume conductor.”

Our news journalists obtained a quote from the research from Polytechnic University, “The proposed model includes the impedance of each electrode and the input impedance of the differential voltage amplifier. When common values for the circuit parameters are assumed, the simplified model predicts: 1) a frequency-independent gain (scale factor) error; 2) inductive artifacts, that is, the measured impedance increases with increasing frequency and may include positive angle phases; and 3) resonance that can affect well below 1 MHz. In addition to the stray capacitance to ground, relevant parameters that determine those errors are the capacitance of the ‘low-current’ electrode and the input capacitance of the differential voltage amplifier.”

According to the news editors, the research concluded: “Experimental results confirm those theoretical predictions and show effects from several additional resonances above 1 MHz that also depend on body capacitance to ground.”

For more information on this research see: On the Effect of Body Capacitance to Ground in Tetrapolar Bioimpedance Measurements. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3405-3411. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting C. Aliau-Bonet, Univ Politecn Cataluna, BarcelonaTech UPC, ES-08034 Barcelona, Spain. (2013 Jan 09)

### **Seoul National University: Sleep/wake estimation using only anterior tibialis electromyography data**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating in Seoul, South Korea, by NewsRx journalists, research stated, “In sleep efficiency monitoring system, actigraphy is the simplest and most commonly used device. However, low specificity to wakefulness of actigraphy was revealed in previous studies.”

The news reporters obtained a quote from the research from Seoul National University, “In this study, we assumed that sleep/wake estimation using actigraphy and electromyography (EMG) signals would show different patterns. Furthermore, each EMG pattern in two states (sleep, wake during sleep) was analysed.”

According to the news reporters, the research concluded: “Finally, we proposed two types of method for the estimation of sleep/wake patterns using only EMG signals from anterior tibialis muscles and the results were compared with PSG data.”

For more information on this research see: Sleep/wake estimation using only anterior tibialis electromyography data. *Biomedical Engineering Online*, 2012;11():26. (BioMed Central - <http://www.biomedcentral.com/>; *Biomedical Engineering Online* - [www.biomedical-engineering-online.com](http://www.biomedical-engineering-online.com))

Our news correspondents report that additional information may be obtained by contacting S. Hwang, Interdisciplinary program of Bioengineering, Seoul National University, Seoul, South Korea. (2013 Jan 09)

## University of Michigan, Ann Arbor: Thoracic artificial lung impedance studies using computational fluid dynamics and in vitro models

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Ann Arbor, Michigan, by NewsRx journalists, research stated, “Current thoracic artificial lungs (TALs) possess blood flow impedances greater than the natural lungs, resulting in abnormal pulmonary hemodynamics when implanted. This study sought to reduce TAL impedance using computational fluid dynamics (CFD).”

The news reporters obtained a quote from the research from the University of Michigan, “CFD was performed on TAL models with inlet and outlet expansion and contraction angles,  $\theta$ , of  $15^\circ$ ,  $45^\circ$ , and  $90^\circ$ . Pulsatile blood flow was simulated for flow rates of 2-6 L/min, heart rates of 80 and 100 beats/min, and inlet pulsilities of 3.75 and 2. Pressure and flow data were used to calculate the zeroth and first harmonic impedance moduli,  $Z(0)$  and  $Z(1)$ , respectively. The  $45^\circ$  and  $90^\circ$  models were also tested in vitro under similar conditions. CFD results indicate  $Z(0)$  increases as stroke volume and  $\theta$  increase. At 4 L/min, 100 beats/min, and a pulsatility of 3.75,  $Z(0)$  was 0.47, 0.61, and 0.79 mmHg/(L/min) for the  $15^\circ$ ,  $45^\circ$ , and  $90^\circ$  devices, respectively. Velocity band and vector plots also indicate better flow patterns in the  $45^\circ$  device. At the same conditions, in vitro  $Z(0)$  were 0.69, 0.13 and 0.79, 0.10 mmHg/(L/min), respectively, for the  $45^\circ$  and  $90^\circ$  models. These  $Z(0)$  are 65% smaller than previous TAL designs. In vitro,  $Z(1)$  increased with flow rate but was small and unlikely to significantly affect hemodynamics.”

According to the news reporters, the research concluded: “The optimal design for flow patterns and low impedance was the  $45^\circ$  model.”

For more information on this research see: Thoracic artificial lung impedance studies using computational fluid dynamics and in vitro models. *Annals of Biomedical Engineering*, 2012;40(3):628-36. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting R.E. Schewe, Dept. of Biomedical Engineering, University of Michigan, Ann Arbor, MI 48109, United States. (2013 Jan 09)



## University of Milan: A New 3-D Tool for Planning Plastic Surgery

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting from Milan, Italy, by NewsRx journalists, research stated, “Face plastic surgery (PS) plays a major role in today medicine. Both for reconstructive and cosmetic surgery, achieving harmony of facial features is an important, if not the major goal.”

The news correspondents obtained a quote from the research from the University of Milan, “Several systems have been proposed for presenting to patient and surgeon possible outcomes of the surgical procedure. In this paper, we present a new 3-D system able to automatically suggest, for selected facial features as nose, chin, etc., shapes that aesthetically match the patient’s face. The basic idea is suggesting shape changes aimed to approach similar but more harmonious faces. To this goal, our system compares the 3-D scan of the patient with a database of scans of harmonious faces, excluding the feature to be corrected. Then, the corresponding features of the k most similar harmonious faces, as well as their average, are suitably pasted onto the patient’s face, producing k+1 aesthetically effective surgery simulations. The system has been fully implemented and tested. To demonstrate the system, a 3-D database of harmonious faces has been collected and a number of PS treatments have been simulated.”

According to the news reporters, the research concluded: “The ratings of the outcomes of the simulations, provided by panels of human judges, show that the system and the underlying idea are effective.”

For more information on this research see: A New 3-D Tool for Planning Plastic Surgery. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3439-3449. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting A. Bottino, University of Milan, Lab Funct Anat Stomatognath Syst, I-20122 Milan, Italy. (2013 Jan 09)

## **University of Minnesota, Minneapolis: A Method to Localize RF B-1 Field in High-Field Magnetic Resonance Imaging Systems**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Minneapolis, Minnesota, by NewsRx journalists, research stated, “In high-field magnetic resonance imaging (MRI) systems, B-0 fields of 7 and 9.4 T, the RF field shows greater inhomogeneity compared to clinical MRI systems with B-0 fields of 1.5 and 3.0 T. In multichannel RF coils, the magnitude and phase of the input to each coil element can be controlled independently to reduce the nonuniformity of the RF field. The convex optimization technique has been used to obtain the optimum excitation parameters with iterative solutions for homogeneity in a selected region of interest.”

The news correspondents obtained a quote from the research from the University of Minnesota, “The pseudoinverse method has also been used to find a solution. The simulation results for 9.4- and 7-T MRI systems are discussed in detail for the head model. Variation of the simulation results in a 9.4-T system with the number of RF coil elements for different positions of the regions of interest in a spherical phantom are also discussed.”

According to the news reporters, the research concluded: “Experimental results were obtained in a phantom in the 9.4-T system and are compared to the simulation results and the specific absorption rate has been evaluated.”

For more information on this research see: A Method to Localize RF B-1 Field in High-Field Magnetic Resonance Imaging Systems. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3365-3371. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting H. Yoo, University of Minnesota, Dept. of Elect & Comp Engn, Minneapolis, MN 55455, United States. (2013 Jan 09)

### **University of New South Wales, Sydney: Analysis of Drug Distribution from a Simulated Drug-Eluting Stent Strut Using an In Vitro Framework**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Sydney, Australia, by NewsRx correspondents, research stated, “The mechanisms of delivery of anti-proliferative drug from a drug-eluting stent are defined by transport forces in the coating, the lumen, and the arterial wall. Dynamic asymmetries in the localized flow about stent struts have previously been shown to contribute to significant heterogeneity in the spatial distribution of drug in in silico three-compartmental models of stent based drug delivery.”

Our news journalists obtained a quote from the research from the University of New South Wales, “A novel bench-top experiment has been created to confirm this phenomena. The experiment simulates drug release from a single stent strut, and then allows visualization of drug uptake into both lumen and tissue domains using optical techniques.”

According to the news editors, the research concluded: “Results confirm the existence of inhomogeneous and asymmetric arterial drug distributions, with this distribution shown to be sensitive to the flow field surrounding the strut.”

For more information on this research see: Analysis of Drug Distribution from a Simulated Drug-Eluting Stent Strut Using an In Vitro Framework. *Annals of Biomedical Engineering*, 2012;40(12):2687-2696. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from C.C. O'Brien, University of New South Wales, Grad Sch Biomed Engn, Sydney, NSW, Australia. (2013 Jan 09)

### **Veterans Affairs Medical Center, Seattle: Co-contraction patterns of trans-tibial amputee ankle and knee musculature during gait**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Seattle, Washington, by NewsRx journalists, research stated, “Myoelectric control of upper extremity powered prostheses has been used clinically for many years, however this approach has not been fully developed for lower extremity prosthetic devices. With the advent of powered lower extremity prosthetic components, the potential role of myoelectric control systems is of increasing importance.”

The news correspondents obtained a quote from the research from Veterans Affairs Medical Center, “An understanding of muscle activation patterns and their relationship to functional ambulation is a vital step in the future development of myoelectric control. Unusual knee muscle co-contractions have been reported in both limbs of trans-tibial amputees. It is currently unknown what differences exist in co-contraction between trans-tibial amputees and controls. This study compares the activation and co-contraction patterns of the ankle and knee musculature of trans-tibial amputees (intact and residual limbs), and able-bodied control subjects during three speeds of gait. It was hypothesized that residual limbs would have greater ankle muscle co-contraction than intact and able-bodied control limbs and that knee muscle co-contraction would be different among all limbs.”

According to the news reporters, the research concluded: “Lastly it was hypothesized that the extent of muscle co-contraction would increase with walking speed.”

For more information on this research see: Co-contraction patterns of trans-tibial amputee ankle and knee musculature during gait. *Journal of Neuroengineering and Rehabilitation*, 2012;9():29. (BioMed Central - <http://www.biomedcentral.com/>; Journal of Neuroengineering and Rehabilitation - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

Our news journalists report that additional information may be obtained by contacting M. Seyedali, Dept. of Veterans Affairs (VA), Rehabilitation Research and Development Center of Excellence for Limb Loss Prevention and Prosthetic Engineering, VA Puget Sound, Seattle, WA 98108, United States. (2013 Jan 09)

### **Virginia Commonwealth University, Richmond: Performance of Combination Drug and Hygroscopic Excipient Submicrometer Particles from a Softmist Inhaler in a Characteristic Model of the Airways**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Richmond, Virginia, by NewsRx journalists, research stated, “Excipient enhanced growth (EEG) of inhaled submicrometer pharmaceutical aerosols is a recently proposed method intended to significantly reduce extrathoracic deposition and improve lung delivery. The objective of this study was to evaluate the size increase of combination drug and hygroscopic excipient particles in a characteristic model of the airways during inhalation using both in vitro experiments and computational fluid dynamic (CFD) simulations.”

The news correspondents obtained a quote from the research from Virginia Commonwealth University, “The airway model included a

characteristic mouth-throat (MT) and upper tracheobronchial (TB) region through the third bifurcation and was enclosed in a chamber geometry used to simulate the thermodynamic conditions of the lungs. Both in vitro results and CFD simulations were in close agreement and indicated that EEG delivery of combination submicrometer particles could nearly eliminate MT deposition for inhaled pharmaceutical aerosols. Compared with current inhalers, the proposed delivery approach represents a 1-2 order of magnitude reduction in MT deposition. Transient inhalation was found to influence the final size of the aerosol based on changes in residence times and relative humidity values.”

According to the news reporters, the research concluded: “Aerosol sizes following EEG when exiting the chamber (2.75-4.61  $\mu\text{m}$ ) for all cases of initial submicrometer combination particles were equivalent to or larger than many conventional pharmaceutical aerosols that frequently have MMADs in the range of 2-3  $\mu\text{m}$ .”

For more information on this research see: Performance of Combination Drug and Hygroscopic Excipient Submicrometer Particles from a Softmist Inhaler in a Characteristic Model of the Airways. *Annals of Biomedical Engineering*, 2012;40(12):2596-2610. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting P.W. Longest, Virginia Commonwealth University, Dept. of Pharmaceut, Richmond, VA 23284, United States. (2013 Jan 09)

### **Virginia Tech, Blacksburg: A Nonlinear Constitutive Model for Stress Relaxation in Ligaments and Tendons**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Blacksburg, Virginia, by NewsRx journalists, research stated, “A novel constitutive model that describes stress relaxation in transversely isotropic soft collagenous tissues such as ligaments and tendons is presented. The model is formulated within the nonlinear integral representation framework proposed by Pipkin and Rogers (J. Mech. Phys. Solids. 16:59-72, 1968).”

The news reporters obtained a quote from the research from Virginia Tech, “It represents a departure from existing models in biomechanics since it describes not only the strain dependent stress relaxation behavior of collagenous tissues but also their finite strains and transverse isotropy. Axial stress-stretch data and stress relaxation data at different axial stretches are collected on rat tail tendon fascicles in order to

compute the model parameters. Toward this end, the rat tail tendon fascicles are assumed to be incompressible and undergo an isochoric axisymmetric deformation. A comparison with the experimental data proves that, unlike the quasi-linear viscoelastic model (Fung, *Biomechanics: Mechanics of Living Tissues*.)

According to the news reporters, the research concluded: “Springer, New York, 1993) the constitutive law can capture the observed nonlinearities in the stress relaxation response of rat tail tendon fascicles.”

For more information on this research see: A Nonlinear Constitutive Model for Stress Relaxation in Ligaments and Tendons. *Annals of Biomedical Engineering*, 2012;40(12):2541-2550. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting F.M. Davis, Virginia Technical, Dept. of Engn Sci & Mech, Mech Soft Biol Syst Lab, Blacksburg, VA 24061, United States. (2013 Jan 09)

### **University of Kentucky, Lexington: Near-infrared diffuse correlation spectroscopy in cancer diagnosis and therapy monitoring**

By a News Reporter-Staff News Editor at Cancer Weekly – Current study results on Cancer Diagnostics have been published. According to news reporting originating from Lexington, Kentucky, by NewsRx editors, the research stated, “A novel near-infrared (NIR) diffuse correlation spectroscopy (DCS) for tumor blood flow measurement is introduced in this review paper. DCS measures speckle fluctuations of NIR diffuse light in tissue, which are sensitive to the motions of red blood cells.”

Our news editors obtained a quote from the research from the University of Kentucky, “DCS offers several attractive new features for tumor blood flow measurement such as noninvasiveness, portability, high temporal resolution, and relatively large penetration depth. DCS technology has been utilized for continuous measurement of tumor blood flow before, during, and after cancer therapies. In those pilot investigations, DCS hemodynamic measurements add important new variables into the mix for differentiation of benign from malignant tumors and for prediction of treatment outcomes.”

According to the news editors, the research concluded: “It is envisaged that with more clinical applications in large patient populations,

DCS might emerge as an important method of choice for bedside management of cancer therapy, and it will certainly provide important new information about cancer physiology that may be of use in diagnosis.”

For more information on this research see: Near-infrared diffuse correlation spectroscopy in cancer diagnosis and therapy monitoring. *Journal of Biomedical Optics*, 2012;17(1):010901.

The news editors report that additional information may be obtained by contacting G. Yu, University of Kentucky, Center for Biomedical Engineering, Lexington, Kentucky 40506-0070, United States. (2013 Jan 08)

### **Huazhong University of Science and Technology, Wuhan: Identification of the Parameters of the Beeler-Reuter Ionic Equation With a Partially Perturbed Particle Swarm Optimization**

By a News Reporter-Staff News Editor at Journal of Robotics & Machine Learning – Investigators publish new report on Particle Swarm Optimization. According to news reporting out of Wuhan, People’s Republic of China, by VerticalNews editors, research stated, “A partially perturbed particle swarm optimization (PPSO) has been proposed for identifying the parameters of the Beeler-Reuter (BR) equation from action potential data.”

Our news journalists obtained a quote from the research from the Huazhong University of Science and Technology, “In the PPSO algorithm, the 63 BR equation parameters are divided into groups, and parameter patterns are made from the combination of the groups. PPSO enhances the capability of conventional particle swarm optimization (CPSO) by partially perturbing the coordinates of the globally best particle with the patterns when the searching process is locally confined. ‘Experimental data’ were produced for cardiac myocytes simulated by the BR equation and the equation of Luo and Rudy (1991), and were used to test the algorithm of PPSO.”

According to the news editors, the research concluded: “The test results show that PPSO was able to identify the parameters of the BR equation effectively for different cardiac myocytes, while still retaining the conceptual simplicity and easy implementation of CPSO.”

For more information on this research see: Identification of the Parameters of the Beeler-Reuter Ionic Equation With a Partially Perturbed Particle Swarm Optimization. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3412-3421. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.>

[ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10](http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10))

Our news journalists report that additional information may be obtained by contacting F.L. Chen, Huazhong University of Science & Technology, Sch Life Sci & Technol, Wuhan 430074, People's Republic of China. (2013 Jan 07)

### **Swiss Federal Institute of Technology, Zurich: Craniospinal Pressure-Volume Dynamics in Phantom Models**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Zurich, Switzerland, by NewsRx correspondents, research stated, “Regulation of intracranial pressure (ICP) is vital to proper brain function. Pathologic conditions such as traumatic brain injury and hydrocephalus can cause lethal changes in ICP through an imbalance of fluid passage into and out of the craniospinal space.”

Our news editors obtained a quote from the research from the Swiss Federal Institute of Technology, “The relationship between craniospinal volume and pressure determines to a large extent whether such imbalance can be compensated or if it will lead to neuronal damage. Phantom models are predisposed for the evaluation of medical procedures and devices that alter volume in the spinal or cranial space. However, current phantoms have substantial limitations in the reproduction of craniospinal pressure-volume relationships, which need to be overcome prior to their deployment outside the basic research setting. We present herein a novel feedback controlled phantom for the reproduction of any physiologic or pathologic pressure-volume relation.”

According to the news editors, the research concluded: “We compare its performance to those of existing passive methods, showing that it follows reference curves more precisely during both infusion of large volumes and fast oscillatory volume changes.”

For more information on this research see: Craniospinal Pressure-Volume Dynamics in Phantom Models. *IEEE Transactions on Biomedical Engineering*, 2012;59(12):3482-3490. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting M.S. Daners, Swiss Fed Inst Technol, Dept. of Mech & Proc Engn, Inst Dynam Syst & Control, CH-8006 Zurich, Switzerland. (2013 Jan 07)



## **Netherlands Cancer Institute-Antoni van Leeuwenhoek Hospital, Amsterdam: Optical coherence tomography in vulvar intraepithelial neoplasia**

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Neoplasia is the subject of a report. According to news reporting originating in Amsterdam, Netherlands, by NewsRx journalists, research stated, “Vulvar squamous cell carcinoma (VSCC) is a gynecological cancer with an incidence of two to three per 100,000 women. VSCC arises from vulvar intraepithelial neoplasia (VIN), which is diagnosed through painful punch biopsy.”

The news reporters obtained a quote from the research from Netherlands Cancer Institute-Antoni van Leeuwenhoek Hospital, “In this study, optical coherence tomography (OCT) is used to differentiate between normal and VIN tissue. We hypothesize that (a) epidermal layer thickness measured in OCT images is different in normal tissue and VIN, and (b) quantitative analysis of the attenuation coefficient (oct) extracted from OCT data differentiates VIN from normal vulvar tissue. Twenty lesions from 16 patients are imaged with OCT. Directly after data acquisition, a biopsy is performed. Epidermal thickness is measured and values of oct are extracted from 200 OCT scans of normal and VIN tissue. For both methods, statistical analysis is performed using Paired Mann-Whitney-test. Correlation between the two methods is tested using a Spearman-correlation test. Both epidermal layer thickness as well as the oct are different between normal vulvar tissue and VIN lesions ( $p < 0.0001$ ). Moreover, no correlation is found between the epidermal layer thickness and oct.”

According to the news reporters, the research concluded: “This study demonstrates that both the epidermal thickness and the attenuation coefficient of vulvar epithelial tissue containing VIN are different from that of normal vulvar tissue.”

For more information on this research see: Optical coherence tomography in vulvar intraepithelial neoplasia. *Journal of Biomedical Optics*, 2012;17(11):116022.

Our news correspondents report that additional information may be obtained by contacting R. Wessels, Netherlands Cancer Institute-Antoni van Leeuwenhoek Hospital, Dept. of Surgery, Plesmanlaan 121, 1066 CX, Amsterdam, Netherlands. (2013 Jan 04)

## **Dynamic indocyanine green angiography measurements**

By a News Reporter-Staff News Editor at Computer Weekly News – Investigators discuss new findings in Drugs and Therapies. According to news reporting originating in St. Louis, Missouri, by VerticalNews journalists, research stated, “Dynamic indocyanine green imaging uses a scanning laser ophthalmoscope and a fluorescent dye to produce movies of the dye-filling pattern in the retina and choroid of the eye. It is used for evaluating choroidal neovascularization.”

The news reporters obtained a quote from the research, “Movies are examined to identify the anatomy of the pathology for planning treatment and to evaluate progression or response to treatment. The popularity of this approach is affected by the complexity and difficulty in interpreting the movies. Software algorithms were developed to produce images from the movies that are easy to interpret. A mathematical model is formulated of the flow dynamics, and a fitting algorithm is designed that solves for the flow parameters. The images provide information about flow and perfusion, including regions of change between examinations. Imaged measures include the dye fill-time, temporal dispersion, and magnitude of the dye dilution temporal curves associated with image pixels. Cases show how the software can help to identify clinically relevant anatomy such as feeder vessels, drain vessels, capillary networks, and normal choroidal draining vessels. As a potential tool for research into the character of neovascular conditions and treatments, it reveals the flow dynamics and character of the lesion.”

According to the news reporters, the research concluded: “Future varieties of this methodology may be used for evaluating the success of engineered tissue transplants, surgical flaps, reconstructive surgery, breast surgery, and many other surgical applications where flow, perfusion, and vascularity of tissue are important.”

For more information on this research see: Dynamic indocyanine green angiography measurements. *Journal of Biomedical Optics*, 2012;17(11):116028.

Our news correspondents report that additional information may be obtained by contacting T. Holmes, Lickenbrock Technologies LLC, 4041 Forest Park Avenue, St Louis, Missouri, United States. (2013 Jan 03)

## **Angular and spectrally resolved investigation of single particles by darkfield scattering microscop**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news reporting out of Ulm, Germany, by NewsRx editors, research stated, “A darkfield scattering microscope has been constructed that enables both angular and spectrally resolved measurements of elastic scattering

patterns. The comparison of the angular and spectral resolution modes is shown in detail.”

Our news journalists obtained a quote from the research, “Angular patterns of the backscattered light by homogeneous polystyrene spheres were measured at 57 wavelengths and the diameters of the single spheres were determined by using Mie theory at each wavelength. The mean diameter values were estimated in the angular mode with a relative standard deviation of 0.25% or less. Spectral scattering patterns of the same beads were investigated and the diameters were determined and compared with the results of the angular measurements.”

According to the news editors, the research concluded: “The estimated diameter values in the angular and the spectral mode were in an excellent agreement with deviations of less than 0.”

For more information on this research see: Angular and spectrally resolved investigation of single particles by darkfield scattering microscopy. *Journal of Biomedical Optics*, 2012;17(11):117006.

Our news journalists report that additional information may be obtained by contacting T. Rothe, Institut für Lasertechnologien in der Medizin und Meßtechnik, Helmholtzstr 12, 89081 Ulm, Germany. (2013 Jan 02)

### **Eindhoven University of Technology: Reducing motion artifacts in photoplethysmograms by using relative sensor motion: phantom study**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Optics. According to news reporting from Eindhoven, Netherlands, by NewsRx journalists, research stated, “Currently, photoplethysmograms (PPGs) are mostly used to determine a patient’s blood oxygenation and pulse rate. However, PPG morphology conveys more information about the patient’s cardiovascular status.”

The news correspondents obtained a quote from the research from the Eindhoven University of Technology, “Extracting this information requires measuring clean PPG waveforms that are free of artifacts. PPGs are highly susceptible to motion, which can distort the PPG-derived data. Part of the motion artifacts are considered to result from sensor-tissue motion and sensor deformation. It is hypothesized that these motion artifacts correlate with movement of the sensor with respect to the skin. This hypothesis has been proven true in a laboratory setup. In vitro PPGs have been measured in a skin perfusion phantom that is illuminated by a laser diode. Optical motion artifacts are generated in the PPG by translating the laser diode with respect to the PPG photodiode. The optical motion artifacts have been reduced significantly in vitro, by using a normalized least-mean-square algorithm

with only a single coefficient that uses the laser's displacement as a reference for the motion artifacts."

According to the news reporters, the research concluded: "Laser displacement has been measured accurately via self-mixing interferometry by a compact laser diode with a ball lens integrated into the package, which can be easily integrated into a commercial sensor."

For more information on this research see: Reducing motion artifacts in photoplethysmograms by using relative sensor motion: phantom study. *Journal of Biomedical Optics*, 2012;17(11):117007.

Our news journalists report that additional information may be obtained by contacting R.W. Wijshoff, Eindhoven University of Technology, Dept. of Electrical Engineering, Signal Processing Systems, Den Dolech 2, 5612 AZ Eindhoven, Netherlands. (2013 Jan 02)

### **Ohio State University, Columbus: Indocyanine-green-loaded microballoons for biliary imaging in cholecystectomy**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Drugs and Therapies. According to news reporting originating in Columbus, Ohio, by NewsRx journalists, research stated, "We encapsulate indocyanine green (ICG) in poly[(D,L-lactide-co-glycolide)-co-PEG] diblock (PLGA-PEG) microballoons for real-time fluorescence and hyperspectral imaging of biliary anatomy. ICG-loaded microballoons show superior fluorescence characteristics and slower degradation in comparison with pure ICG."

The news reporters obtained a quote from the research from Ohio State University, "The use of ICG-loaded microballoons in biliary imaging is demonstrated in both biliary-simulating phantoms and an ex vivo tissue model. The biliary-simulating phantoms are prepared by embedding ICG-loaded microballoons in agar gel and imaged by a fluorescence imaging module in a Da Vinci surgical robot. The ex vivo model consists of liver, gallbladder, common bile duct, and part of the duodenum freshly dissected from a domestic swine. After ICG-loaded microballoons are injected into the gallbladder, the biliary structure is imaged by both hyperspectral and fluorescence imaging modalities. Advanced spectral analysis and image processing algorithms are developed to classify the tissue types and identify the biliary anatomy. While fluorescence imaging provides dynamic information of movement and flow in the surgical region of interest, data from hyperspectral imaging allow for rapid identification of the bile duct and safe exclusion of any contaminant fluorescence from tissue not part of the biliary anatomy."

According to the news reporters, the research concluded: "Our experiments demonstrate the technical feasibility of using ICG-loaded microballoons for biliary imaging in cholecystectomy."

For more information on this research see: Indocyanine-green-loaded microballoons for biliary imaging in cholecystectomy. *Journal of Biomedical Optics*, 2012;17(11):116025.

Our news correspondents report that additional information may be obtained by contacting K. Mitra, Ohio State University, Dept. of Biomedical Engineering, Columbus, Ohio 43210, United States. (2013 Jan 02)

### **Rouen University Hospital: Classification of Endomicroscopic Images of the Lung Based on Random Subwindows and Extra-Trees**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting from Rouen, France, by NewsRx journalists, research stated, “Recently, the in vivo imaging of pulmonary alveoli was made possible thanks to confocal microscopy. For these images, we wish to aid the clinician by developing a computer-aided diagnosis system, able to discriminate between healthy and pathological subjects.”

The news correspondents obtained a quote from the research from Rouen University Hospital, “The lack of expertise currently available on these images has first led us to choose a generic approach, based on pixel-value description of randomly extracted subwindows and decision tree ensemble for classification (extra-trees). In order to deal with the great complexity of our images, we adapt this method by introducing a texture-based description of the subwindows, based on local binary patterns. We show through our experimental protocol that this adaptation is a promising way to classify fibered confocal fluorescence microscopy images.”

According to the news reporters, the research concluded: “In addition, we introduce a rejection mechanism on the classifier output to prevent nondetection errors.”

For more information on this research see: Classification of Endomicroscopic Images of the Lung Based on Random Subwindows and Extra-Trees. *IEEE Transactions on Biomedical Engineering*, 2012;59(9):2677-2683. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting C. Desir, Rouen Univ Hosp, Clin Pneumol, F-76031 Rouen, France. (2013 Jan 02)

**Swiss Federal Institute of Technology, Lausanne:  
Reflectance imaging of the human retina at 810 nm does  
not suffice to optimize the parameters of hydrodynamic  
rebalancing laser treatment**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Optics are discussed in a new report. According to news reporting from Lausanne, Switzerland, by NewsRx journalists, research stated, “The hydrodynamic rebalancing laser (HRL) procedure is an ophthalmic therapy based on the administration of subthreshold infrared (810 nm) laser light to selected areas on the retina to treat various retina diseases. Heterogeneities of tissue response are observed, including undesired retinal damages.”

The news correspondents obtained a quote from the research from the Swiss Federal Institute of Technology, “Variations of tissue absorbance were hypothesized to cause this uneven response. Irradiation parameters (diameter=100  $\mu$ m; power=1 W; irradiation time: 50 to 200 ms), location and tissue response were studied in 16 patients (20 eyes, 2535 laser spots) to discover any correlation between tissue response and normalized fundus reflectance at 810 nm. The results demonstrate a complex relationship between some pathologies and occurrences of retinal damage, but no clear correlation. One possible reason is that the resolution of reflectance images is insufficient to see small (40  $\mu$ m or less) absorption centers, particularly deep-seated ones. Additionally, tissue parameters other than variations of the fundus optical absorption influence heat diffusion and temperature increases.”

According to the news reporters, the research concluded: “Monitoring or individualizing the light dose in HRL therapy, or any similar infrared diode laser-based therapy will require more sophisticated technologies, including imaging the retina’s reflectance with an improved resolution, as well as refined methods to detect complex correlations between retinal damage and specific pathologies.”

For more information on this research see: Reflectance imaging of the human retina at 810 nm does not suffice to optimize the parameters of hydrodynamic rebalancing laser treatment. *Journal of Biomedical Optics*, 2012;17(11):116027.

Our news journalists report that additional information may be obtained by contacting F. Piffaretti, Swiss Federal Institute of Technology, Medical Photonics Group, SB-ISIC, Station 6, 1015 Lausanne, Switzerland. (2013 Jan 02)

**Unilever, Bangalore: Empirical relationship between Kubelka-Munk and radiative transfer coefficients for extracting optical parameters of tissues in diffusive and nondiffusive regimes**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Optics. According to news reporting originating from Bangalore, India, by NewsRx correspondents, research stated, “Kubelka-Munk (K-M) theory is a phenomenological light transport theory that provides analytical expressions for reflectance and transmittance of diffusive substrates such as tissues. Many authors have derived relations between coefficients of K-M theory and that of the more fundamental radiative transfer equations.”

Our news editors obtained a quote from the research from Unilever, “These relations are valid only in diffusive light transport regime where scattering dominates over absorption. They also fail near boundaries where incident beams are not diffusive. By measuring total transmittance and total reflectance of tissue phantoms with varying optical parameters, we have obtained empirical relations between K-M coefficients and the radiative transport coefficients for integrating sphere-based spectrophotometers that use uniform, nondiffusive incident beams. Our empirical relations show that the K-M scattering coefficients depend only on reduced scattering coefficient ( $s'$ ), whereas the K-M absorption coefficient depends on both absorption ( $a$ ) and reduced scattering ( $s'$ ) coefficients of radiative transfer theory. We have shown that these empirical relations are valid in both the diffusive and nondiffusive regimes and can predict total reflectance within an error of 10%.”

According to the news editors, the research concluded: “They also can be used to solve the inverse problem of obtaining multiple optical parameters such as chromophore concentration and tissue thickness from the measured reflectance spectra with a maximum accuracy of 90% to 95%.”

For more information on this research see: Empirical relationship between Kubelka-Munk and radiative transfer coefficients for extracting optical parameters of tissues in diffusive and nondiffusive regimes. *Journal of Biomedical Optics*, 2012;17(11):115006.

The news editors report that additional information may be obtained by contacting A. Roy, Unilever R&D Bangalore, 64 Main Road, Whitefield, Bangalore, 560066, India. (2013 Jan 02)

## **University of Auckland: Neuromuscular Interfacing: Establishing an EMG-Driven Model for the Human Elbow Joint**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating from Auckland, New Zealand, by NewsRx correspondents, research stated, “Assistive devices aim to mitigate the effects of physical disability by aiding users to move their limbs or by rehabilitating through therapy. These devices are commonly embodied by robotic or exoskeletal systems that are still in development and use the electromyographic (EMG) signal to determine user intent.”

Our news editors obtained a quote from the research from the University of Auckland, “Not much focus has been placed on developing a neuromuscular interface (NI) that solely relies on the EMG signal, and does not require modifications to the end user’s state to enhance the signal (such as adding weights). This paper presents the development of a flexible, physiological model for the elbow joint that is leading toward the implementation of an NI, which predicts joint motion from EMG signals for both able-bodied and less-abled users. The approach uses musculotendon models to determine muscle contraction forces, a proposed musculoskeletal model to determine total joint torque, and a kinematic model to determine joint rotational kinematics. After a sensitivity analysis and tuning using genetic algorithms, subject trials yielded an average root-mean-square error of 6.53 degrees and 22.4 degrees for a single cycle and random cycles of movement of the elbow joint, respectively.”

According to the news editors, the research concluded: “This helps us to validate the elbow model and paves the way toward the development of an NI.”

For more information on this research see: Neuromuscular Interfacing: Establishing an EMG-Driven Model for the Human Elbow Joint. *IEEE Transactions on Biomedical Engineering*, 2012;59(9):2586-2593. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting J.W.L. Pau, University of Auckland, Auckland Bioengn Inst, Auckland 1142, New Zealand. (2013 Jan 02)



**University of California, Davis: In vivo validation of a bimodal technique combining time-resolved fluorescence spectroscopy and ultrasonic backscatter microscopy for diagnosis of oral carcinoma**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Optics have been presented. According to news reporting originating from Davis, California, by NewsRx correspondents, research stated, “Tissue diagnostic features generated by a bimodal technique integrating scanning time-resolved fluorescence spectroscopy (TRFS) and ultrasonic backscatter microscopy (UBM) are investigated in an in vivo hamster oral carcinoma model. Tissue fluorescence is excited by a pulsed nitrogen laser and spectrally and temporally resolved using a set of filters/dichroic mirrors and a fast digitizer, respectively.”

Our news editors obtained a quote from the research from the University of California, “A 41-MHz focused transducer (37-m axial, 65-m lateral resolution) is used for UBM scanning. Representative lesions of the different stages of carcinogenesis show that fluorescence characteristics complement ultrasonic features, and both correlate with histological findings. These results demonstrate that TRFS-UBM provide a wealth of co-registered, complementary data concerning tissue composition and structure as it relates to disease status.”

According to the news editors, the research concluded: “The direct co-registration of the TRFS data (sensitive to surface molecular changes) with the UBM data (sensitive to cross-sectional structural changes and depth of tumor invasion) is expected to play an important role in pre-operative diagnosis and intra-operative determination of tumor margins.”

For more information on this research see: In vivo validation of a bimodal technique combining time-resolved fluorescence spectroscopy and ultrasonic backscatter microscopy for diagnosis of oral carcinoma. *Journal of Biomedical Optics*, 2012;17(11):116003.

The news editors report that additional information may be obtained by contacting Y. Sun, University of California, Davis, Dept. of Biomedical Engineering, 451 Health Sciences Drive, Davis, California 95616, United States. (2013 Jan 02)

## **University of California, Irvine: Deep tissue fluorescence imaging and in vivo biological applications**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Optics are presented in a new report. According to news reporting from Irvine, California, by NewsRx journalists, research stated, “We describe a novel technical approach with enhanced fluorescence detection capabilities in twophoton microscopy that achieves deep tissue imaging, while maintaining micron resolution. Compared to conventional two-photon microscopy, greater imaging depth is achieved by more efficient harvesting of fluorescence photons propagating in multiple-scattering media.”

The news correspondents obtained a quote from the research from the University of California, “The system maintains the conventional two-photon microscopy scheme for excitation. However, for fluorescence collection the detection system harvests fluorescence photons directly from a wide area of the turbid sample. The detection scheme relies on a wide area detector, minimal optical components and an emission path bathed in a refractive-index-matching fluid that minimizes emission photon losses. This detection scheme proved to be very efficient, allowing us to obtain high resolution images at depths up to 3 mm. This technique was applied to in vivo imaging of the murine small intestine (SI) and colon. The challenge is to image normal and diseased tissue in the whole live animal, while maintaining high resolution imaging at millimeter depth.”

According to the news reporters, the research concluded: “In Lgr5-GFP mice, we have been successful in imaging Lgr5-eGFP positive stem cells, present in SI and colon crypt bases.”

For more information on this research see: Deep tissue fluorescence imaging and in vivo biological applications. *Journal of Biomedical Optics*, 2012;17(11):116023.

Our news journalists report that additional information may be obtained by contacting V. Crosignani, University of California at Irvine, Laboratory for Fluorescence Dynamics, Dept. of Biomedical Engineering, Irvine, California 92697, United States. (2013 Jan 02)

## **University of California, Irvine: Phase-resolved acoustic radiation force optical coherence elastography**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Optics is now available. According to news reporting from Irvine, California, by NewsRx journalists, research stated, “Many diseases involve changes in the biomechanical properties of tissue, and there is a close correlation between tissue elasticity and pathology. We report on the development of a phase-resolved acoustic radiation force

optical coherence elastography method (ARF-OCE) to evaluate the elastic properties of tissue.”

The news correspondents obtained a quote from the research from the University of California, “This method utilizes chirped acoustic radiation force to produce excitation along the sample’s axial direction, and it uses phase-resolved optical coherence tomography (OCT) to measure the vibration of the sample. Under 500-Hz square wave modulated ARF signal excitation, phase change maps of tissue mimicking phantoms are generated by the ARF-OCE method, and the resulting Young’s modulus ratio is correlated with a standard compression test. The results verify that this technique could efficiently measure sample elastic properties accurately and quantitatively. Furthermore, a three-dimensional ARF-OCE image of the human atherosclerotic coronary artery is obtained.”

According to the news reporters, the research concluded: “The result indicates that our dynamic phase-resolved ARF-OCE method can delineate tissues with different mechanical properties.”

For more information on this research see: Phase-resolved acoustic radiation force optical coherence elastography. *Journal of Biomedical Optics*, 2012;17(11):110505.

Our news journalists report that additional information may be obtained by contacting W. Qi, University of California, Irvine, Beckman Laser Institute, Irvine, California 92612, United States. (2013 Jan 02)

### **University of Kansas, Lawrence: Photoacoustic detection of functional responses in the motor cortex of awake behaving monkey during forelimb movement**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in *Biomedical Optics*. According to news reporting out of Lawrence, Kansas, by NewsRx editors, research stated, “Photoacoustic (PA) imaging was applied to detect the neuronal activity in the motor cortex of an awake, behaving monkey during forelimb movement. An adult macaque monkey was trained to perform a reach-to-grasp task while PA images were acquired through a 30-mm diameter implanted cranial chamber.”

Our news journalists obtained a quote from the research from the University of Kansas, “Increased PA signal amplitude results from an increase in regional blood volume and is interpreted as increased neuronal activity. Additionally, depth-resolved PA signals enabled the study of functional responses in deep cortical areas.”

According to the news editors, the research concluded: “The results demonstrate the feasibility of utilizing PA imaging for studies of functional activation of cerebral cortex in awake monkeys performing behavioral tasks.”

For more information on this research see: Photoacoustic detection of functional responses in the motor cortex of awake behaving monkey during forelimb movement. *Journal of Biomedical Optics*, 2012;17(11):110503.

Our news journalists report that additional information may be obtained by contacting J. Jo, The University of Kansas, KU Bioengineering Research Center, Dept. of Mechanical Engineering, Lawrence, Kansas 66045, United States. (2013 Jan 02)

### **University of London: An Ensemble Classification-Based Approach Applied to Retinal Blood Vessel Segmentation**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting out of London, United Kingdom, by NewsRx editors, research stated, “This paper presents a new supervised method for segmentation of blood vessels in retinal photographs. This method uses an ensemble system of bagged and boosted decision trees and utilizes a feature vector based on the orientation analysis of gradient vector field, morphological transformation, line strength measures, and Gabor filter responses.”

Our news journalists obtained a quote from the research from the University of London, “The feature vector encodes information to handle the healthy as well as the pathological retinal image. The method is evaluated on the publicly available DRIVE and STARE databases, frequently used for this purpose and also on a new public retinal vessel reference dataset CHASE\_DB1 which is a subset of retinal images of multiethnic children from the Child Heart and Health Study in England (CHASE) dataset.”

According to the news editors, the research concluded: “The performance of the ensemble system is evaluated in detail and the incurred accuracy, speed, robustness, and simplicity make the algorithm a suitable tool for automated retinal image analysis.”

For more information on this research see: An Ensemble Classification-Based Approach Applied to Retinal Blood Vessel Segmentation. *IEEE Transactions on Biomedical Engineering*, 2012;59(9):2538-2548. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting M.M. Fraz, University of London, Div Populat Hlth Sci & Educ, London SW17 0RE, United Kingdom. (2013 Jan 02)

## **Vanderbilt University, Nashville: Ex vivo optical metabolic measurements from cultured tissue reflect in vivo tissue status**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Optics are discussed in a new report. According to news reporting originating from Nashville, Tennessee, by NewsRx correspondents, research stated, “Optical measurements of metabolism are ideally acquired in vivo; however, intravital measurements are often impractical. Accurate ex vivo assessments would greatly broaden the applicability of optical measurements of metabolism.”

Our news editors obtained a quote from the research from Vanderbilt University, “We investigate the use of live tissue culture experiments to serve as a surrogate for in vivo metabolic measurements. To validate this approach, NADH and FAD fluorescence intensity and lifetime images were acquired with a two-photon microscope from hamster cheek pouch epithelia in vivo, from biopsies maintained in live tissue culture up to 48 h, and from flash-frozen and thawed biopsies. We found that the optical redox ratio (fluorescence intensity of NADH/FAD) of the cultured biopsy was statistically identical to the in vivo measurement until 24 h, while the redox ratio of the frozen-thawed samples decreased by 15% ( $p < 0.01$ ). The NADH mean fluorescence lifetime ( $\tau_m$ ) remained unchanged ( $p > 0.05$ ) during the first 8 h of tissue culture, while the NADH  $\tau_m$  of frozen-thawed samples increased by 13% ( $p < 0.001$ ). Cellular morphology did not significantly change between in vivo, cultured, and frozen-thawed tissues ( $p > 0.05$ ). All results were consistent across multiple depth layers in this stratified squamous epithelial tissue. Histological markers for proliferation and apoptosis also confirm the viability of tissues maintained in culture.”

According to the news editors, the research concluded: “This study suggests that short-term ex vivo tissue culture may be more appropriate than frozen-thawed tissue for optical metabolic and morphologic measurements that approximate in vivo status.”

For more information on this research see: Ex vivo optical metabolic measurements from cultured tissue reflect in vivo tissue status. *Journal of Biomedical Optics*, 2012;17(11):116015.

The news editors report that additional information may be obtained by contacting A.J. Walsh, Vanderbilt University, Dept. of Biomedical Engineering, Station B, Box 1631, Nashville, Tennessee 37235, United States. (2013 Jan 02)

### **Washington University, St. Louis: Complementary fluorescence-polarization microscopy using division-of-focal-plane polarization imaging sensor**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Optics. According to news reporting originating from St. Louis, Missouri, by NewsRx correspondents, research stated, “Fluorescence microscopy offers high sensitivity for disease diagnosis. However, little structural information is revealed by this method, requiring another technique to localize the source of fluorescence.”

Our news editors obtained a quote from the research from Washington University, “We developed a complementary fluorescence-polarization microscope. We used a division-of-focal-plane charge coupled device polarization sensor to enable real-time video rate polarization imaging without any moving parts. The polarization information provided by the microscope enabled detection of structural element and complements the fluorescence information. Application of this multimodal system for cancer imaging using a tumor selective molecular probe revealed the association of diminished structural integrity of tumor tissue with high fluorescence of the imaging agent compared to surrounding normal tissue.”

According to the news editors, the research concluded: “This study demonstrates a new paradigm to improve cancer detection and diagnosis.”

For more information on this research see: Complementary fluorescence-polarization microscopy using division-of-focal-plane polarization imaging sensor. *Journal of Biomedical Optics*, 2012;17(11):116001.

The news editors report that additional information may be obtained by contacting Y. Liu, Washington University, Dept. of Radiology, St Louis, Missouri 63110, United States. (2013 Jan 02)

### **Washington University, St. Louis: In vivo photoacoustic microscopy with 7.6-m axial resolution using a commercial 125-MHz ultrasonic transducer**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news reporting originating from St. Louis, Missouri, by NewsRx correspondents, research stated, “Photoacoustic microscopy has achieved submicron lateral resolution, but its axial resolution is much lower. Here an axial resolution of 7.6 m, the highest axial resolution validated by experimental data, has been achieved by using a commercial 125 MHz ultrasonic

transducer for signal detection followed by the Wiener deconvolution for signal processing.”

Our news journalists obtained a quote from the research from Washington University, “Limited by the working distance, the high-frequency ultrasonic transducer can penetrate 1.2 mm into biological tissue from the ultrasound detection side. At this depth, the signal-to-noise ratio decreases by 11 dB, and the axial resolution degrades by 36%.”

According to the news editors, the research concluded: “The new system was demonstrated in imaging melanoma cells ex vivo and mouse ears in vivo.”

For more information on this research see: In vivo photoacoustic microscopy with 7.6- $\mu$ m axial resolution using a commercial 125-MHz ultrasonic transducer. *Journal of Biomedical Optics*, 2012;17(11):116016.

The news correspondents report that additional information may be obtained from C. Zhang, Washington University in St Louis, Dept. of Biomedical Engineering, Optical Imaging Laboratory, One Brookings Drive, St Louis, Missouri 63130, United States. (2013 Jan 02)

### **Department of Chemistry, Teresina: Mechanisms of the antinociceptive action of (-) Epicatechin obtained from the hydroalcoholic fraction of *Combretum leprosum* Mart & Eic in rodents**

By a News Reporter-Staff News Editor at Life Science Weekly – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Teresina, Brazil, by NewsRx editors, research stated, “The mechanisms of the antinociceptive activity of (-) epicatechin (EPI), a compound isolated from the hydroalcoholic fraction of *Combretum leprosum* Mart & Eicher. were assessed in the model of chemical nociception induced by glutamate (20  $\mu$ mol/paw).”

Our news journalists obtained a quote from the research from the Department of Chemistry, “To evaluate the mechanisms involved, the animals, male Swiss mice (25-30 g), received EPI (50 mg/kg p.o.) after pretreatment with naloxone (2 mg/kg s.c. opioid antagonist), glibenclamide (2 mg/kg s.c. antagonist K<sup>+</sup> channels sensitive to ATP), ketanserin (0.3 mg/kg s.c. antagonist of receptor 5-HT<sub>2A</sub>), yohimbine (0.15 mg/kg s.c.  $\alpha$ 2 adrenergic receptor antagonist), pindolol (1 mg/kg s.c. 5-HT<sub>1(a)</sub>/1(b) receptor antagonist), atropine (0.1 mg/kg s.c. muscarinic antagonist) and caffeine (3 mg/kg s.c. adenosine receptor antagonist), ondansetron (0.5 mg/kg s.c. for 5-HT<sub>3</sub> receptor) and L-arginine

(600 mg/kg i.p.). The antinociceptive effect of EPI was reversed by pretreatment with naloxone and glibenclamide, ketanserin, yohimbine, atropine and pindolol, which demonstrates the involvement of opioid receptors and potassium channels sensitive to ATP, the serotonergic (receptor 5HT(1A) and 5HT(2A)), adrenergic (receptor alpha 2) and cholinergic (muscarinic receptor) systems in the activities that were observed. The effects of EPI, however, were not reversed by pretreatment with caffeine, L-arginine or ondansetron, which shows that there is no involvement of 5HT(3) receptors or the purinergic and nitrgergic systems in the antinociceptive effect of EPI. In the Open Field and Rotarod test, EPI had no significant effect, which shows that there was no central nervous system depressant or muscle relaxant effect on the results.”

According to the news editors, the research concluded: “This study demonstrates that the antinociceptive activity of EPI in the glutamate model involves the participation of the opioid system, serotonin, adrenergic and cholinergic.”

For more information on this research see: Mechanisms of the antinociceptive action of (-) Epicatechin obtained from the hydroalcoholic fraction of *Combretum leprosum* Mart & Eic in rodents. *Journal of Biomedical Science*, 2012;19():1-6. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

Our news journalists report that additional information may be obtained by contacting L.D. Lopes, Nat Sci Center UFPI, Dept. of Chem, Teresina, PI, Brazil. (2013 Jan 01)

### **Mansoura University: Tumour necrosis factor alpha downregulates human hemojuvelin expression via a novel response element within its promoter**

By a News Reporter-Staff News Editor at Proteomics Weekly – Data detailed on Inflammation have been presented. According to news reporting originating in Mansoura, Egypt, by NewsRx journalists, research stated, “Iron homeostasis is chiefly regulated by hepcidin whose expression is tightly controlled by inflammation, iron stores, and hypoxia. Hemojuvelin (HJV) is a bone morphogenetic protein co-receptor that has been identified as a main upstream regulator of hepcidin expression; HJV mutations are associated with a severe form of iron overload (Juvenile haemochromatosis).”

The news reporters obtained a quote from the research from Mansoura University, “Currently however, there is no information on how HJV is regulated by inflammation. To study the regulation of HJV expression by inflammation and whether Hfe has a role in that regulation,



control and LPS-injected wild type and Hfe KO mice were used. Moreover, human hepatoma cells (HuH7) were used to study the effect of IL-6 and TNF-alpha on HJV mRNA expression. Here we show that LPS repressed hepatic HJV and BMPs, while it induced hepcidin 1 expression in wild-type and Hfe KO mice with no effect on hepatic pSMAD 1, 5, 8 protein levels. In addition, exogenous TNF-alpha (20 ng/mL) decreased HJV mRNA and protein expression to 40% of control with no effect on hepcidin mRNA expression in 24 hours. On the other hand, IL-6 induced hepcidin mRNA and protein expression with no effect on HJV mRNA expression levels. Moreover, using the HJV promoter-luciferase reporter fusion construct (HJVP1.2-luc), we showed that the basal luciferase activity of HJVP1.2-luc was inhibited by 33% following TNF-alpha treatment of HuH7 transfected cells suggesting that the TNF-alpha down-regulation is exerted at the transcriptional level. Additionally, mutation of a canonical TNF-alpha responsive element (TNFRE) within HJVP1.2-luc abolished TNF-alpha response suggesting that this TNFRE is functional. From these results, we conclude that TNF-alpha suppresses HJV transcription possibly via a novel TNFRE within the HJV promoter.”

According to the news reporters, the research concluded: “In addition, the results suggest that the proposed link between inflammation and BMP-SMAD signalling is independent of HJV and BMP ligands.”

For more information on this research see: Tumour necrosis factor alpha downregulates human hemojuvelin expression via a novel response element within its promoter. *Journal of Biomedical Science*, 2012;19():1-12. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

Our news correspondents report that additional information may be obtained by contacting M.F. Salama, Mansoura University, Fac Vet Med, Dept. of Biochem, Mansoura, Egypt. (2012 Dec 31)

## **China Agricultural University, Beijing: Kinetics and equilibrium of solute diffusion into human hair**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Beijing, People’s Republic of China, by NewsRx correspondents, research stated, “The uptake kinetics of five molecules by hair has been measured and the effects of pH and physical chemical properties of molecules were investigated. A theoretical model is proposed to analyze the experimental data.”

Our news editors obtained a quote from the research from China Agricultural University, “The results indicate that the binding affinity

of solute to hair, as characterized by hair-water partition coefficient, scales to the hydrophobicity of the solute and decreases dramatically as the pH increases to the dissociation constant. The effective diffusion coefficient of solute depended not only on the molecular size as most previous studies suggested, but also on the binding affinity as well as solute dissociation. It appears that the uptake of molecules by hair is due to both hydrophobic interaction and ionic charge interaction. Based on theoretical considerations of the cellular structure, composition and physical chemical properties of hair, quantitative-structure-property-relationships (QSPR) have been proposed to predict the hair-water partition coefficient (PC) and the effective diffusion coefficient ( $D(e)$ ) of solute. The proposed QSPR models fit well with the experimental data.”

According to the news editors, the research concluded: “This paper could be taken as a reference for investigating the adsorption properties for polymeric materials, fibres, and biomaterials.”

For more information on this research see: Kinetics and equilibrium of solute diffusion into human hair. *Annals of Biomedical Engineering*, 2012;40(12):2719-26. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting L. Wang, China Agricultural University, PO Box 191, 17 Qing-Hua-Dong-Lu, Beijing, 100083, People's Taiwan. (2012 Dec 26)

### **Chungnam National University, Daejeon: Ultrasonic alignment of bio-functionalized magnetic beads and live cells in PDMS micro-fluidic channel**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Microdevices. According to news reporting out of Daejeon, South Korea, by NewsRx editors, research stated, “In this work, we demonstrated the alignment of polystyrene latex microspheres (diameter of 1 ~45  $\mu$ m), bio-functionalized superparamagnetic beads (diameter 2.8  $\mu$ m), and live cells (average diameter 1 ~2  $\mu$ m) using an ultrasonic standing wave (USW) in a PDMS microfluidic channel (330  $\mu$ m width) attached on a Si substrate for bio-medical applications. To generate a standing wave inside the channel, ultrasound of 2.25 MHz resonance frequency (for the channel width) was applied by two ultrasound transducers installed at both sides of the channel which caused the radiation force to concentrate the micro-particles at the single pressure nodal plane of USW.”

Our news journalists obtained a quote from the research from Chungnam National University, “By increasing the frequency to the next resonance condition of the channel, the particles were concentrated in dual nodal planes. Migration time of the micro-particles towards the

single nodal plane was recorded as 108 s, 17 s, and 115 s for polystyrene particles of 2  $\mu$ m diameter, bio-functionalized magnetic beads, and live cells, respectively.”

According to the news editors, the research concluded: “These successful alignments of the bio-functionalized magnetic beads along the desired part of the channel can enhance the performance of a sensor which is applicable for the bio-hybrid system and the alignment of live cells without any damage can be used for sample pre-treatment for the application of lab-on-a-chip type bioassays.”

For more information on this research see: Ultrasonic alignment of bio-functionalized magnetic beads and live cells in PDMS micro-fluidic channel. *Biomedical Microdevices*, 2012;14(6):1077-84. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting A.T. Islam, Dept. of Materials Science & Engineering, Chungnam National University, Gungdong, Daejeon, 305-764, South Korea.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Dec 26)

### **Institute of Bioengineering, Lausanne: On the estimation of total arterial compliance from aortic pulse wave velocity**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Lausanne, Switzerland, by NewsRx correspondents, research stated, “Total arterial compliance ( $C(T)$ ) is a main determinant of cardiac afterload, left ventricular function and arterio-ventricular coupling.  $C(T)$  is physiologically more relevant than regional aortic stiffness.”

Our news journalists obtained a quote from the research from the Institute of Bioengineering, “However, direct, in vivo, non-invasive, measurement of  $C(T)$  is not feasible. Several methods for indirect  $C(T)$  estimation require simultaneous recording of aortic flow and pressure waves, limiting  $C(T)$  assessment in clinical practice. In contrast, aortic pulse wave velocity (aPWV) measurement, which is considered as the ‘gold standard’ method to assess arterial stiffness, is noninvasive and relatively easy. Our aim was to establish the relation between aPWV and  $C(T)$ . In total, 1000 different hemodynamic cases were simulated, by altering heart rate, compliance, resistance and geometry using an accurate, distributed, nonlinear, one-dimensional model of the arterial tree. Based on Bramwell-Hill theory, the formula [Formula: see text]

was found to accurately estimate  $C(T)$  from aPWV. Coefficient  $k$  was determined both analytically and by fitting  $C(T)$  vs. aPWV data.  $C(T)$  estimation may provide an additional tool for cardiovascular risk (CV) assessment and better management of CV diseases.  $C(T)$  could have greater impact in assessing elderly population or subjects with elevated arterial stiffness, where aPWV seem to have limited prognostic value.”

According to the news editors, the research concluded: “Further clinical studies should be performed to validate the formula in vivo.”

For more information on this research see: On the estimation of total arterial compliance from aortic pulse wave velocity. *Annals of Biomedical Engineering*, 2012;40(12):2619-26. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from O. Vardoulis, Laboratory of Hemodynamics and Cardiovascular Technology, Institute of Bioengineering, Swiss Federal Institute of Technology, Ecole Polytechnique Federale de Lausanne (EPFL), STI, LHTC, BM 5128, Station 17, 1015, Lausanne, Switzerland. (2012 Dec 26)

### **Lund University: Vortex Ring Formation in the Left Ventricle of the Heart: Analysis by 4D Flow MRI and Lagrangian Coherent Structures**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating from Lund, Sweden, by NewsRx correspondents, research stated, “Recent studies suggest that vortex ring formation during left ventricular (LV) rapid filling is an optimized mechanism for blood transport, and that the volume of the vortex ring is an important measure. However, due to lack of quantitative methods, the volume of the vortex ring has not previously been studied.”

Our news editors obtained a quote from the research from Lund University, “Lagrangian Coherent Structures (LCS) is a new flow analysis method, which enables in vivo quantification of vortex ring volume. Therefore, we aimed to investigate if vortex ring volume in the human LV can be reliably quantified using LCS and magnetic resonance velocity mapping (4D PC-MR). Flow velocities were measured using 4D PC-MR in 9 healthy volunteers and 4 patients with dilated ischemic cardiomyopathy. LV LCS were computed from flow velocities and manually delineated in all subjects. Vortex volume in the healthy volunteers was  $51 \pm 17\%$  of the LV volume, and  $21 \pm 17\%$  in the patients. Interobserver variability was  $-1 \pm 17\%$  and interstudy variability was  $-2 \pm 17\%$ ; 12%. Compared to idealized flow experiments, the

vortex rings showed additional complexity and asymmetry, related to endocardial trabeculation and papillary muscles.”

According to the news editors, the research concluded: “LCS and 4D PC-MR enables measurement of vortex ring volume during rapid filling of the LV.”

For more information on this research see: Vortex Ring Formation in the Left Ventricle of the Heart: Analysis by 4D Flow MRI and Lagrangian Coherent Structures. *Annals of Biomedical Engineering*, 2012;40(12):2652-62. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting J. Toger, Dept. of Clinical Physiology, Skane University Hospital Lund, Lund University, 221 85, Lund, Sweden. (2012 Dec 26)

### **National Cheng Kung University, Tainan: Video-based Gait Analysis for Functional Evaluation of Healing Achilles Tendon in Rats**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of Tainan, Taiwan, by NewsRx editors, research stated, “Video-based walking track systems have been developed for gait analysis in rat models. However, there is no previous study using video-based tracking systems to address the gait parameters to evaluate the recovery of Achilles tendon rupture models.”

Our news journalists obtained a quote from the research from National Cheng Kung University, “This study conducted a comprehensive gait analysis using a video-based image processing system. Eighteen Sprague-Dawley rats were randomly assigned to one of three interventional conditions: sham surgery, Achilles tendon repair, and Achilles tendon defect. After surgery, all animals were evaluated using a video-based walking track system. The gait parameters and the Achilles functional index (AFI) were further analyzed. The ankle joint angles of the injury side at mid-stance and pre-swing were highly correlated with the AFI. However, lack of sensitivity was found for the AFI. Increased measurement sensitivity of the Achilles tendon healing condition was found in the ankle joint angle of the involved side at the pre-swing and the level of asymmetry of the hindlimb joint position and stance/swing time. The overall sensitivity of the ankle motion analysis was significantly higher than that of AFI.”

According to the news editors, the research concluded: “We conclude that the ankle motion analysis is a reliable, reproducible, and sensitive tool for Achilles tendon analysis in rats.”

For more information on this research see: Video-based Gait Analysis for Functional Evaluation of Healing Achilles Tendon in Rats. *Annals of Biomedical Engineering*, 2012;40(12):2532-40. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting J.I. Liang, Institute of Biomedical Engineering, National Cheng Kung University, No 1, University Road, Tainan, 701, Taiwan. (2012 Dec 26)

### **Osaka University: Rapidly-moving insect muscle-powered microrobot and its chemical acceleration**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Microdevices are discussed in a new report. According to news originating from Osaka, Japan, by NewsRx correspondents, research stated, “Insect dorsal vessel (DV) tissue seems well suited for microactuators due to its environmental robustness and low maintenance. We describe an insect muscle-powered autonomous microrobot (iPAM) and its acceleration with a neuroactive chemical, crustacean cardioactive peptide (CCAP).”

Our news journalists obtained a quote from the research from Osaka University, “The iPAM, consisting of a DV tissue and a frame, was designed on the basis of a finite element method simulation and fabricated. The iPAM moved autonomously by spontaneous contraction of the DV tissue at a significantly improved velocity compared to our previous model. The best-case iPAM moved faster than other reported microrobots powered by mammalian cardiomyocytes. It moved forward with a small declination of 0.54°; during one contraction since the DV tissue not only shortened but also twisted. The iPAM frame should be designed by taking into account the innate contractile characteristic of DV tissue. The acceleration effect of CCAP on contracting frequency was evaluated using a micropillar array and was a maximum at 10(-6)M. The effect peaked 1 min after addition and remained for 2 min. CCAP addition at 10(-6)M accelerated the iPAM temporally and the velocity increased 8.1-fold.”

According to the news editors, the research concluded: “We view the DV tissue as one of the most promising materials for chemically regulatable microactuators.”

For more information on this research see: Rapidly-moving insect muscle-powered microrobot and its chemical acceleration. *Biomedical Microdevices*, 2012;14(6):979-86. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Biomedical Microdevices* - <http://www.springerlink.com/content/1387-2176/>)

The news correspondents report that additional information may be obtained from Y. Akiyama, Dept. of Mechanical Engineering, Osaka University, 2-1 Yamadaoka, Suita, Osaka, 565-0871, Japan.

The publisher's contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Dec 26)

### **Purdue University, West Lafayette: Could spatial heterogeneity in human vocal fold elastic properties improve the quality of phonation?**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating in West Lafayette, Indiana, by NewsRx journalists, research stated, “The physical mechanisms leading to the acoustic and perceptual qualities of voice are not well understood. This study examines the spatial distribution of biomechanical properties in human vocal folds and explores the consequences of these properties on phonation.”

The news reporters obtained a quote from the research from Purdue University, “Vocal fold lamina propria specimens isolated from nine excised human male larynges were tested in uniaxial tension (six from non-smokers, three from smokers). An optical method was employed to determine the local stretch, from which the elastic modulus of three segments in the anterior-posterior direction was calculated. Several specimens exhibited a significant heterogeneity in the modulus with the middle segment stiffer than the other segments. It was concluded that such modulus gradients are stronger in specimens from non-smokers than smokers. To understand the functional implications of a modulus gradient, the first eigenmode of vibration was calculated with a finite element model. With a modulus gradient, the vocal fold's eigenmode deflection was spread along the anterior-posterior length, whereas for a homogeneous modulus distribution, the deflection was more focused around the mid-coronal plane.”

According to the news reporters, the research concluded: “Consequently, the strong modulus gradient may enable more complete glottal closure, which is important for normal phonation, while a more homogeneous modulus may be responsible for poor glottal closure and a perceived ‘breathy’ voice.”

For more information on this research see: Could spatial heterogeneity in human vocal fold elastic properties improve the quality of phonation? *Annals of Biomedical Engineering*, 2012;40(12):2708-18. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting J.E. Kelleher, School of Mechanical Engineering, Purdue University, 585 Purdue Mall, West Lafayette, IN, 47907, United States. (2012 Dec 26)

### **Shanghai Institute of Planned Parenthood Research: Gestrinone inhibits growth of human uterine leiomyoma may relate to activity regulation of ER $\alpha$ , Src and P38 MAPK**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedicine and Pharmacotherapy are discussed in a new report. According to news originating from Shanghai, People's Republic of China, by NewsRx correspondents, research stated, "The study was to investigate the effect of gestrinone on the growth of human uterine leiomyoma cells and on the levels and activity of p38, Src and estrogen receptor alpha (ER $\alpha$ ). Human uterine leiomyoma cells were cultured and treated with dimethylsulfoxide (DMSO) or a gestrinone concentration gradient."

Our news journalists obtained a quote from the research from the Shanghai Institute of Planned Parenthood Research, "Morphological changes were observed and apoptosis was evaluated. Levels of p38 and phosphorylated-p38 (pp38) were assayed by enzyme-linked immunosorbent assay (ELISA). Levels of ER $\alpha$  and Src were analyzed using real-time RT-PCR and Western blotting. The result showed that gestrinone significantly inhibited the growth of cultured human uterine leiomyoma cells in a concentration- and time-dependent manner, with a 50% inhibitory concentration (IC<sub>50</sub>) value and corresponding 95% confidence intervals (CI) of 43.67 (23.46~81.32), 27.78 (12.51~61.68) and 15.25 (7.17~32.43) mol/L at 20, 40 and 60h, respectively. Compared with control-treated leiomyoma cells, gestrinone significantly reduced both the expression of ER $\alpha$  ( $p < 0.05$ ) and the levels of phospho-Ser167-ER $\alpha$  ( $p < 0.05$ ). Gestrinone also markedly suppressed the level of phospho-Tyr416-Src ( $p < 0.05$ ). Moreover, gestrinone significantly increased the ratio of phospho-p38/p38 mitogen-activated protein kinase (MAPK) ( $p < 0.05$ ). However, no significant increase in apoptosis or cell cycle arrest was observed ( $p > 0.05$ ) in response to the tested concentrations of 0.1 to 3.0 mol/L. As a conclusion, gestrinone suppresses the proliferation of uterine leiomyoma cells mainly by regulating the activity of ER $\alpha$ /Src/p38 MAPK in a concentration-dependent manner at a low concentration of 0.1~3.0M, but not significantly regulating apoptosis."

According to the news editors, the research concluded: "Gestrinone opposes the growth of uterine leiomyoma through multiple genes."



For more information on this research see: Gestrinone inhibits growth of human uterine leiomyoma may relate to activity regulation of ER $\alpha$ , Src and P38 MAPK. *Biomedicine & Pharmacotherapy*, 2012;66(8):569-77. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedicine & Pharmacotherapy - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

The news correspondents report that additional information may be obtained from Y. Zhu, Dept. of Reproductive Pharmacology, NPFPC Key Laboratory of Contraceptives and Devices, Shanghai Institute of Planned Parenthood Research, Shanghai 200032, People's Taiwan. (2012 Dec 26)

### **Tokyo University of Agriculture and Technology: Insect biofuel cells using trehalose included in insect hemolymph leading to an insect-mountable biofuel cell**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Microdevices is now available. According to news reporting out of Tokyo, Japan, by NewsRx editors, research stated, “In this paper, an insect biofuel cell (BFC) using trehalose included in insect hemolymph was developed. The insect BFC is based on trehalase and glucose oxidase (GOD) reaction systems which oxidize &#223;-glucose obtained by hydrolyzing trehalose.”

Our news journalists obtained a quote from the research from the Tokyo University of Agriculture and Technology, “First, we confirmed by LC-MS that a sufficient amount of trehalose was present in the cockroach hemolymph (CHL). The maximum power density obtained using the insect BFC was 6.07 W/cm(2). The power output was kept more than 10 % for 2.5 h by protecting the electrodes with a dialysis membrane. Furthermore, the maximum power density was increased to 10.5 W/cm(2) by using an air diffusion cathode. Finally, we succeeded in driving a melody integrated circuit (IC) and a piezo speaker by connecting five insect BFCs in series.”

According to the news editors, the research concluded: “The results indicate that the insect BFC is a promising insect-mountable battery to power environmental monitoring micro-tools.”

For more information on this research see: Insect biofuel cells using trehalose included in insect hemolymph leading to an insect-mountable biofuel cell. *Biomedical Microdevices*, 2012;14(6):1063-8. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting K. Shoji, Dept. of Bio-Applications and Systems

Engineering, Tokyo University of Agriculture and Technology, 2-24-16 Nakacho, Koganei, Tokyo, 184-8588, Japan.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Dec 26)

### **University of Virginia, Charlottesville: A finite element model of the foot and ankle for automotive impact applications**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Charlottesville, Virginia, by NewsRx journalists, research stated, “A finite element (FE) model of the foot and leg was developed to improve understanding of injury mechanisms of the ankle and subtalar joints during vehicle collisions and to aid in the design of injury countermeasures. The FE model was developed based on the reconstructed geometry of a male volunteer close to the anthropometry of a 50th percentile male and a commercial anatomical database.”

The news correspondents obtained a quote from the research from the University of Virginia, “While the forefoot bones were defined as rigid bodies connected by ligament models, the surrounding bones of the ankle and subtalar joints and the leg bones were modeled as deformable structures. The material and structural properties were selected based on a synthesis of current knowledge of the constitutive models for each tissue. The whole foot and leg model was validated in different loading conditions including forefoot impact, axial rotation, dorsiflexion, and combined loadings. Overall results obtained in the model validation indicated improved biofidelity relative to previous FE models. The developed model was used to investigate the injury tolerance of the ankle joint under brake pedal loading for internally and externally rotated feet. Ligament failures were predicted as the main source of injury in this loading condition. A 12% variation of failure moment was observed in the range of axial foot rotations (15° to 17°). The most vulnerable position was the internally rotated (15°) posture among three different foot positions.”

According to the news reporters, the research concluded: “Furthermore, the present foot and ankle model will be coupled together with other body region FE models into the state-of-art human FE model to be used in the field of automotive safety.”

For more information on this research see: A finite element model of the foot and ankle for automotive impact applications. *Annals of Biomedical Engineering*, 2012;40(12):2519-31. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting J. Shin, Mechanical and Aerospace Engineering Department, University of Virginia, Charlottesville, VA, United States. (2012 Dec 26)

### **National Defense Medical Center, Taipei: Daidzein induces neuritogenesis in DRG neuronal cultures**

By a News Reporter-Staff News Editor at Life Science Weekly – Researchers detail new data in Enzymes and Coenzymes. According to news originating from Taipei, Taiwan, by NewsRx correspondents, research stated, “Daidzein, a phytoestrogen found in isoflavone, is known to exert neurotrophic and neuroprotective effects on the nervous system. Using primary rat dorsal root ganglion (DRG) neuronal cultures, we have examined the potential neurite outgrowth effect of daidzein.”

Our news journalists obtained a quote from the research from National Defense Medical Center, “Dissociated dorsal root ganglia (DRG) cultures were used to study the signaling mechanism of daidzein-induced neuritogenesis by immunocytochemistry and Western blotting. In response to daidzein treatment, DRG neurons showed a significant increase in total neurite length and in tip number per neuron. The neuritogenic effect of daidzein was significantly hampered by specific blockers for Src, protein kinase C delta (PKC delta) and mitogen-activated protein kinase/extracellular signal-regulated kinase kinases (MEK/ERK), but not by those for estrogen receptor (ER). Moreover, daidzein induced phosphorylation of Src, PKC delta and ERK. The activation of PKC delta by daidzein was attenuated in the presence of a Src kinase inhibitor, and that of ERK by daidzein was diminished in the presence of either a Src or PKC delta inhibitor.”

According to the news editors, the research concluded: “Daidzein may stimulate neurite outgrowth of DRG neurons depending on Src kinase, PKC delta and ERK signaling pathway.”

For more information on this research see: Daidzein induces neuritogenesis in DRG neuronal cultures. *Journal of Biomedical Science*, 2012;19(0):1-13. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

The news correspondents report that additional information may be obtained from S.H. Yang, Natl Def Med Center, Dept. of Biol & Anat, Taipei, Taiwan. (2012 Dec 25)

## **University of Miami, Coral Gables: Nutrient Transport in Human Annulus Fibrosus is Affected by Compressive Strain and Anisotropy**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Coral Gables, Florida, by NewsRx correspondents, research stated, “The avascular intervertebral disc (IVD) receives nutrition via transport from surrounding vasculature; poor nutrition is believed to be a main cause of disc degeneration. In this study, we investigated the effects of mechanical deformation and anisotropy on the transport of two important nutrients-oxygen and glucose-in human annulus fibrosus (AF).”

Our news editors obtained a quote from the research from the University of Miami, “The diffusivities of oxygen and glucose were measured under three levels of uniaxial confined compression-0, 10, and 20%-and in three directions-axial, circumferential, and radial. The glucose partition coefficient was also measured at three compression levels. Results for glucose and oxygen diffusivity in AF ranged from  $4.46 \times 10^{-7}$  to  $9.77 \times 10^{-6}$  cm<sup>2</sup>/s and were comparable to previous studies; the glucose partition coefficient ranged from 0.71 to 0.82 and was also similar to previous results. Transport properties were found to decrease with increasing deformation, likely caused by fluid exudation during tissue compression and reduction in pore size. Furthermore, diffusivity in the radial direction was lower than in the axial or circumferential directions, indicating that nutrient transport in human AF is anisotropic. This behavior is likely a consequence of the layered structure and unique collagen architecture of AF tissue.”

According to the news editors, the research concluded: “These findings are important for better understanding nutritional supply in IVD and related disc degeneration.”

For more information on this research see: Nutrient Transport in Human Annulus Fibrosus is Affected by Compressive Strain and Anisotropy. *Annals of Biomedical Engineering*, 2012;40(12):2551-8. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting A.R. Jackson, Orthopaedic Biomechanics Lab, Dept. of Biomedical Engineering, University of Miami, Coral Gables, FL, United States. (2012 Dec 25)

## Virginia Tech, Blacksburg: Effect of body shape on the motile behavior of bacteria-powered swimming microrobots (BacteriaBots)

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on Biomedical Microdevices have been presented. According to news reporting from Blacksburg, Virginia, by NewsRx journalists, research stated, “Swimming microrobots are envisioned to impact minimally invasive diagnosis, localized treatment of diseases, and environmental monitoring. Dynamics of micro-scale swimming robots falls in the realm of low Reynolds number, where viscous forces exerted on the robots are dominant over inertia.”

The news correspondents obtained a quote from the research from Virginia Tech, “Viscous forces developed at the interface of the swimming microrobots and the surrounding fluid are a strong function of the body geometry. In this work, a collection of bacteria-powered microrobots (BacteriaBots) with prolate spheroid, barrel, and bullet-shaped bodies is fabricated and the influence of body shape on the dynamics of the BacteriaBots is investigated. We have experimentally demonstrated that using non-spherical geometries increases the mean directionality of the motion of the BacteriaBots but does not significantly affect their average speed compared with their spherical counterparts.”

According to the news reporters, the research concluded: “We have also demonstrated that directionality of non-spherical BacteriaBots depends on the aspect ratio of the body and for the case of prolate spheroid, a higher aspect ratio of two led to a larger directionality compared to their low aspect ratio counterparts.”

For more information on this research see: Effect of body shape on the motile behavior of bacteria-powered swimming microrobots (BacteriaBots). *Biomedical Microdevices*, 2012;14(6):999-1007. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting A. Sahari, School of Biomedical Engineering and Sciences, Virginia Technical, Blacksburg, VA, 24061, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Dec 25)

## Osaka University: Cardiomyocyte-driven gel network for bio mechano-informatic wet robotics

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators publish new report on Biomedical Microdevices. According to news originating from Osaka, Japan, by NewsRx correspondents, research stated, “This paper reports on a cellular mechano-informatics network gel robot which was powered by culturing cardiomyocytes in the micro gel structure. Contraction activities propagated through the cardiomyocyte gel network will transmit a spatial mechanical wave as information about the chemical and mechanical responses to environmental changes.”

Our news journalists obtained a quote from the research from Osaka University, “The cardiomyocyte gel network robot transmits electrically excited potential and mechanical stretch-induced contractions as information carried on the gel network. The cardiomyocyte gel network robot was fabricated from a mixture of primary cardiomyocytes and collagen gel and molded in a PDMS casting mold, which could produce serial, parallel lattice, or radial pattern networks. Fluorescent calcium imaging showed that the calcium activity of the cardiomyocytes in the gel network was segmented in small domains in the gel network; however, the local contraction that started on one branch of the gel network was propagated to a neighboring branch, and the propagation velocity was increased with increasing concentration of adrenaline. This increase was limited to ~20 mm/s.”

According to the news editors, the research concluded: “This proposed mechano-informatics kineticism will provide not only mechano-informatics for cardiomyocyte powered wet robotics but will also help show how cardiac disease occurs in activity propagation systems.”

For more information on this research see: Cardiomyocyte-driven gel network for bio mechano-informatic wet robotics. *Biomedical Microdevices*, 2012;14(6):969-77. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news correspondents report that additional information may be obtained from T. Hoshino, Dept. of Mechanical Engineering, Osaka University, 2-1, Yamadaoka, Suita-shi, Osaka, 565-0871, Japan.

The publisher’s contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Dec 24)

### **Carnegie Mellon University, Pittsburgh: An experimental investigation on thermal exposure during bone drilling**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Medical Engineering and Physics have been published. According to news originating from Pittsburgh, Pennsylvania, by NewsRx correspondents, research stated, “This study presents an experimental investigation of the effects of spindle speed, feed rate, and depth of drilling on the temperature distribution during drilling of the cortical section of the bovine femur. In an effort to reduce measurement uncertainties, a new approach for temperature measurements during bone drilling is presented in this study.”

Our news journalists obtained a quote from the research from Carnegie Mellon University, “The new approach is based on a setup for precise positioning of multiple thermocouples, automated data logging system, and a computer numerically controlled (CNC) machining system. A battery of experiments that has been performed to assess the uncertainty and repeatability of the new approach displayed adequate results. Subsequently, a parametric study was conducted to determine the effects of spindle speed, feed rate, hole depth, and thermocouple location on the measured bone temperature. This study suggests that the exposure time during bone drilling far exceeds the commonly accepted threshold for thermal injury, which may prevail at significant distances from the drilled hole.”

According to the news editors, the research concluded: “Results of this study suggest that the correlation of the thermal exposure threshold for bone injury and viability should be further explored.”

For more information on this research see: An experimental investigation on thermal exposure during bone drilling. *Medical Engineering & Physics*, 2012;34(10):1510-20. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from J. Lee, Carnegie Mellon University, Dept. of Mechanical Engineering, Pittsburgh, PA 15213, United States. (2012 Dec 21)

### **Fujian Medical University: Angled abutments result in increased or decreased stress on surrounding bone of single-unit dental implants: A finite element analysis**

By a News Reporter-Staff News Editor at Health & Medicine Week – A new study on Medical Engineering and Physics is now available. According to news reporting out of Fujian, People’s Republic of China, by NewsRx editors, research stated, “The influence of angled abutments on stress is a matter of debate. It is widely accepted that increased

stress on implants and bone has been associated with the use of angled abutments.”

Our news journalists obtained a quote from the research from Fujian Medical University, “However, comparisons of clinical success rates of implants restored with angled and straight abutments indicate no significant differences. The aim of the present study was to determine whether angled abutments could result in decreased stress on surrounding bone of single-unit dental implants. By means of finite element analysis (FEA), four simplified models were designed to simulate clinical scenarios in which that implants were placed in an ideal axial position or at an angled position. Each implant was paired with a straight or angled abutment. A simulated occlusal load of 100N was applied along the vertical axis of the jawbone. The von Mises stress and strain were recorded for each model. The numerical results showed that angled abutments resulted in decreased stresses when implants were not placed in ideal axial position.”

According to the news editors, the research concluded: “The present study identified by means of FEA that angled abutments could result in decreased stress on the supporting bone of implant system and may provide some clues to resolve the debate regarding the influence of angled abutments.”

For more information on this research see: Angled abutments result in increased or decreased stress on surrounding bone of single-unit dental implants: A finite element analysis. *Medical Engineering & Physics*, 2012;34(10):1526-31. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting K. Tian, School of Stomatology, Fujian Medical University, Fuzhou, Fujian 350000, People’s Taiwan. (2012 Dec 21)

### **Stanford University: Behavior of tip-steerable needles in ex vivo and in vivo tissue**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Stanford, California, by NewsRx journalists, research stated, “Robotic needle steering is a promising technique to improve the effectiveness of needle-based clinical procedures, such as biopsies and ablation, by computer-controlled, curved insertions of needles within solid organs. In this paper, we explore the capabilities, challenges, and clinical relevance of asymmetric-tip needle steering through experiments in ex vivo and in vivo tissue.”

The news correspondents obtained a quote from the research from Stanford University, “We evaluate the repeatability of needle insertion



in inhomogeneous biological tissue and compare ex vivo and in vivo needle curvature and insertion forces. Steerable needles curved more in kidney than in liver and prostate, likely due to differences in tissue properties. Pre-bent needles produced higher insertion forces in liver and more curvature in vivo than ex vivo. When compared to straight stainless steel needles, steerable needles did not cause a measurable increase in tissue damage and did not exert more force during insertion. The minimum radius of curvature achieved by prebent needles was 5.23 cm in ex vivo tissue, and 10.4 cm in in vivo tissue. The curvatures achieved by bevel tip needles were negligible for in vivo tissue. The minimum radius of curvature for bevel tip needles in ex vivo tissue was 16.4 cm; however, about half of the bevel tip needles had negligible curvatures.”

According to the news reporters, the research concluded: “We also demonstrate a potential clinical application of needle steering by targeting and ablating overlapping regions of cadaveric canine liver.”

For more information on this research see: Behavior of tip-steerable needles in ex vivo and in vivo tissue. *Ieee Transactions On Bio-medical Engineering*, 2012;59(10):2705-15.

Our news journalists report that additional information may be obtained by contacting A. Majewicz, Dept. of Mechanical Engineering, Stanford University, Stanford, CA 94305, United States. (2012 Dec 19)

### **University of Delaware, Newark: Fiber optic micro sensor for the measurement of tendon forces**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Newark, Delaware, by NewsRx correspondents, research stated, “A fiber optic sensor developed for the measurement of tendon forces was designed, numerically modeled, fabricated, and experimentally evaluated. The sensor incorporated fiber Bragg gratings and micro-fabricated stainless steel housings.”

Our news journalists obtained a quote from the research from the University of Delaware, “A fiber Bragg grating is an optical device that is spectrally sensitive to axial strain. Stainless steel housings were designed to convert radial forces applied to the housing into axial forces that could be sensed by the fiber Bragg grating. The metal housings were fabricated by several methods including laser micromachining, swaging, and hydroforming. Designs are presented that allow for simultaneous temperature and force measurements as well as for simultaneous resolution of multi-axis forces. The sensor was experimentally evaluated by hydrostatic loading and in vitro testing. A commercial hydraulic burst tester was used to provide uniform pressures on the sensor in order to establish the linearity, repeatability, and accuracy

characteristics of the sensor. The in vitro experiments were performed in excised tendon and in a dynamic gait simulator to simulate biological conditions. In both experimental conditions, the sensor was found to be a sensitive and reliable method for acquiring minimally invasive measurements of soft tissue forces.”

According to the news editors, the research concluded: “Our results suggest that this sensor will prove useful in a variety of biomechanical measurements.”

For more information on this research see: Fiber optic micro sensor for the measurement of tendon forces. *Biomedical Engineering Online*, 2012;11(0):77. (BioMed Central - <http://www.biomedcentral.com/>; Biomedical Engineering Online - [www.biomedical-engineering-online.com](http://www.biomedical-engineering-online.com))

The news correspondents report that additional information may be obtained from G.P. Behrmann, The University of Delaware, Newark, DE, 19716, United States. (2012 Dec 19)

### **Panjab University, Chandigarh: Technology and research developments in carotid image registration**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Stroke have been published. According to news reporting originating from Chandigarh, India, by NewsRx correspondents, research stated, “Brain stroke is the leading cause of death worldwide. Mortality, morbidity and economic effects of stroke are alarming.”

Our news editors obtained a quote from the research from Panjab University, “Carotid atherosclerosis is the most common cause of stroke. Early identification, monitoring and quantification of carotid plaque with the help of imaging modalities can help manage the stroke and evaluate the effectiveness of medical therapy. Carotid image registration has the potential to improve the monitoring, quantification and characterization of the disease. It helps to accurately correlate the findings of various imaging modalities for the diagnostic and therapeutic purposes. This paper aims to present the current state-of-the-art in carotid image registration techniques. For the monomodality registration, ultrasound and magnetic resonance imaging are the primary concerns. Multimodality registration will cover the combination of different modalities.”

According to the news editors, the research concluded: “The registration process and validation methods for carotid image registration are also discussed.”

For more information on this research see: Technology and research developments in carotid image registration. *Biomedical Signal Processing and Control*, 2012;7(6):560-570. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard,

Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news editors report that additional information may be obtained by contacting A. Gupta, Panjab University, UIET, Dept. of Comp Sci & Engn, Chandigarh 160019, India. (2012 Dec 14)

### **Chalmers University of Technology, Gothenburg: Analysis and Design of RF Power and Data Link Using Amplitude Modulation of Class-E for a Novel Bone Conduction Implant**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Bone Research have been published. According to news reporting from Gothenburg, Sweden, by NewsRx journalists, research stated, “This paper presents analysis and design of a radio frequency power and data link for a novel Bone Conduction Implant (BCI) system. Patients with conductive and mixed hearing loss and single-sided deafness can be rehabilitated by bone-anchored hearing aids (BAHA).”

The news correspondents obtained a quote from the research from the Chalmers University of Technology, “Whereas the conventional hearing aids transmit sound to the tympanic membrane via air conduction, the BAHA transmits sound via vibrations through the skull directly to the cochlea. It uses a titanium screw that penetrates the skin and needs life-long daily care; it may cause skin infection and redness. The BCI is developed as an alternative to the percutaneous BAHA since it leaves the skin intact. The BCI comprises an external audio processor with a transmitter coil and an implanted unit called the bridging bone conductor with a receiver coil. Using amplitude modulation of the Class-E power amplifier that drives the inductive link, the sound signal is transmitted to the implant through the intact skin. It was found that the BCI can generate enough output force level for candidate patients.”

According to the news reporters, the research concluded: “Maximum power output of the BCI was designed to occur at 5-mm skin thickness and the variability was within 1.5 dB for 1-8-mm skin thickness variations.”

For more information on this research see: Analysis and Design of RF Power and Data Link Using Amplitude Modulation of Class-E for a Novel Bone Conduction Implant. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3050-3059. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.>

[ieeee.org/; IEEE Transactions on Biomedical Engineering - http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10](http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10))

Our news journalists report that additional information may be obtained by contacting H. Taghavi, Chalmers, Dept. of Signals & Syst, S-41296 Gothenburg, Sweden. (2012 Dec 12)

### **Clarkson University, Potsdam: Automatic food intake detection based on swallowing sounds**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Potsdam, New York, by NewsRx correspondents, research stated, “This paper presents a novel fully automatic food intake detection methodology, an important step toward objective monitoring of ingestive behavior. The aim of such monitoring is to improve our understanding of eating behaviors associated with obesity and eating disorders.”

Our news journalists obtained a quote from the research from Clarkson University, “The proposed methodology consists of two stages. First, acoustic detection of swallowing instances based on mel-scale Fourier spectrum features and classification using support vector machines is performed. Principal component analysis and a smoothing algorithm are used to improve swallowing detection accuracy. Second, the frequency of swallowing is used as a predictor for detection of food intake episodes. The proposed methodology was tested on data collected from 12 subjects with various degrees of adiposity. Average accuracies of >80% and >75% were obtained for intra-subject and inter-subject models correspondingly with a temporal resolution of 30 s. Results obtained on 44.1 h of data with a total of 7305 swallows show that detection accuracies are comparable for obese and lean subjects. They also suggest feasibility of food intake detection based on swallowing sounds and potential of the proposed methodology for automatic monitoring of ingestive behavior.”

According to the news editors, the research concluded: “Based on a wearable non-invasive acoustic sensor the proposed methodology may potentially be used in free-living conditions.”

For more information on this research see: Automatic food intake detection based on swallowing sounds. *Biomedical Signal Processing and Control*, 2012;7(6):649-656. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from O. Makeyev, Clarkson University, Dept. of Elect & Comp Engn, Potsdam, NY 13699, United States. (2012 Dec 12)

### **Cornell University, Ithaca: On chip porous polymer membranes for integration of gastrointestinal tract epithelium with microfluidic 'body-on-a-chip' devices**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Microdevices is the subject of a report. According to news originating from Ithaca, New York, by NewsRx correspondents, research stated, “We describe a novel fabrication method that creates microporous, polymeric membranes that are either flat or contain controllable 3-dimensional shapes that, when populated with Caco-2 cells, mimic key aspects of the intestinal epithelium such as intestinal villi and tight junctions. The developed membranes can be integrated with microfluidic, multi-organ cell culture systems, providing access to both sides, apical and basolateral, of the 3D epithelial cell culture.”

Our news journalists obtained a quote from the research from Cornell University, “Partial exposure of photoresist (SU-8) spun on silicon substrates creates flat membranes with micrometer-sized pores (0.5-4.0  $\mu$ m) that—supported by posts—span across 50  $\mu$ m deep microfluidic chambers that are 8 mm wide and 10 mm long. To create three-dimensional shapes the membranes were air dried over silicon pillars with aspect ratios of up to 4:1. Space that provides access to the underside of the shaped membranes can be created by isotropically etching the sacrificial silicon pillars with xenon difluoride. Depending on the size of the supporting posts and the pore sizes the overall porosity of the membranes ranged from 4.4 % to 25.3 %.”

According to the news editors, the research concluded: “The micro-fabricated membranes can be used for integrating barrier tissues such as the gastrointestinal tract epithelium, the lung epithelium, or other barrier tissues with multi-organ 'body-on-a-chip' devices.”

For more information on this research see: On chip porous polymer membranes for integration of gastrointestinal tract epithelium with microfluidic 'body-on-a-chip' devices. *Biomedical Microdevices*, 2012;14(5):895-906. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news correspondents report that additional information may be obtained from M.B. Esch, Dept. of Biomedical Engineering, Cornell University, Ithaca, NY 14853, United States.

The publisher's contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Dec 12)

### **Cyprus Institute of Neurology and Genetics, Nicosia: Segmentation of the Common Carotid Intima-Media Complex in Ultrasound Images Using Active Contours**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating in Nicosia, Cyprus, by NewsRx journalists, research stated, “The segmentation of the intima-media complex (IMC) of the common carotid artery (CCA) wall is important for the evaluation of the intima media thickness (IMT) on B-mode ultrasound (US) images. The IMT is considered an important marker in the evaluation of the risk for the development of atherosclerosis.”

The news reporters obtained a quote from the research from the Cyprus Institute of Neurology and Genetics, “The fully automated segmentation algorithm presented in this article is based on active contours and active contours without edges and incorporates anatomical information to achieve accurate segmentation. The level set formulation by Chan and Vese using random initialization provides a segmentation of the CCA US images into different distinct regions, one of which corresponds to the carotid wall region below the lumen and includes the far wall IMC. The segmented regions are used to automatically achieve image normalization, which is followed by speckle removal. The resulting smoothed lumen-intima boundary combined with anatomical information provide an excellent initialization for parametric active contours that provide the final IMC segmentation. The algorithm is extensively evaluated on 100 different cases with ground truth (GT) segmentation available from two expert clinicians. The GT mean IMT value is 0.6679 mm +/- 0.1350 mm and the corresponding automatically segmented (AS) mean IMT value is 0.6054 mm +/- 0.1464 mm. The mean absolute difference between the GT IMT and the IMT evaluated from from the AS region is 0.095 mm +/- 0.0615 mm. The polyline distance is 0.096 mm +/- 0.034 mm while the Hausdorff distance is 0.176 mm +/- 0.047 mm.”

According to the news reporters, the research concluded: “The algorithm compares favorably to both automatic and semiautomatic methods presented in the literature.”

For more information on this research see: Segmentation of the Common Carotid Intima-Media Complex in Ultrasound Images Using Active Contours. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3060-3069. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445

Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting S. Petroudi, Cyprus Inst Neurol & Genet, CY-23462 Nicosia, Cyprus. (2012 Dec 12)

### **Duke University, Durham: Multiscale Mechanics of Articular Cartilage: Potentials and Challenges of Coupling Musculoskeletal, Joint, and Microscale Computational Models**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting from Durham, North Carolina, by NewsRx journalists, research stated, “Articular cartilage experiences significant mechanical loads during daily activities. Healthy cartilage provides the capacity for load bearing and regulates the mechanobiological processes for tissue development, maintenance, and repair.”

The news correspondents obtained a quote from the research from Duke University, “Experimental studies at multiple scales have provided a fundamental understanding of macroscopic mechanical function, evaluation of the micromechanical environment of chondrocytes, and the foundations for mechanobiological response. In addition, computational models of cartilage have offered a concise description of experimental data at many spatial levels under healthy and diseased conditions, and have served to generate hypotheses for the mechanical and biological function. Further, modeling and simulation provides a platform for predictive risk assessment, management of dysfunction, as well as a means to relate multiple spatial scales. Simulation-based investigation of cartilage comes with many challenges including both the computational burden and often insufficient availability of data for model development and validation. This review outlines recent modeling and simulation approaches to understand cartilage function from a mechanical systems perspective, and illustrates pathways to associate mechanics with biological function.”

According to the news reporters, the research concluded: “Computational representations at single scales are provided from the body down to the microstructure, along with attempts to explore multiscale mechanisms of load sharing that dictate the mechanical environment of the cartilage and chondrocytes.”

For more information on this research see: Multiscale Mechanics of Articular Cartilage: Potentials and Challenges of Coupling

Musculoskeletal, Joint, and Microscale Computational Models. *Annals of Biomedical Engineering*, 2012;40(11):2456-2474. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting J.P. Halloran, Duke University, Medical Center, Dept. of Orthopaed Surg, Durham, NC, United States. (2012 Dec 12)

### **Federal University, Rio de Janeiro: Noninvasive pressure pulse waveform analysis of flow-mediated vasodilation evoked by post-occlusive reactive hyperemia maneuver**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Rio de Janeiro, Brazil, by NewsRx correspondents, research stated, “Post-occlusive reactive hyperemia (PORH) assesses flow-mediated vasodilation at microvascular level due to bioactivity of endothelial-derived factors. Ordinary augmentation index that quantifies endothelial response is based on an ensemble-averaged waveform that limits its short-time application.”

Our news journalists obtained a quote from the research from Federal University, “This study proposes a mathematical model and two corresponding indices to evaluate arterial pressure response after blood flow restoration. Radial pressure pulse waveforms were acquired by a 12 bits acquisition board at a sampling rate of 1.0 kHz using a piezoelectric transducer. Signals were stored during 30 s at baseline condition and 60 s after 5-min occlusion using an arm-cuff placed over the brachial artery. In both conditions, the pressure pulse waveform presents systolic and diastolic phases with progressive and regressive pulse waveforms, respectively. Changes in pulse wave morphology were also observed and comprised attenuation of the pulse pressure amplitude (markedly first and second systolic peaks). This characteristic of the pulse pressure was described by the time-domain summation of two pairs of Gaussian-like waveforms (representing independent progressive and regressive components) with parameters related to amplitude, time lag, and duration for each component. A steepest descent optimization routine was used to fit the model parameters to experimental data of normotensive and subjects with hypertension. The optimized parameters were used to calculate two indices, R<sub>Ix</sub>(1,2) (second-to-first systolic peak ratio) and R<sub>Ix</sub>(1,3) (first diastolic-to-first systolic ratio).”

According to the news editors, the research concluded: “The observed responses between groups suggest that R<sub>Ix</sub>(1,2) is related to an



endothelial response to the ischemic process and could be used as a clinical tool to assess endothelial function in hypertension.”

For more information on this research see: Noninvasive pressure pulse waveform analysis of flow-mediated vasodilation evoked by post-occlusive reactive hyperemia maneuver. *Biomedical Signal Processing and Control*, 2012;7(6):616-621. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from A.D. Ferreira, Federal University of Rio de Janeiro, Elect Engn Dept. of EE, Rio De Janeiro, RJ, Brazil. (2012 Dec 12)

### **Hanyang University, Seoul: A new method for the evaluation of dental implant stability using an inductive sensor**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Seoul, South Korea, by NewsRx editors, research stated, “We developed a new method for the measurement of dental implant stability by analyzing the impulse response of the implant. The movement of the implant was measured by an inductive sensor with a dedicated adaptor.”

Our news journalists obtained a quote from the research from Hanyang University, “The large inductance of the adapter amplified the small displacement signal of the implant. The Periotest (Siemens, Bensheim, Germany) was used as a source of excitation force to acquire the impact response of the implant. Power spectrum analysis was applied to the impact response of the implant. The peak frequency of the spectrum was used as a measure of the implant stability. The performance of the system was tested and verified through simulation of the implant-bone interface in an in vitro model. Various implant-bone interfacial conditions were assessed. Holes of varying depth and diameter were drilled into a dental implantation model. Two types of impression materials (EXAMIXFINE, Regisil Rigid) with different degrees of hardness were used to fix the implant into the hole. The implant stability was also measured using the ISQ (implant stability quotient) by resonance frequency analysis on the Osstell Mentor (Integration Diagnostics AB, Goteborgsvagen, Sweden) for comparison. Linear regression analysis of the peak frequency as a stability parameter showed a linear relationship with both the depth and the diameter of the hole ( $p < 0.05$ ). When EXAMIXFINE was used, the peak frequency was linearly associated with the depth ( $R^2 = 0.443$ ) and diameter ( $R^2 = 0.396$ ) of

the hole. When Regisil Rigid was used, the peak frequency also showed a linear relationship with the depth ( $R^2 = 0.555$ ) and diameter ( $R^2 = 0.350$ ) of the hole. The peak frequency also increased as the hardness of the impression material increased. Differentiability of the system was evaluated by an ANOVA test. A statistically significant difference ( $p < 0.01$ ) was found between all implantation conditions, except in one case using the Regisil Rigid material. In contrast, the ISQ value did not consistently differentiate under several implantation conditions.”

According to the news editors, the research concluded: “The developed method could differentiate the stability changes in simulated implantation conditions with a wider dynamic range and with higher resolution than the ISQ value.”

For more information on this research see: A new method for the evaluation of dental implant stability using an inductive sensor. *Medical Engineering & Physics*, 2012;34(9):1247-1252. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting D.S. Kim, Hanyang University, Coll Engrn, Dept. of Biomed Engrn, Seoul, South Korea. (2012 Dec 12)

### **Harvard University, Boston: A Novel Fully Implantable Wireless Sensor System for Monitoring Hypertension Patients**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Boston, Massachusetts, by NewsRx correspondents, research stated, “This paper presents a novel fully implantable wireless sensor system intended for long-term monitoring of hypertension patients, designed for implantation into the femoral artery with computed tomography angiography.”

Our news editors obtained a quote from the research from Harvard University, “It consists of a pressure sensor and a telemetric unit, which is wirelessly connected to an extracorporeal readout station for energy supply and data recording. The system measures intraarterial pressure at a sampling rate of 30 Hz and an accuracy of  $\pm 1.0$  mmHg over a range of 30-300 mmHg, while consuming up to 300  $\mu$ W. A special peel-away sheath introducer set was developed to support the implantation procedure.”

According to the news editors, the research concluded: “The system delivered stable measurements in initial animal trials in sheep, with results being in good agreement with reference sensor systems.”

For more information on this research see: A Novel Fully Implantable Wireless Sensor System for Monitoring Hypertension Patients. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3124-3130. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting N.J. Cleven, Harvard University, Brigham & Women's Hospital, Sch Med, Surg Planning Lab, Boston, MA 02115, United States. (2012 Dec 12)

### **Harvard University, Boston: In Silico Studies of Magnetic Microparticle Aggregations in Fluid Environments for MRI-Guided Drug Delivery**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Boston, Massachusetts, by NewsRx journalists, research stated, “A computational platform has been developed to perform simulation, visualization, and postprocessing analysis of the aggregation process of magnetic particles within a fluid environment such as small arteries and arterioles or fluid-filled cavities of the human body.”

The news correspondents obtained a quote from the research from Harvard University, “The mathematical models needed to describe the physics of the system are presented in detail and also computational algorithms needed for efficient computation of these models are described. A number of simulation results demonstrate the simulation capabilities of the platform and preliminary experimental results validate simulation predictions.”

According to the news reporters, the research concluded: “The platform can be used to design optimal strategies for magnetic steering and magnetic targeting of drug-loaded magnetic microparticles.”

For more information on this research see: In Silico Studies of Magnetic Microparticle Aggregations in Fluid Environments for MRI-Guided Drug Delivery. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3028-3038. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting P. Vartholomeos, Harvard University, Sch Med, Childrens Hosp Boston, Cardiac Surg Bioengn Lab, Boston, MA 02115, United States. (2012 Dec 12)

### **Institute for Health, Boston: Mobile Voice Health Monitoring Using a Wearable Accelerometer Sensor and a Smartphone Platform**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Boston, Massachusetts, by NewsRx journalists, research stated, “Many common voice disorders are chronic or recurring conditions that are likely to result from faulty and/or abusive patterns of vocal behavior, referred to generically as vocal hyperfunction. An ongoing goal in clinical voice assessment is the development and use of noninvasively derived measures to quantify and track the daily status of vocal hyperfunction so that the diagnosis and treatment of such behaviorally based voice disorders can be improved.”

The news correspondents obtained a quote from the research from Institute for Health, “This paper reports on the development of a new, versatile, and cost-effective clinical tool for mobile voice monitoring that acquires the high-bandwidth signal from an accelerometer sensor placed on the neck skin above the collarbone. Using a smartphone as the data acquisition platform, the prototype device provides a user-friendly interface for voice use monitoring, daily sensor calibration, and periodic alert capabilities. Pilot data are reported from three vocally normal speakers and three subjects with voice disorders to demonstrate the potential of the device to yield standard measures of fundamental frequency and sound pressure level and model-based glottal airflow properties.”

According to the news reporters, the research concluded: “The smartphone-based platform enables future clinical studies for the identification of the best set of measures for differentiating between normal and hyperfunctional patterns of voice use.”

For more information on this research see: Mobile Voice Health Monitoring Using a Wearable Accelerometer Sensor and a Smartphone Platform. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3090-3096. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting D.D. Mehta, Massachusetts General Hospital, Inst Hlth Profess, Boston, MA 02114, United States. (2012 Dec 12)

### **Johannes Gutenberg-University, Mainz: Toward Morphological Thoracic EIT: Major Signal Sources Correspond to Respective Organ Locations in CT**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Mainz, Germany, by NewsRx correspondents, research stated, “Lung and cardiovascular monitoring applications of electrical impedance tomography (EIT) require localization of relevant functional structures or organs of interest within the reconstructed images. We describe an algorithm for automatic detection of heart and lung regions in a time series of EIT images.”

Our news journalists obtained a quote from the research from Johannes Gutenberg-University, “Using EIT reconstruction based on anatomical models, candidate regions are identified in the frequency domain and image-based classification techniques applied. The algorithm was validated on a set of simultaneously recorded EIT and CT data in pigs. In all cases, identified regions in EIT images corresponded to those manually segmented in the matched CT image.”

According to the news editors, the research concluded: “Results demonstrate the ability of EIT technology to reconstruct relevant impedance changes at their anatomical locations, provided that information about the thoracic boundary shape (and electrode positions) are used for reconstruction.”

For more information on this research see: Toward Morphological Thoracic EIT: Major Signal Sources Correspond to Respective Organ Locations in CT. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3000-3008. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from D. Ferrario, Johannes Gutenberg Univ Mainz, Dept. of Anesthesiol, D-55122 Mainz, Germany. (2012 Dec 12)

**Massachusetts Institute of Technology, Boston: The accuracy and repeatability of an automatic 2D-3D fluoroscopic image-model registration technique for determining shoulder joint kinematics**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Boston, Massachusetts, by NewsRx journalists, research stated, “Fluoroscopic imaging, using single plane or dual plane images, has grown in popularity to measure dynamic in vivo human shoulder joint kinematics. However, no study has quantified the difference in spatial positional accuracy between single and dual plane image-model registration applied to the shoulder joint.”

The news correspondents obtained a quote from the research from the Massachusetts Institute of Technology, “In this paper, an automatic 2D-3D image-model registration technique was validated for accuracy and repeatability with single and dual plane fluoroscopic images. Accuracy was assessed in a cadaver model, kinematics found using the automatic registration technique were compared to those found using radiostereometric analysis. The in vivo repeatability of the automatic registration technique was assessed during the dynamic abduction motion of four human subjects. The in vitro data indicated that the error in spatial positional accuracy of the humerus and the scapula was less than 0.30 mm in translation and less than 0.58 degrees in rotation using dual plane images. Single plane accuracy was satisfactory for in-plane motion variables, but out-of-plane motion variables on average were approximately 8 times less accurate. The in vivo test indicated that the repeatability of the automatic 2D-3D image-model registration was 0.50 mm in translation and 1.04 degrees in rotation using dual images. For a single plane technique, the repeatability was 3.31 mm in translation and 2.46 degrees in rotation for measuring shoulder joint kinematics.”

According to the news reporters, the research concluded: “The data demonstrate that accurate and repeatable shoulder joint kinematics can be obtained using dual plane fluoroscopic images with an automatic 2D-3D image-model registration technique; and that out-of-plane motion variables are less accurate than in-plane motion variables using a single plane technique.”

For more information on this research see: The accuracy and repeatability of an automatic 2D-3D fluoroscopic image-model registration technique for determining shoulder joint kinematics. *Medical Engineering & Physics*, 2012;34(9):1303-1309. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting Z.L. Zhu, MIT, Dept. of Mech Engn, Boston, MA, United States. (2012 Dec 12)

### **Massachusetts Institute of Technology, Cambridge: Needle-free jet injection using real-time controlled linear Lorentz-force actuators**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Cambridge, Massachusetts, by NewsRx correspondents, research stated, “Needle-free drug delivery by jet injection is achieved by ejecting a liquid drug through a narrow orifice at high pressure, thereby creating a fine high-speed fluid jet that can readily penetrate skin and tissue. Until very recently, all jet injectors utilized force- and pressure-generating principles that progress injection in an uncontrolled manner with limited ability to regulate delivery volume and injection depth.”

Our news editors obtained a quote from the research from the Massachusetts Institute of Technology, “In order to address these shortcomings, we have developed a controllable jet injection device, based on a custom high-stroke linear Lorentz-force motor that is feed-back controlled during the time-course of an injection. Using this device, we are able to monitor and modulate continuously the speed of the drug jet, and regulate precisely the volume of drug delivered during the injection process.”

According to the news editors, the research concluded: “We demonstrate our ability to control injection depth (up to 16 mm) and repeatably and precisely inject volumes of up to 250  $\mu$ L into transparent gels and post-mortem animal tissue.”

For more information on this research see: Needle-free jet injection using real-time controlled linear Lorentz-force actuators. *Medical Engineering & Physics*, 2012;34(9):1228-1235. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting A. Taberner, MIT, Dept. of Mech Engn, Cambridge, MA 02139, United States. (2012 Dec 12)

## **SRI International, Menlo Park: Application of hyperpolarized [1-<sup>13</sup>C]lactate for the in vivo investigation of cardiac metabolism**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Keto Acids. According to news reporting out of Menlo Park, California, by NewsRx editors, research stated, “In addition to cancer imaging, (13) C-MRS of hyperpolarized pyruvate has also demonstrated utility for the investigation of cardiac metabolism and ischemic heart disease. Although no adverse effects have yet been reported for doses commonly used in vivo, high substrate concentrations have lead to supraphysiological pyruvate levels that can affect the underlying metabolism and should be considered when interpreting results.”

Our news journalists obtained a quote from the research from SRI International, “With lactate serving as an important energy source for the heart and physiological lactate levels one to two orders of magnitude higher than for pyruvate, hyperpolarized lactate could potentially be used as an alternative to pyruvate for probing cardiac metabolism. In this study, hyperpolarized [1-(13) C]lactate was used to acquire time-resolved spectra from the healthy rat heart in vivo and to measure dichloroacetate (DCA)-modulated changes in flux through pyruvate dehydrogenase (PDH). Both primary oxidation of lactate to pyruvate and subsequent conversion of pyruvate to alanine and bicarbonate could reliably be detected.”

According to the news editors, the research concluded: “Since DCA stimulates the activity of PDH through inhibition of PDH kinase, a more than 2.5-fold increase in bicarbonate-to-substrate ratio was found after administration of DCA, similar to the effect when using [1-(13) C]pyruvate as the substrate.”

For more information on this research see: Application of hyperpolarized [1-<sup>13</sup>C]lactate for the in vivo investigation of cardiac metabolism. *Nmr In Biomedicine*, 2012;25(10):1119-24. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-1492)

Our news journalists report that additional information may be obtained by contacting D. Mayer, SRI International, Neuroscience Program, 333 Ravenswood Ave, Menlo Park, CA 94025, United States. (2012 Dec 12)



### **South China Normal University, Guangdong: Image resolution enhancement using statistical estimation in wavelet domain**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting from Guangdong, People’s Republic of China, by NewsRx journalists, research stated, “The goal of medical image resolution enhancement is to reconstruct a higher-resolution image from its lower-resolution counterpart.”

The news correspondents obtained a quote from the research from South China Normal University, “This paper proposes a Bayesian approach in the wavelet domain by exploiting a Bayesian inference framework to mathematically formulate the image interpolation problem. Furthermore, the proposed approach jointly estimates both the unknown wavelet coefficients of the high-resolution image and the unknown parameters of the statistical model for wavelet coefficients.”

According to the news reporters, the research concluded: “Experiments are conducted to demonstrate the superior performance of the proposed approach.”

For more information on this research see: Image resolution enhancement using statistical estimation in wavelet domain. *Biomedical Signal Processing and Control*, 2012;7(6):571-578. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting J.L. Shi, South China Normal University, Sch Comp, Guangzhou 510631, Guangdong, People’s Republic of China. (2012 Dec 12)

### **Tongji University, Shanghai: The domain knowledge based graph-cut model for liver CT segmentation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Shanghai, People’s Republic of China, by NewsRx journalists, research stated, “In this paper, we present a semi-supervised approach for liver segmentation from computed tomography (CT) scans, which is based on the graph cut model integrated with domain knowledge. Firstly, some hard constraints are obtained according to the knowledge of liver characteristic appearance and anatomical location.”

The news correspondents obtained a quote from the research from Tongji University, “Secondly, the energy function is constructed via

knowledge based similarity measure. A path-based spatial connectivity measure is applied for robust regional properties. Finally, the image is interpreted as a graph, afterwards the segmentation problem is casted as an optimal cut on it, which can be computed through the existing max-flow algorithm. The model is evaluated on MICCAI 2007 liver segmentation challenge datasets and some other CT volumes from the hospital.”

According to the news reporters, the research concluded: “The experimental results show its effectiveness and efficiency.”

For more information on this research see: The domain knowledge based graph-cut model for liver CT segmentation. *Biomedical Signal Processing and Control*, 2012;7(6):591-598. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting Y.F. Chen, Tongji Univ, Minist Educ, Engn Res Center Enterprise Digital Technol, Shanghai 200092, People’s Republic of China. (2012 Dec 12)

### **Tsinghua University, Beijing: A Two-Hop Wireless Power Transfer System With an Efficiency-Enhanced Power Receiver for Motion-Free Capsule Endoscopy Inspection**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating from Beijing, People’s Republic of China, by NewsRx correspondents, research stated, “This paper presents a wireless power transfer system for a motion-free capsule endoscopy inspection. Conventionally, a wireless power transmitter in a specifically designed jacket has to be connected to a strong power source with a long cable.”

Our news editors obtained a quote from the research from Tsinghua University, “To avoid the power cable and allow patients to walk freely in a room, this paper proposes a two-hop wireless power transfer system. First, power is transferred from a floor to a power relay in the patient’s jacket via strong coupling. Next, power is delivered from the power relay to the capsule via loose coupling. Besides making patients much more conformable, the proposed techniques eliminate the sources of reliability issues arisen from the moving cable and connectors. In the capsule, it is critical to enhance the power conversion efficiency. This paper develops a switch-mode rectifier (rectifying efficiency of 93.6%) and a power combination circuit (enhances combining efficiency by 18%).”

According to the news editors, the research concluded: “Thanks to the two-hop transfer mechanism and the novel circuit techniques, this system is able to transfer an average power of 24 mW and a peak power of 90 mW from the floor to a 13 mm x 27 mm capsule over a distance of 1 m with the maximum dc-to-dc power efficiency of 3.04%.”

For more information on this research see: A Two-Hop Wireless Power Transfer System With an Efficiency-Enhanced Power Receiver for Motion-Free Capsule Endoscopy Inspection. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3247-3254. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting T.J. Sun, Tsinghua Univ, Dept. of Elect Engn, Beijing 100084, People’s Republic of China. (2012 Dec 12)

### **Tsinghua University, Beijing: A Wireless Portable System With Microsensors for Monitoring Respiratory Diseases**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Respiratory Disease. According to news reporting originating from Beijing, People’s Republic of China, by NewsRx correspondents, research stated, “A wireless portable monitoring system for respiratory diseases using microsensors is proposed. The monitoring system consists of two sensor nodes integrating with Bluetooth transmitters that measure user’s respiratory airflow, blood oxygen saturation, and body posture.”

Our news editors obtained a quote from the research from Tsinghua University, “The utility of micro-hot-film flow sensor makes the monitor can acquire comprehensive respiration parameters which are useful for diagnoses of obstructive sleep apnea, chronic obstructive pulmonary disease, and asthma. The system can serve as both sleep recorder and spirometer. Additionally, a mobile phone or a PC connected to the Internet serving as a monitoring and transfer terminal makes telemedicine achievable.”

According to the news editors, the research concluded: “Several experiments were conducted to verify the feasibility and effectiveness of the proposed system for monitoring and diagnosing OSA, COPD, and asthma.”

For more information on this research see: A Wireless Portable System With Microsensors for Monitoring Respiratory Diseases. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3110-3116. *IEEE Transactions on Biomedical Engineering* can be contacted at:

Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting Z. Cao, Tsinghua Univ, State Key Lab Precis Measurement Technol & Instru, Dept. of Precis Instruments & Mechanol, Beijing 100084, People's Republic of China. (2012 Dec 12)

### **University Hospital, Badalona: Multiclass classification of subjects with sleep apnoea-hypopnoea syndrome through snoring analysis**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Badalona, Spain, by NewsRx correspondents, research stated, “The gold standard for diagnosing sleep apnoea-hypopnoea syndrome (SAHS) is polysomnography (PSG), an expensive, labour-intensive and time-consuming procedure. Accordingly, it would be very useful to have a screening method to allow early assessment of the severity of a subject, prior to his/her referral for PSG.”

Our news editors obtained a quote from the research from University Hospital, “Several differences have been reported between simple snorers and SANS patients in the acoustic characteristics of snoring and its variability. In this paper, snores are fully characterised in the time domain, by their sound intensity and pitch, and in the frequency domain, by their formant frequencies and several shape and energy ratio measurements. We show that accurate multiclass classification of snoring subjects, with three levels of SAHS, can be achieved on the basis of acoustic analysis of snoring alone, without any requiring information on the duration or the number of apnoeas. Several classification methods are examined. The best of the approaches assessed is a Bayes model using a kernel density estimation method, although good results can also be obtained by a suitable combination of two binary logistic regression models. Multiclass snore-based classification allows early stratification of subjects according to their severity.”

According to the news editors, the research concluded: “This could be the basis of a single channel, snore-based screening procedure for SAHS.”

For more information on this research see: Multiclass classification of subjects with sleep apnoea-hypopnoea syndrome through snoring analysis. *Medical Engineering & Physics*, 2012;34(9):1213-1220. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The

Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting J. Sola-Soler, Hosp Univ Germans Trios & Pujol, Pulmonol Serv, Badalona, Spain. (2012 Dec 12)

### **University of British Columbia, Vancouver: Shear force measurements on low- and high-stiffness posterior fusion devices**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Vancouver, Canada, by NewsRx correspondents, research stated, “Low-stiffness posterior fusion devices for the lumbar spine have been developed to treat degenerative spinal conditions. However, the demands on an implant vary between a stable motion segment and one which exhibits a significant degree of sagittal plane instability.”

Our news editors obtained a quote from the research from the University of British Columbia, “Shear motion in the antero-posterior direction is a relevant mode of instability for clinical conditions such as degenerative lumbar spondylolisthesis. Shear load-sharing between the implant and spine in conditions of antero-posterior instability has not been studied, nor have there been comparisons between traditional rigid implants and novel low-stiffness implants. The objective of this study was to develop a method to measure in vitro shear forces on three clinically relevant fusion implants when they are applied to an unstable model of degenerative spondylolisthesis in a human cadaver spine. Uniaxial strain gauges were affixed to the surface of the implants and a spine-segment-specific calibration method was used to calibrate the strain output to an applied shear force.”

According to the news editors, the research concluded: “The accuracy of the force measurements was within 3.4 N for all implant types and the repeatability was within 5.4 N. The force measurement technique was sufficiently accurate and reliable to conclude that it is suitable for use in in vitro experiments to measure implant shear force.”

For more information on this research see: Shear force measurements on low- and high-stiffness posterior fusion devices. *Medical Engineering & Physics*, 2012;34(9):1260-1267. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting A.D. Melnyk, University of British Columbia, Dept. of Orthopaed, Div Spine, Vancouver, BC V5Z 1M9, Canada. (2012 Dec 12)

### **University of California, Irvine: Imaging scattering orientation with spatial frequency domain imaging**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news reporting from Irvine, California, by NewsRx journalists, research stated, “Optical imaging techniques based on multiple light scattering generally have poor sensitivity to the orientation and direction of microscopic light scattering structures. In order to address this limitation, we introduce a spatial frequency domain method for imaging contrast from oriented scattering structures by measuring the angular-dependence of structured light reflectance.”

The news correspondents obtained a quote from the research from the University of California, “The measurement is made by projecting sinusoidal patterns of light intensity on a sample, and measuring the degree to which the patterns are blurred as a function of the projection angle. We derive a spatial Fourier domain solution to an anisotropic diffusion model. This solution predicts the effects of bulk scattering orientation on the amplitude and phase of the projected patterns. We introduce a new contrast function based on a scattering orientation index (SOI) which is sensitive to the degree to which light scattering is directionally dependent. We validate the technique using tissue simulating phantoms, and ex vivo samples of muscle and brain. Our results show that SOI is independent of the overall amount of bulk light scattering and absorption, and that isotropic versus oriented scattering structures can be clearly distinguished.”

According to the news reporters, the research concluded: “We determine the orientation of subsurface microscopic scattering structures located up to 600 m beneath highly scattering ((‘) (s)=1.5 mm(-1)) material.”

For more information on this research see: Imaging scattering orientation with spatial frequency domain imaging. *Journal of Biomedical Optics*, 2011;16(12):126001.

Our news journalists report that additional information may be obtained by contacting S.D. Konecky, University of California, Irvine, Beckman Laser Institute and Medical Clinic, Laser Microbeam and Medical Program (LAMMP), 1002 Health Sciences Road, Irvine, California 92612, United States. (2012 Dec 12)

## **University of California, Irvine: Improved Surface Laplacian Estimates of Cortical Potential Using Realistic Models of Head Geometry**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Irvine, California, by NewsRx journalists, research stated, “Surface Laplacian of scalp EEG can be used to estimate the potential distribution on the cortical surface as an alternative to invasive approaches. However, the accuracy of surface Laplacian estimation depends critically on the geometric shape of the head model.”

The news reporters obtained a quote from the research from the University of California, “This paper presents a new method for computing the surface Laplacian of scalp potential directly on realistic scalp surfaces in the form of a triangular mesh reconstructed from MRI scans. Unlike previous methods, this algorithm does not resort to any surface fitting proxy and can improve the surface Laplacian estimation of cortical potential patterns by as much as 34% on realistically shaped head models.”

According to the news reporters, the research concluded: “Simulations and experimental data are presented to demonstrate the advantage of the proposed method over the conventional spherical approximation and the utility of a more accurate surface Laplacian method for estimating cortical potentials from scalp electrodes.”

For more information on this research see: Improved Surface Laplacian Estimates of Cortical Potential Using Realistic Models of Head Geometry. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):2979-2985. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting S.Y. Deng, University of California, Inst Math Behav Sci, Irvine, CA 92697, United States. (2012 Dec 12)

## **University of California, Los Angeles: Robust Human Activity and Sensor Location Corecognition via Sparse Signal Representation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news originating from Los Angeles, California, by NewsRx correspondents, research stated, “Human activity recognition with wearable body sensors receives lots of attentions in both research and industrial communities due to the significant role in ubiquitous and mobile health monitoring. One of the most concerned issues related to this wearable technology is that the sensor signals significantly depends on where the sensors are worn on the human body.”

Our news journalists obtained a quote from the research from the University of California, “Existing research work either extracts location information from the activity signals or takes advantage of the sensor location information as a priori information to achieve better activity recognition performance. In this paper, we present a sparse signal-based approach to corecognize human activity and sensor location in a single framework. Therefore, the wearable sensor is not necessarily constrained to fixed body position and the deployment is much easier although the recognition difficulty becomes much more challenging. To validate the effectiveness of our approach, we run a pilot study in the lab, which includes 14 human activities and seven on-body locations to recognize.”

According to the news editors, the research concluded: “The experimental results show that our approach achieves an 87.72% classification accuracy (the mean of precision and recall), which outperforms classical classification methods.”

For more information on this research see: Robust Human Activity and Sensor Location Corecognition via Sparse Signal Representation. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3169-3176. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from W.Y. Xu, University of California, Los Angeles, CA 90089, United States. (2012 Dec 12)



## University of Florence: Investigation on the load-displacement curves of a human healthy heel pad: In vivo compression data compared to numerical results

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Florence, Italy, by NewsRx journalists, research stated, “The aims of the present work were to build a 3D subject-specific heel pad model based on the anatomy revealed by MR imaging of a subject’s heel pad, and to compare the load-displacement responses obtained from this model with those obtained from a compression device used on the subject’s heel pad. A 30 year-old European healthy female (mass = 54 kg, height = 165 cm) was enrolled in this study.”

The news reporters obtained a quote from the research from the University of Florence, “Her left foot underwent both MRI and compression tests. A numerical model of the heel region was developed based on a 3D CAD solid model obtained by MR images. The calcaneal fat pad tissue was described with a visco-hyperelastic model, while a fiber-reinforced hyperelastic model was formulated for the skin. Numerical analyses were performed to interpret the mechanical response of heel tissues. Different loading conditions were assumed according to experimental tests. The heel tissues showed a non-linear visco-elastic behavior and the load-displacement curves followed a characteristic hysteresis form. The energy dissipation ratios measured by experimental tests ( $0.25 \pm 0.02$  at low strain rate and  $0.26 \pm 0.03$  at high strain rate) were comparable with those evaluated by finite element analyses ( $0.23 \pm 0.01$  at low strain rate and  $0.25 \pm 0.01$  at high strain rate). The validity and efficacy of the investigation performed was confirmed by the interpretation of the mechanical response of the heel tissues under different strain rates.”

According to the news reporters, the research concluded: “The mean absolute percentage error between experimental data and model results was 0.39% at low strain rate and 0.28% at high strain rate.”

For more information on this research see: Investigation on the load-displacement curves of a human healthy heel pad: In vivo compression data compared to numerical results. *Medical Engineering & Physics*, 2012;34(9):1253-1259. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting C.G. Fontanella, University of Florence, Dept. of Mech & Ind Technol, I-50139 Florence, Italy. (2012 Dec 12)

## **University of Iowa, Iowa City: A New Paradigm of Interactive Artery/Vein Separation in Noncontrast Pulmonary CT Imaging Using Multiscale Topomorphologic Opening**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting out of Iowa City, Iowa, by NewsRx editors, research stated, “Distinguishing pulmonary arterial and venous (A/V) trees via in vivo imaging is a critical first step in the quantification of vascular geometry for the purpose of diagnosing several pulmonary diseases and to develop new image-based phenotypes. A multiscale topomorphologic opening (MSTMO) algorithm has recently been developed in our laboratory for separating A/V trees via noncontrast pulmonary human CT imaging.”

Our news journalists obtained a quote from the research from the University of Iowa, “The method starts with two sets of seeds—one for each of A/V trees and combines fuzzy distance transform and fuzzy connectivity in conjunction with several morphological operations leading to locally adaptive iterative multiscale opening of two mutually conjoined structures. In this paper, we introduce the methods for handling ‘local update’ and ‘separators’ into our previous theoretical formulation and incorporate the algorithm into an effective graphical user interface (GUI). Results of a comprehensive evaluative study assessing both accuracy and reproducibility of the method under the new setup are presented and also, the effectiveness of the GUI-based system toward improving A/V separation results is examined. Accuracy of the method has been evaluated using mathematical phantoms, CT images of contrast-separated pulmonary A/V casting of a pig’s lung and non-contrast pulmonary human CT imaging. The method has achieved 99% true A/V labeling in the cast phantom and, almost, 92-94% true labeling in human lung data. Reproducibility of the method has been evaluated using multiuser A/V separation in human CT data along with contrast-enhanced CT images of a pig’s lung at different positive end-expiratory pressures (PEEPs). The method has achieved, almost, 92-98% agreements in multiuser A/V labeling with ICC for A/V measures being over 0.96-0.99. Effectiveness of the GUI-based method has been evaluated on human data in terms of improvements of accuracy of A/V separation results and results have shown 8-22% improvements in true A/V labeling.”

According to the news editors, the research concluded: “Both qualitative and quantitative results found are very promising.”

For more information on this research see: A New Paradigm of Interactive Artery/Vein Separation in Noncontrast Pulmonary CT Imaging Using Multiscale Topomorphologic Opening. *IEEE Transactions on*

*Biomedical Engineering*, 2012;59(11):3016-3027. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting Z.Y. Gao, University of Iowa, Dept. of Biomed Engn, Iowa City, IA 52242, United States. (2012 Dec 12)

### **University of Lausanne, Epalinges: Heel and Toe Clearance Estimation for Gait Analysis Using Wireless Inertial Sensors**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in *Biomedical Engineering*. According to news reporting from Epalinges, Switzerland, by NewsRx journalists, research stated, “Tripping is considered a major cause of fall in older people. Therefore, foot clearance (i.e., height of the foot above ground during swing phase) could be a key factor to better understand the complex relationship between gait and falls.”

The news correspondents obtained a quote from the research from the University of Lausanne, “This paper presents a new method to estimate clearance using a foot-worn and wireless inertial sensor system. The method relies on the computation of foot orientation and trajectory from sensors signal data fusion, combined with the temporal detection of toe-off and heel-strike events. Based on a kinematic model that automatically estimates sensor position relative to the foot, heel and toe trajectories are estimated. 2-D and 3-D models are presented with different solving approaches, and validated against an optical motion capture system on 12 healthy adults performing short walking trials at self-selected, slow, and fast speed. Parameters corresponding to local minimum and maximum of heel and toe clearance were extracted and showed accuracy +/- precision of 4.1 +/- 2.3 cm for maximal heel clearance and 1.3 +/- 0.9 cm for minimal toe clearance compared to the reference.”

According to the news reporters, the research concluded: “The system is lightweight, wireless, easy to wear and to use, and provide a new and useful tool for routine clinical assessment of gait outside a dedicated laboratory.”

For more information on this research see: Heel and Toe Clearance Estimation for Gait Analysis Using Wireless Inertial Sensors. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3162-3168. *IEEE Transactions on Biomedical Engineering* can be contacted at:

Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting B. Mariani, University of Lausanne, Medical Center, Serv Geriatr Med & Geriatr Rehabil, CH-1066 Epalinges, Switzerland. (2012 Dec 12)

### **University of Limerick: Mechanical characterisation of unidirectional and cross-directional multilayered urinary bladder matrix (UBM) scaffolds**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting out of Limerick, Ireland, by NewsRx editors, research stated, “Multilayered biological scaffolds derived from mammalian extracellular matrix (ECM) have shown promising long-term clinical results when reconstructing damaged tissues and organs. Despite their established clinical applicability, experimental studies that describe the effects of alternate manufacturing protocols on an ECM’s mechanical properties are lacking.”

Our news journalists obtained a quote from the research from the University of Limerick, “In the present study the mechanical properties of multilayered ‘unidirectional’ porcine urinary bladder matrix (UBM) scaffolds were determined in favour of its longitudinal and circumferential axes. The scaffold’s unidirectional mechanical properties were then compared with ‘cross-directional’ UBM scaffolds. The results showed significant variations when alternate manufacturing protocols for multilayered UBM were applied. Unidirectional longitudinal UBM remained the strongest biomaterial on a consistent basis. Its failure strength occurred at 4.79 +/- 0.85 MPa compared to 3.36 +/- 0.53 MPa for unidirectional circumferential and 2.91 +/- 1.05 MPa for cross-directional UBM respectively ( $p < 0.0001$ ). Distensibility was greatest in unidirectional circumferential UBM with failure extension occurring at 14.77 +/- 1.66 mm. In comparison, failure extension occurred at 12.88 +/- 0.94 mm and 13.04 +/- 4.35 mm for unidirectional longitudinal and cross-directional UBM respectively ( $p = 0.0024$ ).”

According to the news editors, the research concluded: “The present study demonstrates that predefined manufacturing protocols for UBM should be considered when reconstructing anatomical structures with specific mechanical requirements.”

For more information on this research see: Mechanical characterisation of unidirectional and cross-directional multilayered urinary

bladder matrix (UBM) scaffolds. *Medical Engineering & Physics*, 2012;34(9):1368-1374. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting A. Callanan, University of Limerick, Mat & Surface Sci Inst, Limerick, Ireland. (2012 Dec 12)

### **University of London Imperial College: Technique for Interference Reduction in Battery Powered Physiological Monitoring Devices**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from London, United Kingdom, by NewsRx journalists, research stated, “This paper presents a novel simple method to identify and remove systematic interference in battery powered physiological monitoring devices. This interference is very typically introduced via fluctuations in the power supply voltage, caused by the nonideal output resistance of small batteries, when a transceiver chip changes operating modes.”

The news correspondents obtained a quote from the research from the University of London Imperial College, “The proposed method is designed to have low computational complexity in order to potentially allow for low cost, real-time implementations on low-power-based platforms, either in the system front or back end. Additionally, the paper provides guidelines on how to choose some of the operating conditions of the transceiver in order to minimize the effect of the interference through the application of the proposed method.”

According to the news reporters, the research concluded: “Overall, successful performance is illustrated with experimental results obtained from an acoustic monitoring system, since this is considered to have specifications which are representative of most physiological monitoring devices.”

For more information on this research see: Technique for Interference Reduction in Battery Powered Physiological Monitoring Devices. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3197-3203. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting E. Aguilar-Pelaez, University of London Imperial College, Dept. of Elect & Elect Engn, London SW7 2AZ, United Kingdom. (2012 Dec 12)

### **University of Manchester: Smoothed particle hydrodynamics method applied to pulsatile flow inside a rigid two-dimensional model of left heart cavity**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Manchester, United Kingdom, by NewsRx journalists, research stated, “This paper aims to extend the application of smoothed particle hydrodynamics (SPH), a meshfree particle method, to simulate flow inside a model of the heart’s left ventricle (LV). This work is considered the first attempt to simulate flow inside a heart cavity using a meshfree particle method.”

The news correspondents obtained a quote from the research from the University of Manchester, “Simulating this kind of flow, characterized by high pulsatility and moderate Reynolds number using SPH is challenging. As a consequence, validation of the computational code using benchmark cases is required prior to simulating the flow inside a model of the LV. In this work, this is accomplished by simulating an unsteady oscillating flow (pressure amplitude:  $A = 2500 \text{ N/m}^3$ ) and Womersley number:  $W_o = 16$ ) and the steady lid-driven cavity flow ( $Re = 3200, 5000$ ). The results are compared against analytical solutions and reference data to assess convergence. Then, both benchmark cases are combined and a pulsatile jet in a cavity is simulated and the results are compared with the finite volume method. Here, an approach to deal with inflow and outflow boundary conditions is introduced. Finally, pulsatile inlet flow in a rigid model of the LV is simulated. The results demonstrate the ability of SPH to model complex cardiovascular flows and to track the history of fluid properties.”

According to the news reporters, the research concluded: “Some interesting features of SPH are also demonstrated in this study, including the relation between particle resolution and sound speed to control compressibility effects and also order of convergence in SPH simulations, which is consistently demonstrated to be between first-order and second-order at the moderate Reynolds numbers investigated.”

For more information on this research see: Smoothed particle hydrodynamics method applied to pulsatile flow inside a rigid two-dimensional model of left heart cavity. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(11):1121-1143.

*International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; International Journal for Numerical Methods in Biomedical Engineering - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news journalists report that additional information may be obtained by contacting S. Shahriari, University of Manchester, Sch Mech Aerosp & Civil Engn, Manchester, Lancs, United Kingdom. (2012 Dec 12)

### **University of Naples Federico II: A comparison of denoising methods for X-ray fluoroscopic images**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating in Naples, Italy, by NewsRx journalists, research stated, “Fluoroscopic images exhibit severe signal-dependent quantum noise, due to the reduced X-ray dose involved in image formation, that is generally modelled as Poisson-distributed. However, image gray-level transformations, commonly applied by fluoroscopic device to enhance contrast, modify the noise statistics and the relationship between image noise variance and expected pixel intensity.”

The news reporters obtained a quote from the research from the University of Naples Federico II, “Image denoising is essential to improve quality of fluoroscopic images and their clinical information content. Simple average filters are commonly employed in real-time processing, but they tend to blur edges and details. An extensive comparison of advanced denoising algorithms specifically designed for both signal-dependent noise (AAS, BM3Dc, HHM, TLS) and independent additive noise (AV, BM3D, K-SVD) was presented. Simulated test images degraded by various levels of Poisson quantum noise and real clinical fluoroscopic images were considered. Typical gray-level transformations (e.g. white compression) were also applied in order to evaluate their effect on the denoising algorithms. Performances of the algorithms were evaluated in terms of peak-signal-to-noise ratio (PSNR), signal-to-noise ratio (SNR), mean square error (MSE), structural similarity index (SSIM) and computational time. On average, the filters designed for signal-dependent noise provided better image restorations than those assuming additive white Gaussian noise (AWGN). Collaborative denoising strategy was found to be the most effective in denoising of both simulated and real data, also in the presence of image gray-level transformations.”

According to the news reporters, the research concluded: “White compression, by inherently reducing the greater noise variance of brighter pixels, appeared to support denoising algorithms in performing more effectively.”

For more information on this research see: A comparison of denoising methods for X-ray fluoroscopic images. *Biomedical Signal Processing and Control*, 2012;7(6):550-559. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news correspondents report that additional information may be obtained by contacting T. Cerciello, University of Naples Federico II, Dept. of Biomed Elect & Telecommun Engn, I-80125 Naples, Italy. (2012 Dec 12)

### **University of Oklahoma, Tulsa: Developing a Reproducible Non-Line-of-Sight Experimental Setup for Testing Wireless Medical Device Coexistence Utilizing ZigBee**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Tulsa, Oklahoma, by NewsRx journalists, research stated, “The integration of heterogeneous wireless technologies is believed to aid revolutionary healthcare delivery in hospitals and residential care. Wireless medical device coexistence is a growing concern given the ubiquity of wireless technology.”

The news correspondents obtained a quote from the research from the University of Oklahoma, “In spite of this, a consensus standard that addresses risks associated with wireless heterogeneous networks has not been adopted. This paper serves as a starting point by recommending a practice for assessing the coexistence of a wireless medical device in a non-line-of-sight environment utilizing 802.15.4 in a practical, versatile, and reproducible test setup. This paper provides an extensive survey of other coexistence studies concerning 802.15.4 and 802.11 and reports on the authors’ coexistence testing inside and outside an anechoic chamber. Results are compared against a non-line-of-sight test setup.”

According to the news reporters, the research concluded: “Findings relative to co-channel and adjacent channel interference were consistent with results reported in the literature.”

For more information on this research see: Developing a Reproducible Non-Line-of-Sight Experimental Setup for Testing Wireless Medical Device Coexistence Utilizing ZigBee. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3221-3229. *IEEE Transactions*



on *Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting N.J. LaSorte, University of Oklahoma, Dept. of Elect & Comp Engn, Tulsa, OK 74135, United States. (2012 Dec 12)

### **University of Pisa: Model-oriented review and multi-body simulation of the ossicular chain of the human middle ear**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from Pisa, Italy, by NewsRx journalists, research stated, “The ossicular chain of the human middle ear has a key role in sound conduction since it transfers vibrations from the tympanic membrane to the cochlea, connecting the outer and the inner part of the hearing organ. This study reports firstly a description of the main anatomical features of the middle ear to introduce a detailed survey of its biomechanics, focused on model development, with a collection of geometric, inertial and mechanical/material parameters.”

The news correspondents obtained a quote from the research from the University of Pisa, “The joint issues are particularly discussed from the perspective of developing a model of the middle ear both explanatory and predictive. Such a survey underlines the remarkable dispersion of data, due also to the lack of a standardization of the experimental techniques and conditions. Subsequently, a 3D multi-body model of the ossicular chain and other structures of the middle ear is described. Such an approach is justified as the ossicles were proven to behave as rigid bodies in the human hearing range and was preferred to the more widely used finite element one as it simplifies the model development and improves joint modeling. The displacement of the umbo (a reference point of the tympanic membrane) in the 0.3-6 kHz frequency range was defined as input of the model, while the stapes footplate displacement as output. A parameter identification procedure was used to find parameter values for reproducing experimental and numerical reference curves taken from the literature.”

According to the news reporters, the research concluded: “This simple model might represent a valid alternative to more complex models and might provide a useful tool to simulate pathological/post-surgical/post-traumatic conditions and evaluate ossicular replacement prostheses.”

For more information on this research see: Model-oriented review and multi-body simulation of the ossicular chain of the human middle ear. *Medical Engineering & Physics*, 2012;34(9):1339-1355. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting G. Volandri, University of Pisa, Dept. of Mech Nucl & Prod Engn, I-56122 Pisa, Italy. (2012 Dec 12)

### **University of Rochester: Neuron selection by relative importance for neural decoding of dexterous finger prosthesis control application**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Rochester, New York, by NewsRx correspondents, research stated, “Future generations of upper limb prosthesis will have dexterous hand with individual fingers and will be controlled directly by neural signals. Neurons from the primary motor (M1) cortex code for finger movements and provide the source for neural control of dexterous prosthesis.”

Our news editors obtained a quote from the research from the University of Rochester, “Each neuron’s activation can be quantified by the change in firing rate before and after finger movement, and the quantified value is then represented by the neural activity over each trial for the intended movement. Since this neural activity varies with the intended movement, we define the relative importance of each neuron independent of specific intended movements. The relative importance of each neuron is determined by the inter-movement variance of the neural activities for respective intended movements. Neurons are ranked by the relative importance and then a subpopulation of rank-ordered neurons is selected for the neural decoding. The use of the proposed neuron selection method in individual finger movements improved decoding accuracy by 21.5% in the case of decoding with only 5 neurons and by 9.2% in the case of decoding with only 10 neurons. With only 15 highly ranked neurons, a decoding accuracy of 99.5% was achieved. The performance improvement is still maintained when combined movements of two fingers were included though the decoding accuracy fell to 95.7%.”

According to the news editors, the research concluded: “Since the proposed neuron selection method can achieve the targeting accuracy of decoding algorithms with less number of input neurons, it can be significant for developing brain-machine interfaces for direct neural control of hand prostheses.”

For more information on this research see: Neuron selection by relative importance for neural decoding of dexterous finger prosthesis control application. *Biomedical Signal Processing and Control*, 2012;7(6):632-639. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news editors report that additional information may be obtained by contacting H.N. Kim, University of Rochester, Medical Center, Dept. of Neurol Neurobiol & Anat, Rochester, NY 14642, United States. (2012 Dec 12)

### **University of Seville: Distributed Circuit Modeling of Galvanic and Capacitive Coupling for Intrabody Communication**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Seville, Spain, by NewsRx correspondents, research stated, “Modeling of intrabody communication (IBC) entails the understanding of the interaction between electromagnetic fields and living tissues. At the same time, an accurate model can provide practical hints toward the deployment of an efficient and secure communication channel for body sensor networks.”

Our news editors obtained a quote from the research from the University of Seville, “In the literature, two main IBC coupling techniques have been proposed: galvanic and capacitive coupling. Nevertheless, models that are able to emulate both coupling approaches have not been reported so far. In this paper, a simple model based on a distributed parameter structure with the flexibility to adapt to both galvanic and capacitive coupling has been proposed. In addition, experimental results for both coupling methods were acquired by means of two harmonized measurement setups. The model simulations have been subsequently compared with the experimental data, not only to show their validity but also to revise the practical frequency operation range for both techniques.”

According to the news editors, the research concluded: “Finally, the model, along with the experimental results, has also allowed us to provide some practical rules to optimally tackle IBC design.”

For more information on this research see: Distributed Circuit Modeling of Galvanic and Capacitive Coupling for Intrabody Communication. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3263-3269. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes

Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting M.A. Callejon, Univ Seville, Dept. of Signal Theory & Commun, Seville 41092, Spain. (2012 Dec 12)

### **University of Technology, Lisbon: Miniature Implantable Antennas for Biomedical Telemetry: From Simulation to Realization**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting out of Lisbon, Portugal, by NewsRx editors, research stated, “We address numerical versus experimental design and testing of miniature implantable antennas for biomedical telemetry in the medical implant communications service band (402-405 MHz). A model of a novel miniature antenna is initially proposed for skin implantation, which includes varying parameters to deal with fabrication-specific details.”

Our news journalists obtained a quote from the research from the University of Technology, “An iterative design-and-testing methodology is further suggested to determine the parameter values that minimize deviations between numerical and experimental results. To assist in vitro testing, a low-cost technique is proposed for reliably measuring the electric properties of liquids without requiring commercial equipment. Validation is performed within a specific prototype fabrication/testing approach for miniature antennas. To speed up design while providing an antenna for generic skin implantation, investigations are performed inside a canonical skin-tissue model. Resonance, radiation, and safety performance of the proposed antenna is finally evaluated inside an anatomical head model. This study provides valuable insight into the design of implantable antennas, assessing the significance of fabrication-specific details in numerical simulations and uncertainties in experimental testing for miniature structures.”

According to the news editors, the research concluded: “The proposed-methodology can be applied to optimize antennas for several fabrication/testing approaches and biotelemetry applications.”

For more information on this research see: Miniature Implantable Antennas for Biomedical Telemetry: From Simulation to Realization. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3140-3147. *IEEE Transactions on Biomedical Engineering* can be contacted at:

Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting A. Kiourti, Univ Tecn Lisboa, Inst Super Tecn, P-1049001 Lisbon, Portugal. (2012 Dec 12)

### **University of Technology, Troyes: Design and validation of the Grip-ball for measurement of hand grip strength**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Troyes, France, by NewsRx journalists, research stated, “The Grip-ball is a new dynamometer used to evaluate grip strength, as well as for use in home-based rehabilitation of the hand and forearm. The Grip-ball consists of pressure and temperature sensors and an electronic wireless communication system contained in an airtight ball.”

The news reporters obtained a quote from the research from the University of Technology, “That can be inflated to different pressures. The device has advantages over standard dynamometers in that it looks like a simple ball, and can wirelessly communicate via Bluetooth to any compatible receiver, thus have potential to be used for clinical assessment and rehabilitation in a remote setting. The reliability and reproducibility of the device were assessed for the pressure sensor itself, as well as the relationship between the force applied and the pressure measured by the Grip-ball. The initial validation was performed using the pressure sensor without the ball in order to confirm the accuracy of the sensor used. A second validation study was conducted using the Grip-ball rather than just its sensor to examine the relationship between the pressure measured inside the ball and force applied. The results showed that there is a very good correlation ( $r = 0.997, p < 0.05$ ) between the pressure measured by the Grip-ball sensor and that measured by a Vigorimeter, thus confirming the reliability of the sensor used in the Grip-ball. A quadratic regression equation was calculated in order to predict the force applied based on the pressure measured inside the ball, and the initial pressure to which the ball was inflated ( $R^2 = 0.97$ , standard error 10.9 N). Such a finding compares favourably with the variability inherent in Jamar recordings, thus indicating that the Grip-ball could be used to assess grip force.”

According to the news reporters, the research concluded: “An industrial version of the Grip-ball, which is currently under development, will be able to be used for the entire range of grip force in the population.”

For more information on this research see: Design and validation of the Grip-ball for measurement of hand grip strength. *Medical Engineering & Physics*, 2012;34(9):1356-1361. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting R. Jaber, Univ Technol Troyes, Inst Charles Delaunay, CNRS, UMR 6279, F-10010 Troyes, France. (2012 Dec 12)

### **University of Texas Southwestern, Dallas: An Implantable, Batteryless, and Wireless Capsule With Integrated Impedance and pH Sensors for Gastroesophageal Reflux Monitoring**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Dallas, Texas, by NewsRx correspondents, research stated, “In this study, a device for gastroesophageal reflux disease (GERD) monitoring has been prototyped. The system consists of an implantable, batteryless and wireless transponder with integrated impedance and pH sensors; and a wearable, external reader that wirelessly powers up the transponder and interprets the transponded radio-frequency signals.”

Our news journalists obtained a quote from the research from the University of Texas Southwestern, “The transponder implant with the total size of 0.4 cm x 0.8 cm x 3.8 cm harvests radio frequency energy to operate dual-sensor and load-modulation circuitry. The external reader can store the data in a memory card and/or send it to a base station wirelessly, which is optional in the case of multiple-patient monitoring in a hospital or conducting large-scale freely behaving animal experiments. Tests were carried out to verify the signal transduction reliability in different situations for antenna locations and orientation. In vitro, experiments were conducted in a mannequin model by positioning the sensor capsule inside the wall of a tube mimicking the esophagus. Different liquids with known pH values were flushed through the tube creating reflux episodes and wireless signals were recorded. Live pigs under anesthesia were used for the animal models with the transponder implant attached on the esophageal wall. The reflux episodes were created while the sensor data were recorded wirelessly. The data were compared with those recorded independently by a clinically used wireless pH sensor capsule placed next to our implant transponder. The results showed that our transponder detected every episode in both acid

and nonacid nature, while the commercial pH sensor missed events that had similar, repeated pH values, and failed to detect pH values higher than 10.”

According to the news editors, the research concluded: “Our battery-less transponder does not require a battery thus allowing longer diagnosis and prognosis periods to monitor drug efficacy, as well as providing accurate assessment of GERD symptoms.”

For more information on this research see: An Implantable, Battery-less, and Wireless Capsule With Integrated Impedance and pH Sensors for Gastroesophageal Reflux Monitoring. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3131-3139. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from H. Cao, Univ Texas SW Med Center Dallas, Dept. of Internal Med, Dallas, TX 75390, United States. (2012 Dec 12)

### **University of Zaragoza: Enhanced Protocol for Real-Time Transmission of Echocardiograms Over Wireless Channels**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Zaragoza, Spain, by NewsRx journalists, research stated, “This paper presents a methodology to transmit clinical video over wireless networks in real-time. A 3-D set partitioning in hierarchical trees compression prior to transmission is proposed.”

The news reporters obtained a quote from the research from the University of Zaragoza, “In order to guarantee the clinical quality of the compressed video, a clinical evaluation specific to each video modality has to be made. This evaluation indicates the minimal transmission rate necessary for an accurate diagnosis. However, the channel conditions produce errors and distort the video. A reliable application protocol is therefore proposed using a hybrid solution in which either retransmission or retransmission combined with forward error correction (FEC) techniques are used, depending on the channel conditions. In order to analyze the proposed methodology, the 2-D mode of an echocardiogram has been assessed. A bandwidth of 200 kbps is necessary to guarantee its clinical quality. The transmission using the proposed solution and retransmission and FEC techniques working separately have been simulated and compared in highspeed uplink packet access (HSUPA) and worldwide interoperability for microwave access (WiMAX) networks.”

According to the news reporters, the research concluded: “The proposed protocol achieves guaranteed clinical quality for bit error rates higher than with the other protocols, being for a mobile speed of 60 km/h up to 3.3 times higher for HSUPA and 10 times for WiMAX.”

For more information on this research see: Enhanced Protocol for Real-Time Transmission of Echocardiograms Over Wireless Channels. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3212-3220. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting E. Cavero, University of Zaragoza, Aragon Inst Engrn Res, Commun Technol Grp, Zaragoza 50018, Spain. (2012 Dec 12)

### **Vanderbilt University, Nashville: Automatic Pre- to Intra-Operative CT Registration for Image-Guided Cochlear Implant Surgery**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Cochlear Implants. According to news reporting out of Nashville, Tennessee, by NewsRx editors, research stated, “Percutaneous cochlear implantation (PCI) is a minimally-invasive image-guided cochlear implant approach, where access to the cochlea is achieved by drilling a linear channel from the skull surface to the cochlea. The PCI approach requires pre- and intra-operative planning.”

Our news journalists obtained a quote from the research from Vanderbilt University, “Computation of a safe linear drilling trajectory is performed in a preoperative CT. This trajectory is mapped to intraoperative space using the transformation matrix that registers the pre- and intra-operative CTs. However, the difference in orientation between the pre- and intra-operative CTs is too extreme to be recovered by standard, gradient descent-based registration methods. Thus far, the registration has been initialized manually by an expert. In this paper, we present a method that aligns the scans completely automatically. We compared the performance of the automatic approach to the registration approach when an expert does the manual initialization on 11 pairs of scans. There is a maximum difference of 0.18 mm between the entry and target points of the trajectory mapped with expert initialization and the automatic registration method.”



According to the news editors, the research concluded: “This suggests that the automatic registration method is accurate enough to be used in a PCI surgery.”

For more information on this research see: Automatic Pre- to Intra-Operative CT Registration for Image-Guided Cochlear Implant Surgery. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3070-3077. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting F.A. Reda, Vanderbilt University, Medical Center, Dept. of Otolaryngol Head & Neck Surg, Nashville, TN 37232, United States. (2012 Dec 12)

### **Waterford Institute of Technology: Virtual Groups for Patient WBAN Monitoring in Medical Environments**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting out of Waterford, Ireland, by NewsRx editors, research stated, “Wireless body area networks (WBAN) provide a tremendous opportunity for remote health monitoring. However, engineering WBAN health monitoring systems encounters a number of challenges including efficient WBAN monitoring information extraction, dynamically fine tuning the monitoring process to suit the quality of data, and to allow the translation of high-level requirements of medical officers to low-level sensor reconfiguration.”

Our news journalists obtained a quote from the research from the Waterford Institute of Technology, “This paper addresses these challenges, by proposing an architecture that allows virtual groups to be formed between devices of patients, nurses, and doctors in order to enable remote analysis of WBAN data. Group formation and modification is performed with respect to patients’ conditions and medical officers’ requirements, which could be easily adjusted through high-level policies. We also propose, a new metric called the Quality of Health Monitoring, which allows medical officers to provide feedback on the quality of WBAN data received. The WBAN data gathered are transmitted to the virtual group members through an underlying environmental sensor network.”

According to the news editors, the research concluded: “The proposed approach is evaluated through a series of simulation.”

For more information on this research see: Virtual Groups for Patient WBAN Monitoring in Medical Environments. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3238-3246. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting S. Ivanov, Waterford Inst Technol, Telecommun Software & Syst Grp TSSG, Waterford, Ireland. (2012 Dec 12)

### **Xidian University, Xi'an: Structural similarity regularized and sparse coding based super-resolution for medical images**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news originating from Xi'an, People's Republic of China, by NewsRx correspondents, research stated, "Recently the single image super-resolution reconstruction (SISR) via sparse coding has attracted increasing interests. Considering that there are obviously repetitive image structures in medical images, in this study we propose a regularized SISR method via sparse coding and structural similarity."

Our news journalists obtained a quote from the research from Xidian University, "The pixel based recovery is incorporated as a regularization term to exploit the non-local structural similarities of medical images, which is very helpful in further improving the quality of recovered medical images. An alternative variables optimization algorithm is proposed and some medical mages including CT, MRI and ultrasound images are used to investigate the performance of our proposed method."

According to the news editors, the research concluded: "The results show the superiority of our method to its counterparts."

For more information on this research see: Structural similarity regularized and sparse coding based super-resolution for medical images. *Biomedical Signal Processing and Control*, 2012;7(6):579-590. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from S.Y. Yang, Xidian Univ, Minist Educ, Dept. of

Elect Engn, Key Lab Intelligent Percept & Image Understanding, Xian 710071, People's Republic of China. (2012 Dec 12)

### **Yeditepe University, Istanbul: The effect of loading in mechanical response predictions of bone lengthening**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Istanbul, Turkey, by NewsRx journalists, research stated, “Intramedullary (IM) distractor nails have become a viable alternative in bone-distraction operations. Upon stabilization of the fractured/dissected limb via the nail, the resulting construct accommodates the load bearing function of the otherwise healthy limb.”

The news correspondents obtained a quote from the research from Yeditepe University, “In establishing design performance targets for these devices, in vitro test conditions are widely accepted leaving the in vivo conditions aside. However, in vivo device failures due to distraction forces necessitate novel modeling considerations. It is especially important to simulate the loads in limb distraction, as this brings the bone-implant construct to a totally different regime than the hip-joint contact force (Point-Force Model, PFM). In this work we used a simplified approach to incorporate ligament stretching due to limb distraction via self-equilibrating spring elements in a finite-element setting (spring-force model, SFM). We compared the effect of loading type on load transmission paths through the locking pins, for these two distinct loading modes, namely, SFM and PFM. The two modes illustrate entirely different load transfer regimes around the bone/nail interface region. In order to avoid high contact stresses between the nail and the bone segments, it is advisable to keep the osteotomy away from the mid-range between the pin connections.”

According to the news reporters, the research concluded: “It was also seen for both loading modes that including an additional pin at a load transfer location does not significantly alter the load carried by a single pin (the additional pin rather acts as a geometric stabilizer).”

For more information on this research see: The effect of loading in mechanical response predictions of bone lengthening. *Medical Engineering & Physics*, 2012;34(9):1362-1367. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting A.F. Okyar, Yeditepe Univ, Dept. of Mech Engn, TR-34755 Istanbul, Turkey. (2012 Dec 12)

## **Columbia University, New York City: Iterative Self-Organizing Atherosclerotic Tissue Labeling in Intravascular Ultrasound Images and Comparison With Virtual Histology**

By a News Reporter-Staff News Editor at Ivy League Week – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from New York City, New York, by NewsRx correspondents, research stated, “Intravascular ultrasound (IVUS) is the predominant imaging modality in the field of interventional cardiology that provides real-time cross-sectional images of coronary arteries and the extent of atherosclerosis. Due to heterogeneity of lesions and stringent spatial/spectral behavior of tissues, atherosclerotic plaque characterization has always been a challenge and still is an open problem.”

Our news journalists obtained a quote from the research from Columbia University, “In this paper, we present a systematic framework from in vitro data collection, histology preparation, IVUS-histology registration along with matching procedure, and finally a robust texture-derived unsupervised atherosclerotic plaque labeling. We have performed our algorithm on in vitro and in vivo images acquired with single-element 40 MHz and 64-elements phased array 20 MHz transducers, respectively. In former case, we have quantified results by local contrasting of constructed tissue colormaps with corresponding histology images employing an independent expert and in the latter case, virtual histology images have been utilized for comparison. We tackle one of the main challenges in the field that is the reliability of tissues behind arc of calcified plaques and validate the results through a novel random walks framework by incorporating underlying physics of ultrasound imaging.”

According to the news editors, the research concluded: “We conclude that proposed framework is a formidable approach for retrieving imperative information regarding tissues and building a reliable training dataset for supervised classification and its extension for in vivo applications.”

For more information on this research see: Iterative Self-Organizing Atherosclerotic Tissue Labeling in Intravascular Ultrasound Images and Comparison With Virtual Histology. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3039-3049. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from A. Katouzian, Columbia University, Dept. of Biomed Engn & Radiol, New York, NY 10027, United States. (2012 Dec 11)

### **First Affiliated Hospital, Nanjing: The single nucleotide polymorphism and haplotype analysis of MDR1 in Jiangsu Han population of China**

By a News Reporter-Staff News Editor at China Weekly News – Investigators discuss new findings in Disease Associations. According to news reporting originating from Nanjing, People's Republic of China, by VerticalNews correspondents, research stated, "The aim of this study was to perform the frequency distribution of MDR1 gene SNPs and haplotypes of Jiangsu Han population in China. A total of 225 Jiangsu Han unrelated volunteers were enrolled and genotyped by PCR-ASP method at three loci: C1236T (rs1128503), G2677T/A (rs2032582) and C3435T (rs1045642)."

Our news editors obtained a quote from the research from First Affiliated Hospital, "In total, C and T were found at locus 1236, with the frequency of 35% and 65%, respectively. The most frequent allele at locus 2677 was G with the frequency of 44%, followed by T (41%) and A (15%). At locus 3435, C was more common (60%) than T (40%). The most common haplotype at loci 1236-2677-3435 was T-T-T (31.84%), at loci 1236-2677 was T-T (37.68%), at loci 2677-3435 was G-C (39.06%), and at loci 1236-3435 was T-T (34.28%). The haplotype linkage disequilibrium study found that all three loci were in linkage disequilibrium, such as T-T at loci 1236-2677, T-T at loci 2677-3435 and C-C at loci 1236-3435 ( $p < 0.01$ ). The dendrogram study indicated that the distribution of MDR1 SNPs in Jiangsu Han population were close to Japan and Malay populations and far away from European countries. These findings could shade new lights in population genetics and anthropology studies of Han-Chinese."

According to the news editors, the research concluded: "It also provides basic data for research on MDR1 gene polymorphism, disease association and drug resistance study."

For more information on this research see: The single nucleotide polymorphism and haplotype analysis of MDR1 in Jiangsu Han population of China. *Biomedicine & Pharmacotherapy*, 2012;66(6):459-63. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedicine & Pharmacotherapy - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

The news editors report that additional information may be obtained by contacting H. Qiu, Dept. of Hematology, the First Affiliated Hospital of Nanjing Medical University, Nanjing 210029, People's Taiwan. (2012 Dec 11)

## **Shandong University, Jinan: Non-rigid registration of medical images with scale-space corner detection and thin-plate spline**

By a News Reporter-Staff News Editor at Telemedicine Week – Current study results on Biomedical Engineering have been published. According to news reporting out of Jinan, People’s Republic of China, by NewsRx editors, research stated, “Image registration is an important enabling technology with many clinical applications, and has received considerable research interest. This paper presents a new non-rigid registration method by using nonlinear complex diffusion corner detection and thin-plate spline model.”

Our news journalists obtained a quote from the research from Shandong University, “Compared with general multiple scale space process which often blurs edges in the image and causes loss of useful information, nonlinear diffusion process has many favorite properties because it can provide a hierarchical representation of images in different scales and preserve image edges well. Furthermore, the imaginary part of the image in the complex diffusion process can serve as an edge detector. In this study, corner detection is performed by combining the nonlinear complex diffusion process and global and local curvature properties. The detected corners are served as landmarks, and thin-plate spline (TPS) is employed for non-rigid registration.”

According to the news editors, the research concluded: “The proposed registration method is evaluated on CT and CBCT images, and the experimental results demonstrate the effectiveness of the new method.”

For more information on this research see: Non-rigid registration of medical images with scale-space corner detection and thin-plate spline. *Biomedical Signal Processing and Control*, 2012;7(6):599-605. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting W.H. Sun, Shandong University, Sch Informat Sci & Engn, Jinan, People’s Republic of China. (2012 Dec 11)

## Swiss Federal Institute of Technology, Zurich: In Vitro Oxygen Sensing Using Intraocular Microrobots

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on Biomedical Engineering have been presented. According to news reporting from Zurich, Switzerland, by NewsRx journalists, research stated, “We present a luminescence oxygen sensor integrated with a wireless intraocular microrobot for minimally-invasive diagnosis. This microrobot can be accurately controlled in the intraocular cavity by applying magnetic fields.”

The news correspondents obtained a quote from the research from the Swiss Federal Institute of Technology, “The microrobot consists of a magnetic body susceptible to magnetic fields and a sensor coating. This coating embodies Pt(II) octaethylporphine (PtOEP) dyes as the luminescence material and polystyrene as a supporting matrix, and it can be wirelessly excited and read out by optical means. The sensor works based on quenching of luminescence in the presence of oxygen. The excitation and emission spectrum, response time, and oxygen sensitivity of the sensor were characterized using a spectrometer. A custom device was designed and built to use this sensor for intraocular measurements with the microrobot. Due to the intrinsic nature of luminescence lifetimes, a frequency-domain lifetime measurement approach was used.”

According to the news reporters, the research concluded: “An alternative sensor design with increased performance was demonstrated by using poly(styrene-co-maleic anhydride) (PS-MA) and PtOEP nanospheres.”

For more information on this research see: In Vitro Oxygen Sensing Using Intraocular Microrobots. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3104-3109. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting O. Ergeneman, Swiss Fed Inst Technol, Particle Technol Lab, CH-8092 Zurich, Switzerland. (2012 Dec 11)

## **University of California, La Jolla: Accurate Respiration Measurement Using DC-Coupled Continuous-Wave Radar Sensor for Motion-Adaptive Cancer Radiotherapy**

By a News Reporter-Staff News Editor at Cancer Weekly – New research on Biomedical Engineering is the subject of a report. According to news reporting from La Jolla, California, by NewsRx journalists, research stated, “Accurate respiration measurement is crucial in motion-adaptive cancer radiotherapy. Conventional methods for respiration measurement are undesirable because they are either invasive to the patient or do not have sufficient accuracy.”

The news correspondents obtained a quote from the research from the University of California, “In addition, measurement of external respiration signal based on conventional approaches requires close patient contact to the physical device which often causes patient discomfort and undesirable motion during radiation dose delivery. In this paper, a dc-coupled continuous-wave radar sensor was presented to provide a non-contact and noninvasive approach for respiration measurement. The radar sensor was designed with dc-coupled adaptive tuning architectures that include RF coarse-tuning and baseband fine-tuning, which allows the radar sensor to precisely measure movement with stationary moment and always work with the maximum dynamic range. The accuracy of respiration measurement with the proposed radar sensor was experimentally evaluated using a physical phantom, human subject, and moving plate in a radiotherapy environment. It was shown that respiration measurement with radar sensor while the radiation beam is on is feasible and the measurement has a submillimeter accuracy when compared with a commercial respiration monitoring system which requires patient contact.”

According to the news reporters, the research concluded: “The proposed radar sensor provides accurate, noninvasive, and noncontact respiration measurement and therefore has a great potential in motion-adaptive radiotherapy.”

For more information on this research see: Accurate Respiration Measurement Using DC-Coupled Continuous-Wave Radar Sensor for Motion-Adaptive Cancer Radiotherapy. *IEEE Transactions on Biomedical Engineering*, 2012;59(11):3117-3123. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting C.Z. Gu, University of California, Center Adv Radiotherapy Technol, La Jolla, CA 92093, United States. (2012 Dec 11)



## **University of Texas, Houston: Dysregulation of MicroRNAs in cancer**

By a News Reporter-Staff News Editor at Cancer Weekly – Data detailed on Biomedical Engineering have been presented. According to news reporting from Houston, Texas, by NewsRx journalists, research stated, “MicroRNAs (miRNAs) are involved in multiple biological activities as well as disease progression including cancer. Interestingly, miRNAs could act as either tumor suppressors or oncogenes depending on the functions of their targets.”

The news correspondents obtained a quote from the research from the University of Texas, “Using high-throughput profiling, dysregulation of miRNAs has been widely observed in different stages of cancer, and there is mounting evidence demonstrating several misguided mechanisms that cause miRNA dysregulation. In this review, we summarize the key functions of miRNAs in cancer, especially those affecting tumor metastasis and drug resistance.”

According to the news reporters, the research concluded: “Moreover, the mechanisms leading to dysregulation of miRNAs, including genomic abnormalities, DNA/histone modifications, transcriptional regulation, abnormal biogenesis, and interaction between miRNAs, are also discussed.”

For more information on this research see: Dysregulation of MicroRNAs in cancer. *Journal of Biomedical Science*, 2012;19(0):1-8. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; Journal of Biomedical Science - [www.jbiomedsci.com](http://www.jbiomedsci.com))

Our news journalists report that additional information may be obtained by contacting P.S. Chen, Univ Texas MD Anderson Canc Center, Dept. of Mol & Cellular Oncol, Houston, TX 77030, United States. (2012 Dec 11)

## **Hong Kong Polytechnic University: Microvascular Transport and Tumor Cell Adhesion in the Microcirculation**

By a News Reporter-Staff News Editor at Hematology Week – Current study results on Microcirculation have been published. According to news reporting out of Hong Kong, People’s Republic of China, by NewsRx editors, research stated, “One critical step in tumor metastasis is tumor cell adhesion to the endothelium forming the microvessel wall. Understanding this step may lead to new therapeutic concepts for tumor metastasis.”

Our news journalists obtained a quote from the research from Hong Kong Polytechnic University, “Vascular endothelium forming the microvessel wall and the glycocalyx layer at its surface are the principal barriers to, and regulators of the material exchange between circulating blood and body tissues. The cleft between adjacent ECs (interendothelial cleft) is the principal pathway for water and solutes transport through the microvessel wall in health. It is also suggested to be the pathway for high molecular weight plasma proteins, leukocytes and tumor cells across microvessel walls in disease. Thus the first part of the review introduced the mathematical models for water and solutes transport through the interendothelial cleft. These models, combined with the experimental results from in vivo animal studies and electron microscopic observations, are used to evaluate the role of the endothelial surface glycocalyx, the junction strand geometry in the interendothelial cleft, and the surrounding extracellular matrix and tissue cells, as the determinants of microvascular transport.”

According to the news editors, the research concluded: “The second part of the review demonstrated how the microvascular permeability, hydrodynamic factors, microvascular geometry and cell adhesion molecules affect tumor cell adhesion in the microcirculation.”

For more information on this research see: Microvascular Transport and Tumor Cell Adhesion in the Microcirculation. *Annals of Biomedical Engineering*, 2012;40(11):2442-2455. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting B.M.M. Fu, Hong Kong Polytechnic University, Dept. of Mech Engn, Kowloon, Hong Kong, People’s Republic of China. (2012 Dec 10)

### **Intravascular optical coherence tomography to characterize tissue deformation during angioplasty: preliminary experiments with artery phantoms**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Intravascular have been published. According to news reporting from Montreal, Canada, by NewsRx journalists, research stated, “We explored the potential of intravascular optical coherence tomography (IVOCT) to assess deformation during angioplasty balloon inflation. Using a semi-compliant balloon and artery phantoms, we considered two experimental scenarios.”

The news correspondents obtained a quote from the research, “The goal for the first scenario was to investigate if variation in the elasticity

of the structure surrounding the balloon could be sensed by IVOCT monitoring. In this scenario, we used three single-layer phantoms with various mechanical properties. Image analysis was performed to extract the inner and outer diameters of the phantoms at various pressures. The goal for the second scenario was twofold. First, we investigated the IVOCT capability to monitor a more complex balloon inflation process. The balloon was in a folded state prior to inflation. This allowed studying two stages of deformation: during balloon unfolding and during balloon expansion. Second, we investigated IVOCT capability to monitor the deformation in a three-layer phantom used to better mimic a true artery. So, not only were the IVOCT images processed to provide the inner and outer diameters of the phantom, but the layer thicknesses were also determined."

According to the news reporters, the research concluded: "In both scenarios, IVOCT monitoring revealed to be very efficient in providing relevant information about the phantom deformation during balloon inflation."

For more information on this research see: Intravascular optical coherence tomography to characterize tissue deformation during angioplasty: preliminary experiments with artery phantoms. *Journal of Biomedical Optics*, 2012;17(9):171-177. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting H. Azarnoush, Montreal Neurol Hosp & Inst, Montreal, PQ H3A 2B4, Canada. (2012 Dec 07)

### **University of Minnesota, Minneapolis: Influence of dental resin material composition on cross-polarization-optical coherence tomography imaging**

By a News Reporter-Staff News Editor at Health & Medicine Week – A new study on Dentistry is now available. According to news reporting originating in Minneapolis, Minnesota, by NewsRx journalists, research stated, "The purpose of this study was to investigate cross-polarization-optical coherence tomography (CP-OCT) signal attenuation through different resin material compositions. Four distinct composite systems were used: Filtek supreme ultra (FSU) (3M ESPE), IPS empress direct (EMD) (Ivoclar Vivadent), estelite sigma quick (SQK) (Tokuyama Dental), and Z100 (3M ESPE)."

The news reporters obtained a quote from the research from the University of Minnesota, "Cross-sectional images of different composite-demineralized phantoms (n = 108) were collected using a 1310-nm intraoral cross-polarization swept source OCT (CP-OCT) imaging system.

% T quantified the CP-OCT signal attenuation. Scanning electron microscopy, transmission electron microscopy, and energy-dispersive x-ray spectrometer chemical analysis was utilized to determine how different matrix/filler compositions affected attenuation of the near infrared (NIR) signal. CP-OCT imaging of dental resin composites showed enormous variation in signal attenuation. For each of our composite systems, there was not a consistent attenuation difference in the NIR signal for A to D shades. The four composites had similar measured backscattering values but attenuated the overall signal to different degrees. When comparing the A2 shades between the four different composite systems, the order of highest to lowest of % T was EMD > Z100, FSU > SQK (ANOVA, Tukey,  $p < 0.0001$ )."

According to the news reporters, the research concluded: "As a result, we demonstrate the importance of understanding how the constituents of composite materials affect CP-OCT signal attenuation."

For more information on this research see: Influence of dental resin material composition on cross-polarization-optical coherence tomography imaging. *Journal of Biomedical Optics*, 2012;17(10):210-219. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting C. Lammeier, University of Minnesota, Clin & Translat Sci Inst, Minneapolis, MN 55455, United States. (2012 Dec 07)

### **Alcon Research Ltd, Fort Worth: Measuring ultraviolet-visible light transmission of intraocular lenses: double-beam mode versus integrating-sphere mode**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting out of Fort Worth, Texas, by NewsRx editors, research stated, "This study compared integrating-sphere and double-beam methodologies for measuring the ultraviolet/visible transmission of intraocular lenses (IOLs). Transmission spectra of control IOLs and clinically explanted IOLs were measured with an optical spectrophotometer in two optical configurations: single-beam mode with integrating sphere detector and double-beam mode with photodiode detector."

Our news journalists obtained a quote from the research from Alcon Research Ltd, "Effects of temperature and surface light scattering on transmittance were measured. Effects of lens power were measured and were modeled with ray-tracing software. Results indicated that transmission was consistent over a range of IOL powers when measured with the integrating-sphere configuration, but transmission gradually

decreased with increasing IOL power (in a wave-length-dependent fashion) when measured with the double-beam configuration. Ray tracing indicated that the power-dependent loss in transmission was partially due to higher-powered IOLs spreading the light beam outside of the detector area. IOLs with surface light scattering had transmission spectra that differed between double-beam and integrating-sphere configurations in a power-dependent fashion. Temperature (ambient or physiological 35 degrees C) did not affect transmission in the integrating-sphere configuration.”

According to the news editors, the research concluded: “Overall, results indicated that double-beam spectrophotometers may be useful for measuring transmittance of low-power IOLs, but an integrating-sphere configuration should be used to obtain accurate measurements of transmittance of higher-power IOLs.”

For more information on this research see: Measuring ultraviolet-visible light transmission of intraocular lenses: double-beam mode versus integrating-sphere mode. *Journal of Biomedical Optics*, 2012;17(10):138-144. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting A. Akinay, Alcon Res Ltd, Fort Worth, TX 76134, United States. (2012 Dec 05)

### **Central Michigan University, Mountain Pleasant: Noninvasive Raman spectroscopy of rat tibiae: approach to in vivo assessment of bone quality**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Mountain Pleasant, Michigan, by NewsRx journalists, research stated, “We report on in vivo noninvasive Raman spectroscopy of rat tibiae using robust fiber-optic Raman probes and holders designed for transcutaneous Raman measurements in small animals. The configuration allows placement of multiple fibers around a rat leg, maintaining contact with the skin.”

The news correspondents obtained a quote from the research from Central Michigan University, “Bone Raman data are presented for three regions of the rat tibia diaphysis with different thicknesses of overlying soft tissue. The ability to perform in vivo noninvasive Raman measurement and evaluation of subtle changes in bone composition is demonstrated with rat leg phantoms in which the tibia has carbonated hydroxylapatite, with different carbonate contents.”

According to the news reporters, the research concluded: “Our data provide proof of the principle that small changes in bone composition

can be monitored through soft tissue at anatomical sites of interest in biomedical studies.”

For more information on this research see: Noninvasive Raman spectroscopy of rat tibiae: approach to in vivo assessment of bone quality. *Journal of Biomedical Optics*, 2012;17(9):12-14. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting P.I. Okagbare, Cent Michigan Univ, Dept. of Chem, Mt Pleasant, MI 48859, United States. (2012 Dec 05)

### **Federal University, Santo Andre: Low-level laser therapy on MCF-7 cells: a micro-Fourier transform infrared spectroscopy study**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting out of Santo Andre, Brazil, by NewsRx editors, research stated, “Low-level laser therapy (LLLT) is an emerging therapeutic approach for several clinical conditions. The clinical effects induced by LLLT presumably scale from photobiostimulation/photobioinhibition at the cellular level to the molecular level.”

Our news journalists obtained a quote from the research from Federal University, “The detailed mechanism underlying this effect remains unknown. This study quantifies some relevant aspects of LLLT related to molecular and cellular variations. Malignant breast cells (MCF-7) were exposed to spatially filtered light from a He-Ne laser (633 nm) with fluences of 5, 28.8, and 1000 mJ/cm(2). The cell viability was evaluated by optical microscopy using the Trypan Blue viability test. The micro-Fourier transform infrared technique was employed to obtain the vibrational spectra of each experimental group (control and irradiated) and identify the relevant biochemical alterations that occurred due to the process. It was observed that the red light influenced the RNA, phosphate, and serine/threonine/tyrosine bands. We found that light can influence cell metabolism depending on the laser fluence. For 5 mJ/cm(2), MCF-7 cells suffer bioinhibition with decreased metabolic rates. In contrast, for the 1 J/cm(2) laser fluence, cells present biostimulation accompanied by a metabolic rate elevation. Surprisingly, at the intermediate fluence, 28.8 mJ/cm(2), the metabolic rate is increased despite the absence of proliferative results.”

According to the news editors, the research concluded: “The data were interpreted within the retrograde signaling pathway mechanism activated with light irradiation.”

For more information on this research see: Low-level laser therapy on MCF-7 cells: a micro-Fourier transform infrared spectroscopy study. *Journal of Biomedical Optics*, 2012;17(10):115-123. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting T.D. Magrini, Univ Fed ABC, Center Ciencias Nat & Humanas, BR-09210170 Santo Andre, SP, Brazil. (2012 Dec 05)

### **Indian Institute of Science, Bangalore: Quantitative estimation of mechanical and optical properties from ultrasound assisted optical tomography data**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of Bangalore, India, by NewsRx editors, research stated, “We demonstrate quantitative optical property and elastic property imaging from ultrasound assisted optical tomography data.”

Our news journalists obtained a quote from the research from the Indian Institute of Science, “The measurements, which are modulation depth  $M$  and phase  $\phi$  of the speckle pattern, are shown to be sensitively dependent on these properties of the object in the insonified focal region of the ultrasound (US) transducer. We demonstrate that Young’s modulus ( $E$ ) can be recovered from the resonance observed in  $M$  versus  $\omega$  (the US frequency) plots and optical absorption ( $\mu(a)$ ) and scattering ( $\mu(s)$ ) coefficients from the measured differential phase changes.”

According to the news editors, the research concluded: “All experimental observations are verified also using Monte Carlo simulations.”

For more information on this research see: Quantitative estimation of mechanical and optical properties from ultrasound assisted optical tomography data. *Journal of Biomedical Optics*, 2012;17(10):56-60. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting M.S. Singh, Indian Inst Sci, Dept. of Civil Engrn, Bangalore 560012, Karnataka, India. (2012 Dec 05)

### **Indiana University School of Medicine, Indianapolis: Scattering anisotropy-weighted mesoscopic imaging**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news originating from Indianapolis, Indiana, by NewsRx correspondents, research stated, “We report that when tissue images are formed via a small solid angle in the backward direction (i.e., back-directional gating), the image intensity is dominantly determined by tissue scattering anisotropy. Thus, this configuration allows for scattering anisotropy-weighted imaging that can provide an intrinsic contrast by capturing tissue structures and organizations.”

Our news journalists obtained a quote from the research from the Indiana University School of Medicine, “To demonstrate the immediate feasibility, we apply scattering anisotropy-weighted imaging to tissue blocks including basal-cell carcinomas as a pilot study. The main feature of our imaging approach is the high sensitivity to tumor locations and the simplicity for large-area visualization.”

According to the news editors, the research concluded: “We further envision that scattering anisotropy-weighted imaging could potentially be used to visualize tissue microenvironments in a mesoscopic (between microscopic and macroscopic) imaging setting.”

For more information on this research see: Scattering anisotropy-weighted mesoscopic imaging. *Journal of Biomedical Optics*, 2012;17(9):8-10. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from Z.B. Xu, Indiana Univ Sch Med, Dept. of Dermatol, Indianapolis, IN 46202, United States. (2012 Dec 05)

### **Karabuk University: Simulation of creep in non-homogenous samples of human cortical bone**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting from Karabuk, Turkey, by NewsRx journalists, research stated, “Characterising the mechanisms causing viscoelastic mechanical properties of human cortical bone, as well as understanding sources of variation, is important in predicting response of the bone to creep and fatigue loads. Any better understanding, when incorporated into simulations including finite element analysis, would assist bioengineers, clinicians and biomedical scientists.”



The news correspondents obtained a quote from the research from Karabuk University, “In this study, we used an empirically verified model of creep strain accumulation, in a simulation of 10 non-homogeneous samples, which were created from micro-CT scans of human cortical bone of the femur midshaft obtained from a 74-year-old female cadaver. These non-homogeneous samples incorporate the presence of Haversian canals and resorption cavities. The influence of inhomogeneity on the response and variation in the samples in both creep and stress relaxation tests are examined. The relationship between steady-state creep rate, applied loads (stress relaxation and creep tests) and microstructure, that is bone apparent porosity, is obtained.”

According to the news reporters, the research concluded: “These relations may provide insight into damage accumulation of whole human bones and be relevant to studies on osteoporosis.”

For more information on this research see: Simulation of creep in non-homogenous samples of human cortical bone. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(10):1121-8.

Our news journalists report that additional information may be obtained by contacting A.H. Ertas, Dept. of Mechanical Engineering, Karabuk University, Karabuk 78050, Turkey. (2012 Dec 05)

### **Katholieke Universiteit Leuven: A physiology-based inverse dynamic analysis of human gait using sequential convex programming: a comparative study**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Leuven, Belgium, by NewsRx correspondents, research stated, “This paper presents an enhanced version of the previously proposed physiological inverse approach (PIA) to calculate musculotendon (MT) forces and evaluates the proposed methodology in a comparative study. PIA combines an inverse dynamic analysis with an optimisation approach that imposes muscle physiology and optimises performance over the entire motion.”

Our news editors obtained a quote from the research from Katholieke Universiteit Leuven, “To solve the resulting large-scale, nonlinear optimisation problem, we neglected muscle fibre contraction speed and an approximate quadratic optimisation problem (PIA-QP) was formulated. Conversely, the enhanced version of PIA proposed in this paper takes into account muscle fibre contraction speed. The optimisation problem is solved using a sequential convex programming procedure (PIA-SCP). The comparative study includes PIA-SCP, PIA-QP and two commonly used approaches from the literature: static optimisation

(SO) and computed muscle control (CMC). SO and CMC make simplifying assumptions to limit the computational time. Both methods minimise an instantaneous performance criterion. Furthermore, SO does not impose muscle physiology. All methods are applied to a gait cycle of six control subjects. The relative root mean square error averaged over all subjects,  $e(\text{RMS})$ , between the joint torques simulated from the optimised activations and the joint torques obtained from the inverse dynamic analysis was about twice as large for SO ( $e(\text{RMS})=86$ ) as compared with CMC ( $e(\text{RMS})=39$ ) and PIA-SCP ( $e(\text{RMS})=50$ ).  $e(\text{RMS})$  was at least twice as large for PIA-QP ( $e(\text{RMS})=197$ ) than for all other methods. As compared with CMC, muscle activation patterns predicted by PIA-SCP better agree with experimental electromyography (EMG)."

According to the news editors, the research concluded: "This study shows that imposing muscle physiology as well as globally optimising performance is important to accurately calculate MT forces underlying gait."

For more information on this research see: A physiology-based inverse dynamic analysis of human gait using sequential convex programming: a comparative study. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(10):1093-102.

The news editors report that additional information may be obtained by contacting F. De Groote, Dept. of Mechanical Engineering, Katholieke Universiteit Leuven, Leuven, Belgium. (2012 Dec 05)

## **Lomonosov Moscow State University: Cellular viscoelasticity probed by active rheology in optical tweezers**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of Moscow, Russia, by NewsRx editors, research stated, "A novel approach to probe viscoelastic properties of cells based on double trap optical tweezers is reported."

Our news journalists obtained a quote from the research from Lomonosov Moscow State University, "Frequency dependence of the tangent of phase difference in the movement of the opposite erythrocyte edges while one of the edges is forced to oscillate by optical tweezers appeared to be highly dependent on the rigidity of the cellular membrane. Effective viscoelastic parameters characterizing red blood cells with different stiffnesses (normal and glutaraldehyde-fixed) are determined."

According to the news editors, the research concluded: "It is shown that the photo-induced effects caused by laser trapping at the power level used in the experiments are negligible giving the possibility to use the offered technique for dynamic monitoring of soft materials viscoelastic properties."

For more information on this research see: Cellular viscoelasticity probed by active rheology in optical tweezers. *Journal of Biomedical Optics*, 2012;17(10):74-77. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting E.V. Lyubin, Lomonosov Moscow State University, Fac Phys, Moscow 119991, Russia. (2012 Dec 05)

### **Massachusetts General Hospital, Charlestown: Mesh-based Monte Carlo method in time-domain widefield fluorescence molecular tomography**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Charlestown, Massachusetts, by NewsRx correspondents, research stated, “We evaluated the potential of mesh-based Monte Carlo (MC) method for widefield time-gated fluorescence molecular tomography, aiming to improve accuracy in both shape discretization and photon transport modeling in preclinical settings. An optimized software platform was developed utilizing multi-threading and distributed parallel computing to achieve efficient calculation.”

Our news editors obtained a quote from the research from Massachusetts General Hospital, “We validated the proposed algorithm and software by both simulations and in vivo studies. The results establish that the optimized mesh-based Monte Carlo (mMC) method is a computationally efficient solution for optical tomography studies in terms of both calculation time and memory utilization.”

According to the news editors, the research concluded: “The open source code, as part of a new release of mMC, is publicly available at <http://mcx.sourceforge.net/mmc/>.”

For more information on this research see: Mesh-based Monte Carlo method in time-domain widefield fluorescence molecular tomography. *Journal of Biomedical Optics*, 2012;17(10):272-279. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting J. Chen, Massachusetts General Hospital, Martinos Center Biomed Imaging, Charlestown, MA 02129, United States. (2012 Dec 05)

**National Healthcare Group Eye Institute, Singapore:  
Parapapillary atrophy and optic disc region assessment  
(PANDORA): retinal imaging tool for assessment of the  
optic disc and parapapillary atrophy**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of Singapore, Singapore, by NewsRx editors, research stated, “We describe a computer-aided measuring tool, named parapapillary atrophy and optic disc region assessment (PANDORA), for automated detection and quantification of both the parapapillary atrophy (PPA) and the optic disc (OD) regions in two-dimensional color retinal fundus images. The OD region is segmented using a combination of edge detection and ellipse fitting methods.”

Our news journalists obtained a quote from the research from National Healthcare Group Eye Institute, “The PPA region is identified by the presence of bright pixels in the temporal zone of the OD, and it is segmented using a sequence of techniques, including a modified Chan-Vese approach, thresholding, scanning filter, and multiseed region growing. PANDORA has been tested with 133 color retinal images (82 with PPA; 51 without PPA) drawn randomly from the Lothian Birth Cohort (LBC) database, together with a ‘ground truth’ estimate from an ophthalmologist. The PPA detection rate is 89.47% with a sensitivity of 0.83 and a specificity of 1. The mean accuracy in defining the OD region is 81.31% (SD = 10.45) when PPA is present and 95.32% (SD = 4.36) when PPA is absent. The mean accuracy in defining the PPA region is 73.57% (SD = 11.62).”

According to the news editors, the research concluded: “PANDORA demonstrates for the first time how to quantify the OD and PPA regions using two-dimensional fundus images, enabling ophthalmologists to study ocular diseases related to PPA using a standard fundus camera.”

For more information on this research see: Parapapillary atrophy and optic disc region assessment (PANDORA): retinal imaging tool for assessment of the optic disc and parapapillary atrophy. *Journal of Biomedical Optics*, 2012;17(10):281-288. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting C.K. Lu, Tan Tock Seng Hosp, Natl Healthcare Grp Eye Inst, Singapore, Singapore. (2012 Dec 05)

## **National Heart Center, Singapore: Left ventricular wall stress compendium**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Singapore, Singapore, by NewsRx correspondents, research stated, “Left ventricular (LV) wall stress has intrigued scientists and cardiologists since the time of Lame and Laplace in 1800s. The left ventricle is an intriguing organ structure, whose intrinsic design enables it to fill and contract.”

Our news journalists obtained a quote from the research from National Heart Center, “The development of wall stress is intriguing to cardiologists and biomedical engineers. The role of left ventricle wall stress in cardiac perfusion and pumping as well as in cardiac pathophysiology is a relatively unexplored phenomenon. But even for us to assess this role, we first need accurate determination of in vivo wall stress. However, at this point, 150 years after Lame estimated left ventricle wall stress using the elasticity theory, we are still in the exploratory stage of (i) developing left ventricle models that properly represent left ventricle anatomy and physiology and (ii) obtaining data on left ventricle dynamics. In this paper, we are responding to the need for a comprehensive survey of left ventricle wall stress models, their mechanics, stress computation and results. We have provided herein a compendium of major type of wall stress models: thin-wall models based on the Laplace law, thick-wall shell models, elasticity theory model, thick-wall large deformation models and finite element models. We have compared the mean stress values of these models as well as the variation of stress across the wall. All of the thin-wall and thick-wall shell models are based on idealised ellipsoidal and spherical geometries. However, the elasticity model’s shape can vary through the cycle, to simulate the more ellipsoidal shape of the left ventricle in the systolic phase. The finite element models have more representative geometries, but are generally based on animal data, which limits their medical relevance.”

According to the news editors, the research concluded: “This paper can enable readers to obtain a comprehensive perspective of left ventricle wall stress models, of how to employ them to determine wall stresses, and be cognizant of the assumptions involved in the use of specific models.”

For more information on this research see: Left ventricular wall stress compendium. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(10):1015-41.

The news correspondents report that additional information may be obtained from L. Zhong, Dept. of Cardiology, National Heart Centre Singapore, Mistri Wing 17 Third Hospital Avenue, Singapore 168752, Singapore. (2012 Dec 05)

**National Taiwan University, Taipei: Enhancing the sensitivity to scattering coefficient of the epithelium in a two-layered tissue model by oblique optical fibers: Monte Carlo study**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Taipei, Taiwan, by NewsRx correspondents, research stated, “Diffuse reflectance spectroscopy has been applied to detect tissue absorption and scattering properties associated with dysplasia, which is a potential precursor of epithelial cancers. The ability of DRS techniques to detect dysplasia could be improved by enhancing the detection of optical properties of the thin epithelial layer where dysplasia occurs.”

Our news editors obtained a quote from the research from National Taiwan University, “We propose a beveled fiber bundle probe consisting of a source fiber and multiple detection fibers parallel to each other and oriented obliquely to the tissue surface and investigate the sensitivity of reflectance measured with the probe to optical properties of a two-layered normal oral mucosa model. A scalable Monte Carlo method is employed to speed up analyzing spatially resolved reflectance spectra. Results reveal that the oblique probe is more sensitive to epithelial scattering and less sensitive to both stromal absorption and scattering than conventional perpendicular fiber configuration. The clinical relevance of the enhanced sensitivity to epithelial scattering by the proposed probe is demonstrated by quantifying optical properties of the two-layered tissue model from simulated data. The average error of extracted epithelial scattering coefficient is 1.5% and 32% using the oblique and perpendicular probe, respectively.”

According to the news editors, the research concluded: “The errors in other optical properties are all below 10% using the oblique probe.”

For more information on this research see: Enhancing the sensitivity to scattering coefficient of the epithelium in a two-layered tissue model by oblique optical fibers: Monte Carlo study. *Journal of Biomedical Optics*, 2012;17(10):360-373. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting K.B. Sung, National Taiwan University, Mol Imaging Center, Taipei 10617, Taiwan. (2012 Dec 05)

## **Northwestern University, Chicago: Spatial extent of cochlear infrared neural stimulation determined by tone-on-light masking**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Optics. According to news reporting from Chicago, Illinois, by NewsRx journalists, research stated, “Artificial neural stimulation is widely used in clinic, rehabilitation, and research. One of the limitations of electrical stimulation is the current spread in tissue.”

The news correspondents obtained a quote from the research from Northwestern University, “Recently, pulsed mid-infrared laser stimulation of nerves has been investigated as an alternative stimulation method. The likely benefits of infrared neural stimulation (INS) include spatial selectivity of stimulation, noncontact mode of operation, and the lack of stimulation artifact in simultaneous electrical recordings. The hypothesis for this study is that INS of the cochlear spiral ganglion at low pulse energy is as spatially selective as low-level tonal stimulation of the cochlea. Spatial selectivity was measured using a masking method. An optical pulse with fixed optical parameters was delivered through a 200- $\mu$ m diameter optical fiber. An acoustic tone, variable in frequency and level, was presented simultaneously with the optical pulse. Tone-on-light masking in gerbils revealed tuning curves with best frequencies between 5.3 and 11.4 kHz. The width of the tone-on-light tuning curves was similar to the width of tone-on-tone tuning curves.”

According to the news reporters, the research concluded: “The results indicate that the spatial area of INS in the gerbil cochlea is similar to the cochlear area excited by a low level acoustic tone, showing promising results for future use of INS in implantable cochlear prostheses.”

For more information on this research see: Spatial extent of cochlear infrared neural stimulation determined by tone-on-light masking. *Journal of Biomedical Optics*, 2011;16(11):118002.

Our news journalists report that additional information may be obtained by contacting A.I. Matic, Northwestern University, Feinberg School of Medicine, Dept. of Otolaryngology, Chicago, Illinois 60611, United States. (2012 Dec 05)

## **Oregon Health and Science University, Portland: Effects of hypoxia on cochlear blood flow in mice evaluated using Doppler optical microangiography**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating from Portland, Oregon, by NewsRx correspondents, research stated, “Reduced cochlear blood flow (CoBF) is a main contributor to hearing loss. Studying CoBF has remained a challenge due to the lack of available tools.”

Our news editors obtained a quote from the research from Oregon Health and Science University, “Doppler optical microangiography (DOMAG), a method to quantify single-vessel absolute blood flow, and laser Doppler flowmetry (LDF), a method for measuring the relative blood flow within a large volume of tissue, were used for determining the changes in CoBF due to systemic hypoxia in mice. DOMAG determined the change in blood flow in the apical turn (AT) with single-vessel resolution, while LDF averaged the change in the blood flow within a large volume of the cochlea (hemisphere with similar to 1 to 1.5 mm radius). Hypoxia was induced by decreasing the concentration of oxygen-inspired gas, so that the oxygen saturation was reduced from >95% to similar to 80%. DOMAG determined that during hypoxia the blood flow in two areas of the AT near and far from the helicotrema were increased and decreased, respectively. The LDF detected a decrease in blood flow within a larger volume of the cochlea (several turns averaged together).”

According to the news editors, the research concluded: “Therefore, the use of DOMAG as a tool for studying cochlear blood flow due to its ability to determine absolute flow values with single-vessel resolution was proposed.”

For more information on this research see: Effects of hypoxia on cochlear blood flow in mice evaluated using Doppler optical microangiography. *Journal of Biomedical Optics*, 2012;17(10):221-227. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting S. Dziennis, Oregon Health Sciences University, Oregon Hearing Res Center, Sch Med, Portland, OR 97239, United States. (2012 Dec 05)



### **School of Optometry, San Antonio: Visual disruption using the thermal lensing effect in the human eye: pilot study**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating from San Antonio, Texas, by NewsRx correspondents, research stated, “At select wavelengths, near infrared (IR) light is absorbed in the preretinal media of the eye. This produces small transient increases in temperature that temporarily alter the local index of refraction.”

Our news editors obtained a quote from the research from the School of Optometry, “If the IR exposure is sufficiently high, a momentary reduction in the focusing power of the eye can be induced through an effect known as thermal lensing. Fundamental optical interaction and safety aspects of this phenomenon have been demonstrated previously in animal and artificial eye models. However, whether the effect will induce an observable visual change in human subjects has not been explored. Here, results of a pilot study are shown where eight human subjects were exposed to an IR laser at levels that were below the safe exposure limit. The exposures did induce a transient visual distortion if sufficiently high levels were used.”

According to the news editors, the research concluded: “While the description of the visual change varied between subjects, this experiment was able to determine a general guideline for power needed to induce significant effects in human subjects.”

For more information on this research see: Visual disruption using the thermal lensing effect in the human eye: pilot study. *Journal of Biomedical Optics*, 2012;17(10):191-197. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting E.L. Towle, Univ Incarnate Word, Rosenberg Sch Optometry, San Antonio, TX 78229, United States. (2012 Dec 05)

### **South China Normal University, Guangdong: Effects of optical clearing agents on noninvasive blood glucose monitoring with optical coherence tomography: a pilot study**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Blood Glucose Monitoring. According to news reporting originating from Guangdong, People’s Republic of China, by NewsRx correspondents, research stated, “Recently, the capability of

optical coherence tomography (OCT) has been demonstrated for noninvasive blood glucose monitoring. In this work, we investigate the administration of chemical agents onto human skin tissue to increase the transparency of the surface of the skin, as a means of improving the capability of OCT imaging for clinically relevant applications.”

Our news editors obtained a quote from the research from South China Normal University, “Eight groups of experiments were proposed, in which different optical clearing agents (OCA) were used. The results indicate that, when properly used, some OCAs perform well in promoting the capability of OCT for noninvasive blood glucose monitoring. Among the four kinds of OCA we used, 50% v/v glycerol solute turns out to be the best enhancer. Compared with the results of the experiments in which no OCA was used, when 50% glycerol was applied onto the human skin topically, the correlation coefficient between the OCT signal slope (OCTSS) and blood glucose concentration (BGC) was improved by 7.1% on average, and the lag time between changes in the OCTSS and BGC was cut by 8 min on average.”

According to the news editors, the research concluded: “The results of 10 w/v mannitol were also good, but not as pronounced.”

For more information on this research see: Effects of optical clearing agents on noninvasive blood glucose monitoring with optical coherence tomography: a pilot study. *Journal of Biomedical Optics*, 2012;17(10):95-101. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting R.Y. He, South China Normal University, Key Lab Laser Life Sci, Minist Educ China, Guangzhou 510631, Guangdong, People's Republic of China. (2012 Dec 05)

### **Sunnybrook Health Sciences Center, Toronto: Acoustic and photoacoustic characterization of micron-sized perfluorocarbon emulsions**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating from Toronto, Canada, by NewsRx correspondents, research stated, “Perfluorocarbon droplets containing nanoparticles (NPs) have recently been investigated as theranostic and dual-mode contrast agents. These droplets can be vaporized via laser irradiation or used as photoacoustic contrast agents below the vaporization threshold.”

Our news editors obtained a quote from the research from Sunnybrook Health Sciences Center, “This study investigates the photoacoustic mechanism of NP-loaded droplets using photoacoustic frequencies

between 100 and 1000 MHz, where distinct spectral features are observed that are related to the droplet composition. The measured photoacoustic spectrum from NP-loaded perfluorocarbon droplets was compared to a theoretical model that assumes a homogenous liquid. Good agreement in the location of the spectral features was observed, which suggests the NPs act primarily as optical absorbers to induce thermal expansion of the droplet as a single homogenous object. The NP size and composition do not affect the photoacoustic spectrum; therefore, the photoacoustic signal can be maximized by optimizing the NP optical absorbing properties. To confirm the theoretical parameters in the model, photoacoustic, ultrasonic, and optical methods were used to estimate the droplet diameter. Photoacoustic and ultrasonic methods agreed to within 1.4%, while the optical measurement was 8.5% higher; this difference decreased with increasing droplet size.”

According to the news editors, the research concluded: “The small discrepancy may be attributed to the difficulty in observing the small droplets through the partially translucent phantom.”

For more information on this research see: Acoustic and photoacoustic characterization of micron-sized perfluorocarbon emulsions. *Journal of Biomedical Optics*, 2012;17(9):179-187. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting E.M. Strohm, Sunnybrook Hlth Sci Center, Imaging Res Department, Toronto, ON M4N 3M5, Canada. (2012 Dec 05)

### **Telemark University College, Porsgrunn: An assessment of swinger techniques for the playground swing oscillatory motion**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating in Porsgrunn, Norway, by NewsRx editors, the research stated, “Much attention has been devoted to how playground swing amplitudes are built up by swinger techniques, i.e. body actions. However, very little attention has been given to the requirements that such swinger techniques place on the swinger himself.”

The news reporters obtained a quote from the research from Telemark University College, “The purpose of this study was to find out whether different swinger techniques yield significantly different maximum torques, endurance and coordinative skills, and also to identify preferable techniques. We modelled the seated swinger as a rigid dumbbell and compared three different techniques. A series of computer simulations were run with each technique, testing the performance with

different body rotational speeds, delayed onset of body rotation and different body mass distributions, as swing amplitudes were brought up towards 90°;. One technique was found to be extremely sensitive to the timing of body actions, limiting swing amplitudes to 50°; and 8°; when body action was delayed by 0.03 and 0.3 s, respectively. Two other more robust techniques reached 90°; even with the largest of these delays, although more time (and endurance) was needed.”

According to the news reporters, the research concluded: “However, these two methods also differed with respect to maximum torque and endurance, and none was preferable in both these aspects, being dependent on the swinger goals and abilities.”

For more information on this research see: An assessment of swinger techniques for the playground swing oscillatory motion. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(10):1103-9.

Our news correspondents report that additional information may be obtained by contacting S.O. Linge, Telemark University College, PO Box 203, N-3901 Porsgrunn, Norway. (2012 Dec 05)

### **University Hospital, Bern: Evaluation and quantification of spectral information in tissue by confocal microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting from Bern, Switzerland, by NewsRx journalists, research stated, “A confocal imaging and image processing scheme is introduced to visualize and evaluate the spatial distribution of spectral information in tissue. The image data are recorded using a confocal laser-scanning microscope equipped with a detection unit that provides high spectral resolution.”

The news correspondents obtained a quote from the research from University Hospital, “The processing scheme is based on spectral data, is less error-prone than intensity-based visualization and evaluation methods, and provides quantitative information on the composition of the sample. The method is tested and validated in the context of the development of dermal drug delivery systems, introducing a quantitative uptake indicator to compare the performances of different delivery systems is introduced. A drug penetration study was performed in vitro. The results show that the method is able to detect, visualize and measure spectral information in tissue. In the penetration study, uptake efficiencies of different experiment setups could be discriminated and quantitatively described. The developed uptake indicator is a step towards a quantitative assessment and, in a more general view apart

from pharmaceutical research, provides valuable information on tissue composition.”

According to the news reporters, the research concluded: “It can potentially be used for clinical in vitro and in vivo applications.”

For more information on this research see: Evaluation and quantification of spectral information in tissue by confocal microscopy. *Journal of Biomedical Optics*, 2012;17(10):290-297. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting U. Maeder, University Hospital Bern, Inselspital, Inst Diagnost Intervent & Pediat Radiol, CH-3010 Bern, Switzerland. (2012 Dec 05)

### **University of California, Davis: Design, construction, and validation of a rotary multifunctional intravascular diagnostic catheter combining multispectral fluorescence lifetime imaging and intravascular ultrasound**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Davis, California, by NewsRx correspondents, research stated, “We report the development and validation of an intravascular rotary catheter for bimodal interrogation of arterial pathologies. This is based on a point-spectroscopy scanning time-resolved fluorescence spectroscopy technique enabling reconstruction of fluorescence lifetime images (FLIm) and providing information on arterial intima composition and intravascular ultrasound (IVUS) providing information on arterial wall morphology.”

Our news journalists obtained a quote from the research from the University of California, “The catheter design allows for independent rotation of the ultrasonic and optical channels within an 8 Fr outer diameter catheter sheath and integrates a low volume flushing channel for blood removal in the optical pathways. In the current configuration, the two channels consist of (a) a standard 3 Fr IVUS catheter with single element transducer (40 MHz) and (b) a side-viewing fiber optic (400  $\mu\text{m}$  core). Experiments conducted in tissue phantoms showed the ability of the catheter to operate in an intraluminal setting and to generate coregistered FLIm and IVUS in one pull-back scan. Current results demonstrate the feasibility of the catheter for simultaneous bimodal interrogation of arterial lumen and for generation of robust fluorescence lifetime data under IVUS guidance.”

According to the news editors, the research concluded: “These results facilitate further development of a FLIm-IVUS technique for intravascular diagnosis of atherosclerotic cardiovascular diseases including vulnerable plaques.”

For more information on this research see: Design, construction, and validation of a rotary multifunctional intravascular diagnostic catheter combining multispectral fluorescence lifetime imaging and intravascular ultrasound. *Journal of Biomedical Optics*, 2012;17(10):299-308. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from J. Bec, University of California, Dept. of Biomed Engrn, Davis, CA 95616, United States. (2012 Dec 05)

### **University of California, Irvine: Digital parallel frequency-domain spectroscopy for tissue imaging**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating in Irvine, California, by NewsRx journalists, research stated, “Near-infrared (NIR) (650 to 1000 nm) optical properties of turbid media can be quantified accurately and noninvasively using methods based on diffuse reflectance or transmittance, such as frequency-domain photon migration (FDPM). Conventional FDPM techniques based on white-light steady-state (SS) spectral measurements in conjunction with the acquisition of frequency-domain (FD) data at selected wavelengths using laser diodes are used to measure broadband NIR scattering-corrected absorption spectra of turbid media.”

The news reporters obtained a quote from the research from the University of California, “These techniques are limited by the number of wavelength points used to obtain FD data and by the sweeping technique used to collect FD data over a relatively large range. We have developed a method that introduces several improvements in the acquisition of optical parameters, based on the digital parallel acquisition of a comb of frequencies and on the use of a white laser as a single light source for both FD and SS measurements. The source, due to the high brightness, allows a higher penetration depth with an extremely low power on the sample. The parallel acquisition decreases the time required by standard serial systems that scan through a range of modulation frequencies.”

According to the news reporters, the research concluded: “Furthermore, all-digital acquisition removes analog noise, avoids the analog mixer, and does not create radiofrequency interference or emission.”

For more information on this research see: Digital parallel frequency-domain spectroscopy for tissue imaging. *Journal of Biomedical Optics*, 2012;17(9):162-169. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting C. Arnesano, University of California, Dept. of Biomed Engn, Fluorescence Dynam Lab, Irvine, CA 92717, United States. (2012 Dec 05)

### **University of California, Irvine: Impact of contralateral and ipsilateral reference tissue selection on self-referencing differential spectroscopy for breast cancer detection**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Breast Cancer is now available. According to news reporting originating from Irvine, California, by NewsRx correspondents, research stated, “We previously developed a self-referencing differential spectroscopic (SRDS) method to detect lesions by identifying a spectroscopic biomarker of breast cancer, i.e., the specific tumor component (STC). The SRDS method is based on the assumption of the exclusive presence of this spectroscopic biomaker in malignant disease.”

Our news editors obtained a quote from the research from the University of California, “Although clinical results using this method have already been published, the dependence of the STC spectra on the choice of reference tissue has not yet been addressed. In this study, we explore the impact of the selection of the reference region size and location on the STC spectrum in 10 subjects with malignant breast tumors. Referencing from both contralateral and ipsilateral sides was performed. Regardless of the referencing, we are able to obtain consistent high contrast images of malignant lesions using the STC with less than 13% deviation. These results suggest that the STC measurements are independent of any type, location, and amount of normal breast tissue used for referencing. This confirms the initial assumption of the SRDS analysis, that there are specific tumor components in cancer that do not exist in normal tissue.”

According to the news editors, the research concluded: “This also indicates that bilateral measurements are not required for lesion identification using the STC method.”

For more information on this research see: Impact of contralateral and ipsilateral reference tissue selection on self-referencing differential spectroscopy for breast cancer detection. *Journal of Biomedical Optics*, 2011;16(11):116019.

The news editors report that additional information may be obtained by contacting A. Leproux, University of California, Irvine, Beckman Laser Institute, Irvine, California 92612, United States. (2012 Dec 05)

### **University of California, Irvine: Intravascular photoacoustic imaging at 35 and 80 MHz**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Irvine, California, by NewsRx correspondents, research stated, “The catheter-based intravascular photoacoustic (IVPA) imaging for diagnosing atherosclerosis, which can provide optical absorption contrast of the arterial wall besides acoustic scattering contrast from the conventional intravascular ultrasound (IVUS) imaging, has been intensively researched recently. The resolution of IVPA is determined by the frequency bandwidth of an ultrasonic transducer.”

Our news editors obtained a quote from the research from the University of California, “Higher resolution can be achieved by increasing the transducer’s working frequency and bandwidth. We introduce IVPA imaging at 35 and 80 MHz by using newly designed integrated IVUS/IVPA probes. This is the first time IVPA has been achieved as high as 80 MHz. Six-micrometer tungsten wires were imaged to evaluate the probes’ spatial resolutions and beam patterns. Healthy rabbit aorta was imaged in vitro.”

According to the news editors, the research concluded: “Imaging results show that IVPA has superior contrast over IVUS in identifying the arterial wall, and IVPA at 80 MHz demonstrates extraordinary resolution (35  $\mu$  m) compared to 35 MHz.”

For more information on this research see: Intravascular photoacoustic imaging at 35 and 80 MHz. *Journal of Biomedical Optics*, 2012;17(10):240-245. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting X. Li, University of California, Edwards Lifesci Center Adv Cardiovasc Technol, Irvine, CA 92697, United States. (2012 Dec 05)



### **University of California, Irvine: Parallel multigrid solver of radiative transfer equation for photon transport via graphics processing unit**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Irvine, California, by NewsRx journalists, research stated, “A graphics processing unit-based parallel multigrid solver for a radiative transfer equation with vacuum boundary condition or reflection boundary condition is presented for heterogeneous media with complex geometry based on two-dimensional triangular meshes or three-dimensional tetrahedral meshes.”

The news correspondents obtained a quote from the research from the University of California, “The computational complexity of this parallel solver is linearly proportional to the degrees of freedom in both angular and spatial variables, while the full multigrid method is utilized to minimize the number of iterations. The overall gain of speed is roughly 30 to 300 fold with respect to our prior multigrid solver, which depends on the underlying regime and the parallelization.”

According to the news reporters, the research concluded: “The numerical validations are presented with the MATLAB codes at <https://sites.google.com/site/rtefastsolver/>.”

For more information on this research see: Parallel multigrid solver of radiative transfer equation for photon transport via graphics processing unit. *Journal of Biomedical Optics*, 2012;17(9):79-84. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting H. Gao, University of California, Tu & Yuen Center Funct Oncoimaging, Dept. of Radiol Sci, Irvine, CA 92697, United States. (2012 Dec 05)

### **University of Central Oklahoma, Edmond: Impact of the optical depth of field on cytogenetic image quality**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news originating from Edmond, Oklahoma, by NewsRx correspondents, research stated, “In digital pathology, clinical specimen slides are converted into digital images by microscopic image scanners. Since random vibration and mechanical drifting are unavoidable on even high-precision moving stages, the optical depth of field (DOF) of microscopic systems may affect image quality, in particular when using an objective lens with high magnification power.”

Our news journalists obtained a quote from the research from the University of Central Oklahoma, “The DOF of a microscopic system was theoretically analyzed and experimentally validated using standard resolution targets under 60x dry and 100x oil objective lenses, respectively. Then cytogenetic samples were imaged at in-focused and off-focused states to analyze the impact of DOF on the acquired image qualities. For the investigated system equipped with the 60x dry and 100x oil objective lenses, the theoretical estimation of the DOF are 0.855  $\mu\text{m}$  and 0.703  $\mu\text{m}$ , and the measured DOF are 3.0  $\mu\text{m}$  and 1.8  $\mu\text{m}$ , respectively. The observation reveals that the chromosomal bands of metaphase cells are distinguishable when images are acquired up to approximately 1.5  $\mu\text{m}$  or 1  $\mu\text{m}$  out of focus using the 60x dry and 100x oil objective lenses, respectively.”

According to the news editors, the research concluded: “The results of this investigation provide important designing trade-off parameters to optimize the digital microscopic image scanning systems in the future.”

For more information on this research see: Impact of the optical depth of field on cytogenetic image quality. *Journal of Biomedical Optics*, 2012;17(9):189-195. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from Y.C. Qiu, Univ Cent Oklahoma, Dept. of Engr & Phys, Edmond, OK 73034, United States. (2012 Dec 05)

### **University of Houston: In vivo estimation of elastic wave parameters using phase-stabilized swept source optical coherence elastography**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Houston, Texas, by NewsRx correspondents, research stated, “We report a highly sensitive method based on phase-stabilized swept source optical coherence elastography (PhS-SSOCE) to measure elastic wave propagation in soft tissues in vivo. The waves were introduced using a mechanical stimulus and were assessed using the phase response of the swept source optical coherence tomography signal.”

Our news editors obtained a quote from the research from the University of Houston, “The technique was utilized to measure age-related changes in elastic flexural wave velocity and attenuation in mice cornea in vivo. Results demonstrate that the wave velocity increases with animal age, supporting previous observations that stiffness of mice cornea gradually increases with age.”

According to the news editors, the research concluded: “Our studies suggest that the PhS-SSOCE technique could potentially be used to obtain biomechanical properties of ocular tissues in vivo.”

For more information on this research see: In vivo estimation of elastic wave parameters using phase-stabilized swept source optical coherence elastography. *Journal of Biomedical Optics*, 2012;17(10):8-10. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting R.K. Manapuram, University of Houston, Dept. of Biomed Engn, Houston, TX 77204, United States. (2012 Dec 05)

### **University of Houston: Three-dimensional optoacoustic imaging as a new noninvasive technique to study long-term biodistribution of optical contrast agents in small animal models**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news originating from Houston, Texas, by NewsRx correspondents, research stated, “We used a 3-D optoacoustic (OA) tomography system to create maps of optical absorbance of mice tissues contrasted with gold nanorods (GNRs). Nude mice were scanned before and after injection of GNRs at time periods varying from 1 to 192 h. Synthesized GNRs were purified from hexadecyltrimethylammonium bromide and coated with polyethylene glycol (PEG) to obtain GNR-PEG complexes suitable for in vivo applications.”

Our news journalists obtained a quote from the research from the University of Houston, “Intravenous administration of purified GNR-PEG complexes resulted in enhanced OA contrast of internal organs and blood vessels compared to the same mouse before injection of the contrast agent. Maximum enhancement of the OA images was observed 24 to 48 h postinjection, followed by a slow clearance trend for the remaining part of the studied period (eight days).”

According to the news editors, the research concluded: “We demonstrate that OA imaging with two laser wavelengths can be used for non-invasive, long-term studies of biological distribution of contrast agents.”

For more information on this research see: Three-dimensional optoacoustic imaging as a new noninvasive technique to study long-term biodistribution of optical contrast agents in small animal models. *Journal of Biomedical Optics*, 2012;17(10):48-54. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from R. Su, University of Houston, Houston, TX 77004, United States. (2012 Dec 05)

### **University of Illinois, Urbana: Tissue refractive index as marker of disease**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news reporting from Urbana, Illinois, by NewsRx journalists, research stated, “The gold standard in histopathology relies on manual investigation of stained tissue biopsies. A sensitive and quantitative method for in situ tissue specimen inspection is highly desirable, as it would allow early disease diagnosis and automatic screening.”

The news correspondents obtained a quote from the research from the University of Illinois, “Here we demonstrate that quantitative phase imaging of entire unstained biopsies has the potential to fulfill this requirement. Our data indicates that the refractive index distribution of histopathology slides, which contains information about the molecular scale organization of tissue, reveals prostate tumors and breast calcifications. These optical maps report on subtle, nanoscale morphological properties of tissues and cells that cannot be recovered by common stains, including hematoxylin and eosin. We found that cancer progression significantly alters the tissue organization, as exhibited by consistently higher refractive index variance in prostate tumors versus normal regions. Furthermore, using the quantitative phase information, we obtained the spatially resolved scattering mean free path and anisotropy factor  $g$  for entire biopsies and demonstrated their direct correlation with tumor presence.”

According to the news reporters, the research concluded: “In essence, our results show that the tissue refractive index reports on the nanoscale tissue architecture and, in principle, can be used as an intrinsic marker for cancer diagnosis.”

For more information on this research see: Tissue refractive index as marker of disease. *Journal of Biomedical Optics*, 2011;16(11):116017.

Our news journalists report that additional information may be obtained by contacting Z. Wang, University of Illinois at Urbana-Champaign, Beckman Institute for Advanced Science and Technology-Dept. of Electrical and Computer Engineering, Urbana, Illinois 61801, United States. (2012 Dec 05)

### **University of Miami: Infrared microscopic imaging of cutaneous wound healing: lipid conformation in the migrating epithelial tongue**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting from Miami, Florida, by NewsRx journalists, research stated, “Infrared microscopic imaging has been utilized to analyze for the first time the spatial distribution of lipid structure in an ex vivo human organ culture skin wound healing model. Infrared images were collected at zero, two, four, and six days following wounding.”

The news correspondents obtained a quote from the research from the University of Miami, “Analysis of lipid infrared spectral properties revealed the presence of a lipid class with disordered chains within and in the vicinity of the migrating epithelial tongue. The presence of lipid ester C=O bands colocalized with the disordered chains provided evidence for the presence of carbonyl-containing lipid species. Gene array data complemented the biophysical studies and provided a biological rationale for the generation of the disordered chain species. This is the first clear observation, to our knowledge, of disordered lipid involvement in cutaneous wound healing.”

According to the news reporters, the research concluded: “Several possibilities are discussed for the biological relevance of these observations.”

For more information on this research see: Infrared microscopic imaging of cutaneous wound healing: lipid conformation in the migrating epithelial tongue. *Journal of Biomedical Optics*, 2012;17(9):122-129. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting G. Yu, University of Miami, Miller Sch Med, Dept. of Dermatol & Cutaneous Surg, Wound Healing & Regenerat Med Res Program, Miami, FL 33136, United States. (2012 Dec 05)

### **University of Otago, Dunedin: Peer-to-peer Monte Carlo simulation of photon migration in topical applications of biomedical optics**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Dunedin, New Zealand, by NewsRx journalists, research stated, “In the framework of further development of the unified approach of photon migration in complex turbid media, such as biological tissues we present a peer-to-peer (P2P) Monte Carlo (MC) code. The

object-oriented programming is used for generalization of MC model for multipurpose use in various applications of biomedical optics.”

The news reporters obtained a quote from the research from the University of Otago, “The online user interface providing multiuser access is developed using modern web technologies, such as Microsoft Silverlight, ASP. NET. The emerging P2P network utilizing computers with different types of compute unified device architecture-capable graphics processing units (GPUs) is applied for acceleration and to overcome the limitations, imposed by multiuser access in the online MC computational tool. The developed P2P MC was validated by comparing the results of simulation of diffuse reflectance and fluence rate distribution for semi-infinite scattering medium with known analytical results, results of adding-doubling method, and with other GPU-based MC techniques developed in the past.”

According to the news reporters, the research concluded: “The best speedup of processing multiuser requests in a range of 4 to 35 s was achieved using single-precision computing, and the double-precision computing for floating-point arithmetic operations provides higher accuracy.”

For more information on this research see: Peer-to-peer Monte Carlo simulation of photon migration in topical applications of biomedical optics. *Journal of Biomedical Optics*, 2012;17(9):20-22. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting A. Doronin, University of Otago, Dept. of Phys, Dunedin 9054, New Zealand. (2012 Dec 05)

### **University of Paris: Optical phantoms with variable properties and geometries for diffuse and fluorescence optical spectroscopy**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating from Paris, France, by NewsRx correspondents, research stated, “Growing interest in optical instruments for biomedical applications has increased the use of optically calibrated phantoms. Often associated with tissue modeling, phantoms allow the characterization of optical devices for clinical purposes.”

Our news editors obtained a quote from the research from the University of Paris, “Fluorescent gel phantoms have been developed, mimicking optical properties of healthy and tumorous brain tissues. Specific geometries of dedicated molds offer multiple-layer phantoms with variable thicknesses and monolayer phantoms with cylindrical inclusions

at various depths and diameters. Organic chromophores are added to allow fluorescence spectroscopy. These phantoms are designed to be used with 405 nm as the excitation wavelength. This wavelength is then adapted to excite large endogenous molecules. The benefits of these phantoms in understanding fluorescence tissue analysis are then demonstrated.”

According to the news editors, the research concluded: “In particular, detectability aspects as a function of geometrical and optical parameters are presented and discussed.”

For more information on this research see: Optical phantoms with variable properties and geometries for diffuse and fluorescence optical spectroscopy. *Journal of Biomedical Optics*, 2012;17(10):394-403. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting B. Leh, University of Paris, F-75012 Paris, France. (2012 Dec 05)

### **University of Rochester: Optical property measurements establish the feasibility of photodynamic therapy as a minimally invasive intervention for tumors of the kidney**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating in Rochester, New York, by NewsRx journalists, research stated, “We measured the optical properties of freshly excised kidneys with renal parenchymal tumors to assess the feasibility of photodynamic therapy (PDT) in these patients. Kidneys were collected from 16 patients during surgical nephrectomies.”

The news reporters obtained a quote from the research from the University of Rochester, “Spatially resolved, white light, steady-state diffuse reflectance measurements were performed on normal and neoplastic tissue identified by a pathologist. Reflectance data were fit using a radiative transport model to obtain absorption ( $\mu(a)$ ) and transport scattering coefficients ( $\mu'(s)$ ), which define a characteristic light propagation distance,  $\delta$ . Monte Carlo (MC) simulations of light propagation from cylindrical diffusing fibers were run using the optical properties extracted from each of the kidneys. Interpretable spectra were obtained from 14 kidneys. Optical properties of human renal cancers exhibit significant inter-lesion heterogeneity. For all diagnoses, however, there is a trend toward increased light penetration at longer wavelengths. For renal cell carcinomas (RCC), mean values of  $\delta$  increase from 1.28 to 2.78 mm as the PDT treatment wavelength is increased

from 630 to 780 nm. MC simulations of light propagation from interstitial optical fibers show that fluence distribution in tumors is significantly improved at 780 versus 630 nm.”

According to the news reporters, the research concluded: “Our results support the feasibility of PDT in selected renal cancer patients, especially with photosensitizers activated at longer wavelengths.”

For more information on this research see: Optical property measurements establish the feasibility of photodynamic therapy as a minimally invasive intervention for tumors of the kidney. *Journal of Biomedical Optics*, 2012;17(9):312-319. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting T.M. Baran, University of Rochester, Dept. of Urol, Rochester, NY 14642, United States. (2012 Dec 05)

### **University of Texas, Houston: Feasibility of in vivo intravascular photoacoustic imaging using integrated ultrasound and photoacoustic imaging catheter**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting out of Houston, Texas, by NewsRx editors, research stated, “Pilot studies of in vivo combined intravascular ultrasound (IVUS) and intravascular photoacoustic (IVPA) imaging are reported.”

Our news journalists obtained a quote from the research from the University of Texas, “A recently introduced prototype of an integrated IVUS/IVPA imaging catheter consisting of a single-element ultrasound transducer and a light delivery system based on a single optical fiber was adapted and used for in vivo imaging of a coronary stent deployed in a rabbit’s thoracic aorta in the presence of luminal blood. The results suggest that in vivo IVUS/IVPA imaging is feasible using the integrated IVUS/IVPA imaging catheter.”

According to the news editors, the research concluded: “The challenges of in vivo combined IVUS/IVPA imaging are discussed, and further improvements on the design of the catheter and the clinical imaging system are proposed.”

For more information on this research see: Feasibility of in vivo intravascular photoacoustic imaging using integrated ultrasound and photoacoustic imaging catheter. *Journal of Biomedical Optics*, 2012;17(9):115-120. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.



Our news journalists report that additional information may be obtained by contacting A.B. Karpouk, Univ Texas Hlth Sci Center, Div Cardiol, Houston, TX 77030, United States. (2012 Dec 05)

### **University of Texas, Houston: Intravascular photoacoustic imaging of exogenously labeled atherosclerotic plaque through luminal blood**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Houston, Texas, by NewsRx correspondents, research stated, “Combined intravascular ultrasound and intravascular photoacoustic (IVUS/IVPA) imaging has been previously established as a viable means for assessing atherosclerotic plaque morphological and compositional characteristics using both endogenous and exogenous contrast. In this study, IVUS/IVPA imaging of atherosclerotic rabbit aortas following systemic injection of gold nanorods (AUNRs) with peak absorbance within the tissue optical window is performed.”

Our news editors obtained a quote from the research from the University of Texas, “Ex vivo imaging results reveal a high photoacoustic signal from localized AUNRs in regions with atherosclerotic plaques. Corresponding histological staining further confirms the preferential extravasation of AUNRs in atherosclerotic regions with compromised luminal endothelium and acute inflammation. The ability to detect AUNRs using combined IVUS and photoacoustic imaging in the presence of luminal saline and luminal blood is evaluated using both spectroscopic and single wavelength IVPA imaging techniques.”

According to the news editors, the research concluded: “Results demonstrate that AUNR detection within the arterial wall can be achieved using both methods, even in the case of imaging through luminal blood.”

For more information on this research see: Intravascular photoacoustic imaging of exogenously labeled atherosclerotic plaque through luminal blood. *Journal of Biomedical Optics*, 2012;17(10):334-341. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting D. Yeager, Univ Texas MD Anderson Canc Center, Dept. of Imaging Phys, Houston, TX 77030, United States. (2012 Dec 05)

## **University of Ulm: Preparation strategy and illumination of three-dimensional cell cultures in light sheet-based fluorescence microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating in Ulm, Germany, by NewsRx journalists, research stated, “A device for selective plane illumination microscopy (SPIM) of three-dimensional multicellular spheroids, in culture medium under stationary or microfluidic conditions, is described. Cell spheroids are located in a microcapillary and a light sheet, for illumination, is generated in an optical setup adapted to a conventional inverse microscope.”

The news reporters obtained a quote from the research from the University of Ulm, “Layers of the sample, of about 10  $\mu\text{m}$  or less in diameter, are, thus, illuminated selectively and imaged by high resolution fluorescence microscopy. SPIM is operated at low light exposure even if a larger number of layers is imaged and is easily combined with laser scanning microscopy.”

According to the news reporters, the research concluded: “Chinese hamster ovary cells expressing a membrane-associated green fluorescent protein are used for preliminary tests, and the uptake of the fluorescent marker, acridine orange via a microfluidic system, is visualized to demonstrate its potential in cancer research such as for the detection of cellular responses to anticancer drugs.”

For more information on this research see: Preparation strategy and illumination of three-dimensional cell cultures in light sheet-based fluorescence microscopy. *Journal of Biomedical Optics*, 2012;17(10):132-136. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting T. Bruns, Univ Ulm, Inst Lasertechnologien Med & Messtech, D-89081 Ulm, Germany. (2012 Dec 05)

## **Washington University, St. Louis: Video-rate functional photoacoustic microscopy at depths**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of St. Louis, Missouri, by NewsRx editors, research stated, “We report the development of functional photoacoustic microscopy capable of video-rate high-resolution in vivo imaging in deep tissue. A lightweight photoacoustic probe is made of a single-element broadband ultrasound transducer, a compact photoacoustic beam combiner, and a bright-field light delivery system.”

Our news journalists obtained a quote from the research from Washington University, “Focused broadband ultrasound detection provides a 44- $\mu\text{m}$  lateral resolution and a 28- $\mu\text{m}$  axial resolution based on the envelope (a 15- $\mu\text{m}$  axial resolution based on the raw RF signal). Due to the efficient bright-field light delivery, the system can image as deep as 4.8 mm in vivo using low excitation pulse energy (28  $\mu\text{J}$  per pulse, 0.35  $\text{mJ}/\text{cm}^2$ ) on the skin surface). The photoacoustic probe is mounted on a fast-scanning voice-coil scanner to acquire 40 two-dimensional (2-D) B-scan images per second over a 9-mm range. High-resolution anatomical imaging is demonstrated in the mouse ear and brain.”

According to the news editors, the research concluded: “Via fast dual-wavelength switching, oxygen dynamics of mouse cardiovascular structure is imaged in realtime as well.”

For more information on this research see: Video-rate functional photoacoustic microscopy at depths. *Journal of Biomedical Optics*, 2012;17(10):256-260. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting L.D. Wang, Washington University, Dept. of Biomed Engrn, Opt Imaging Lab, St Louis, MO 63130, United States. (2012 Dec 05)

### **Wright State University, Dayton: Assessment of corneal hydration sensing in the terahertz band: in vivo results at 100 GHz**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Dayton, Ohio, by NewsRx journalists, research stated, “Terahertz corneal hydration sensing has shown promise in ophthalmology applications and was recently shown to be capable of detecting water concentration changes of about two parts in a thousand in ex vivo corneal tissues. This technology may be effective in patient monitoring during refractive surgery and for early diagnosis and treatment monitoring in diseases of the cornea.”

The news reporters obtained a quote from the research from Wright State University, “In this work, Fuchs dystrophy, cornea transplant rejection, and keratoconus are discussed, and a hydration sensitivity of about one part in a hundred is predicted to be needed to successfully distinguish between diseased and healthy tissues in these applications. Stratified models of corneal tissue reflectivity are developed and validated using ex vivo spectroscopy of harvested porcine corneas that are hydrated using polyethylene glycol solutions. Simulation of the cornea’s

depth-dependent hydration profile, from 0.01 to 100 THz, identifies a peak in intrinsic reflectivity contrast for sensing at 100 GHz. A 100 GHz hydration sensing system is evaluated alongside the current standard ultrasound pachymetry technique to measure corneal hydration in vivo in four rabbits. A hydration sensitivity, of three parts per thousand or better, was measured in all four rabbits under study.”

According to the news reporters, the research concluded: “This work presents the first in vivo demonstration of remote corneal hydration sensing.”

For more information on this research see: Assessment of corneal hydration sensing in the terahertz band: in vivo results at 100 GHz. *Journal of Biomedical Optics*, 2012;17(9):283-289. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting D. Bennett, Wright State University, Dept. of Phys & Elect Engn, Dayton, OH 45435, United States. (2012 Dec 05)

### **King Saud University, Riyadh: Fluorescence spectra of blood and urine for cervical cancer detection**

By a News Reporter-Staff News Editor at Cancer Weekly – Researchers detail new data in Cancer Detection. According to news reporting from Riyadh, Saudi Arabia, by NewsRx journalists, research stated, “In the current study, the fluorescence emission spectra (FES) and Stokes shift spectra (SSS) of blood and urine samples of cervical cancer patients were obtained and compared to those of normal controls.”

The news correspondents obtained a quote from the research from King Saud University, “Both spectra showed that the relative intensity of biomolecules such as porphyrin, collagen, Nicotinamide adenine dinucleotide, and flavin were quite out of proportion in cervical cancer patients. The biochemical mechanism for the elevation of these fluorophores is not yet definitive; nevertheless, these biomolecules could serve as tumor markers for diagnosis, screening, and follow-up of cervical cancers.”

According to the news reporters, the research concluded: “To the best of our knowledge, this is the first report on FES and SSS of blood and urine of cervical cancer patients to give a sensitivity of 80% and specificity of 78%.”

For more information on this research see: Fluorescence spectra of blood and urine for cervical cancer detection. *Journal of Biomedical Optics*, 2012;17(9):305-310. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting V. Masilamani, King Saud Univ, Coll Sci, Res Chair Laser Diag Canc, Dept. of Phys & Astron, Riyadh 11451, Saudi Arabia. (2012 Dec 04)

### **MIRECC, Salt Lake City: Phase-adjusted echo time (PATE)-averaging H-1 MRS: application for improved glutamine quantification at 2.89 T**

By a News Reporter-Staff News Editor at Life Science Weekly – New research on Biomedical Engineering is the subject of a report. According to news reporting from Salt Lake City, Utah, by NewsRx journalists, research stated, “<sup>1</sup>H MRS investigations have reported altered glutamatergic neurotransmission in a variety of psychiatric disorders. The unraveling of glutamate from glutamine resonances is crucial for the interpretation of these observations, although this remains a challenge at clinical static magnetic field strengths.”

The news correspondents obtained a quote from the research from MIRECC, “Glutamate resolution can be improved through an approach known as echo time (TE) averaging, which involves the acquisition and subsequent averaging of multiple TE steps. The process of TE averaging retains the central component of the glutamate methylene multiplet at 2.35 ppm, with the simultaneous attenuation of overlapping phase-modulated coupled resonances of glutamine and N-acetylaspartate. We have developed a novel post-processing approach, termed phase-adjusted echo time (PATE) averaging, for the retrieval of glutamine signals from a TE-averaged <sup>1</sup>H MRS dataset. The method works by the application of an optimal TE-specific phase term, which is derived from spectral simulation, prior to averaging over TE space. The simulation procedures and preliminary in vivo spectra acquired from the human frontal lobe at 2.89 T are presented. Three metabolite normalization schemes were developed to evaluate the frontal lobe test-retest reliability for glutamine measurement in six subjects, and the resulting values were comparable with previous reports for within-subject (914%) and inter-subject (1420%) measures. Using the acquisition parameters and TE range described, glutamine quantification is possible in approximately 10 min.”

According to the news reporters, the research concluded: “The post-processing methods described can also be applied retrospectively to extract glutamine and glutamate levels from previously acquired TE-averaged <sup>1</sup>H MRS datasets.”

For more information on this research see: Phase-adjusted echo time (PATE)-averaging H-1 MRS: application for improved glutamine quantification at 2.89 T. *NMR in Biomedicine*, 2012;25(11):1245-1252. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, 111

River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; NMR in Biomedicine - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news journalists report that additional information may be obtained by contacting A.P. Prescott, VISN 19 MIRECC, Salt Lake City, UT, United States. (2012 Dec 04)

### **Tata Memorial Hospital, Maharashtra: In vivo Raman spectroscopic identification of premalignant lesions in oral buccal mucosa**

By a News Reporter-Staff News Editor at Cancer Weekly – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Maharashtra, India, by NewsRx correspondents, research stated, “Cancers of oral cavities are one of the most common malignancies in India and other south-Asian countries. Tobacco habits are the main etiological factors for oral cancer.”

Our news editors obtained a quote from the research from Tata Memorial Hospital, “Identification of premalignant lesions is required for improving survival rates related to oral cancer. Optical spectroscopy methods are projected as alternative/adjunct for cancer diagnosis. Earlier studies have demonstrated the feasibility of classifying normal, premalignant, and malignant oral ex-vivo tissues. We intend to evaluate potentials of Raman spectroscopy in detecting premalignant conditions. Spectra were recorded from premalignant patches, contralateral normal (opposite to tumor site), and cancerous sites of subjects with oral cancers and also from age-matched healthy subjects with and without tobacco habits. A total of 861 spectra from 104 subjects were recorded using a fiber-optic probe-coupled HE-785 Raman spectrometer. Spectral differences in the 1200- to 1800-cm(-1) region were subjected to unsupervised principal component analysis and supervised linear discriminant analysis followed by validation with leave-one-out and an independent test data set. Results suggest that premalignant conditions can be objectively discriminated with both normal and cancerous sites as well as from healthy controls with and without tobacco habits.”

According to the news editors, the research concluded: “Findings of the study further support efficacy of Raman spectroscopic approaches in oral-cancer applications.”

For more information on this research see: In vivo Raman spectroscopic identification of premalignant lesions in oral buccal mucosa. *Journal of Biomedical Optics*, 2012;17(10):146-154. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting S.P. Singh, Tata Mem Hosp, Dept. of Surg Oncol, Bombay 400012, Maharashtra, India. (2012 Dec 04)

**University of Bern, Biel: Effects of enamel abrasion, salivary pellicle, and measurement angle on the optical assessment of dental erosion**

By a News Reporter-Staff News Editor at Life Science Weekly – A new study on Dentistry is now available. According to news reporting out of Biel, Switzerland, by NewsRx editors, research stated, “The present study assessed the effects of abrasion, salivary proteins, and measurement angle on the quantification of early dental erosion by the analysis of reflection intensities from enamel. Enamel from 184 caries-free human molars was used for in vitro erosion in citric acid (pH 3.6).”

Our news journalists obtained a quote from the research from the University of Bern, “Abrasion of the eroded enamel resulted in a 6% to 14% increase in the specular reflection intensity compared to only eroded enamel, and the reflection increase depended on the erosion degree. Nevertheless, monitoring of early erosion by reflection analysis was possible even in the abraded eroded teeth. The presence of the salivary pellicle induced up to 22% higher reflection intensities due to the smoothing of the eroded enamel by the adhered proteins. However, this measurement artifact could be significantly minimized ( $p < 0.05$ ) by removing the pellicle layer with 3% NaOCl solution. Change of the measurement angles from 45 to 60 deg did not improve the sensitivity of the analysis at late erosion stages.”

According to the news editors, the research concluded: “The applicability of the method for monitoring the remineralization of eroded enamel remained unclear in a demineralization/remineralization cycling model of early dental erosion in vitro. c 2012 Society of Photo-Optical Instrumentation Engineers (SPIE). [DOI:10.1117/1.JBO.17.9.097009].”

For more information on this research see: Effects of enamel abrasion, salivary pellicle, and measurement angle on the optical assessment of dental erosion. *Journal of Biomedical Optics*, 2012;17(9):291-303. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting A. Lussi, Bern Univ Appl Sci, Optolab, Inst Human Centered Engn, CH-2501 Biel, Switzerland. (2012 Dec 04)

**University of Connecticut, Farmington: Quantitative analysis of angle-resolved scattering properties of ovarian tissue using optical coherence tomography**

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on Optical Coherence Tomography have been presented. According to news reporting originating from Farmington, Connecticut, by NewsRx correspondents, research stated, “Angle-resolved optical scattering properties of ovarian tissue, on different optical coherence tomography (OCT) imaging planes, were quantitatively measured by fitting the compounded OCT A-lines into a single scattering model. Higher cross correlation value of angle-resolved scattering coefficients between different OCT imaging planes was found in normal ovaries than was present in malignant ovaries.”

Our news editors obtained a quote from the research from the University of Connecticut, “The mean cross correlation coefficient (MCC) was introduced in this pilot study to characterize and differentiate normal,  $n = 6$ , and malignant,  $n = 4$ , ovaries. A specificity of 100 percent and a sensitivity of 100 percent were achieved by setting MCC threshold at 0.6. Collagen properties, within the OCT imaging penetration depth, were also qualitatively studied in terms of their content, structure and directivity.”

According to the news editors, the research concluded: “The homogeneous three-dimensional collagen fiber network, observed in the normal ovary, effectively explains the stronger cross correlation of angle-resolved scattering properties on different imaging planes while the heterogeneity, observed in the malignant ovary, suggests a weaker correlation.”

For more information on this research see: Quantitative analysis of angle-resolved scattering properties of ovarian tissue using optical coherence tomography. *Journal of Biomedical Optics*, 2012;17(9):16-18. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting Y. Yang, University of Connecticut, Center Hlth, Div Gynecol Oncol, Farmington, CT 06030, United States. (2012 Dec 04)



## **University of Michigan, Ann Arbor: Cell-based and in vivo spectral analysis of fluorescent proteins for multiphoton microscopy**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Ann Arbor, Michigan, by NewsRx correspondents, research stated, “Multiphoton microscopy of cells and subcellular structures labeled with fluorescent proteins is the state-of-the-art technology for longitudinal imaging studies in tissues and living animals. Successful analysis of separate cell populations or signaling events by intravital microscopy requires optimal pairing of multiphoton excitation wavelengths with spectrally distinct fluorescent proteins.”

Our news editors obtained a quote from the research from the University of Michigan, “While prior studies have analyzed two photon absorption properties of isolated fluorescent proteins, there is limited information about two photon excitation and fluorescence emission profiles of fluorescent proteins expressed in living cells and intact tissues. Multiphoton microscopy was used to analyze fluorescence outputs of multiple blue, green, and red fluorescent proteins in cultured cells and orthotopic tumor xenografts of human breast cancer cells. It is shown that commonly used orange and red fluorescent proteins are excited efficiently by 750 to 760 nm laser light in living cells, enabling dual color imaging studies with blue or cyan proteins without changing excitation wavelength. It is also shown that small incremental changes in excitation wavelength significantly affect emission intensities from fluorescent proteins, which can be used to optimize multi-color imaging using a single laser wavelength.”

According to the news editors, the research concluded: “These data will direct optimal selection of fluorescent proteins for multispectral two photon microscopy.”

For more information on this research see: Cell-based and in vivo spectral analysis of fluorescent proteins for multiphoton microscopy. *Journal of Biomedical Optics*, 2012;17(9):53-61. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting E. Salomonsson, University of Michigan, Sch Med, Dept. of Microbiol & Immunol, Ann Arbor, MI 48109, United States. (2012 Dec 04)

## **Singapore National University: Optimization of flow-sensitive alternating inversion recovery (FAIR) for perfusion functional MRI of rodent brain**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators discuss new findings in Biomedical Engineering. According to news originating from Singapore, Singapore, by NewsRx correspondents, research stated, “Arterial spin labeling (ASL) MRI provides a noninvasive method to image perfusion, and has been applied to map neural activation in the brain. Although pulsed labeling methods have been widely used in humans, continuous ASL with a dedicated neck labeling coil is still the preferred method in rodent brain functional MRI (fMRI) to maximize the sensitivity and allow multislice acquisition.”

Our news journalists obtained a quote from the research from Singapore National University, “However, the additional hardware is not readily available and hence its application is limited. In this study, flow-sensitive alternating inversion recovery (FAIR) pulsed ASL was optimized for fMRI of rat brain. A practical challenge of FAIR is the suboptimal global inversion by the transmit coil of limited dimensions, which results in low effective labeling. By using a large volume transmit coil and proper positioning to optimize the body coverage, the perfusion signal was increased by 38.3% compared with positioning the brain at the isocenter. An additional 53.3% gain in signal was achieved using optimized repetition and inversion times compared with a long TR. Under electrical stimulation to the forepaws, a perfusion activation signal change of 63.7 +/- 6.3% can be reliably detected in the primary somatosensory cortices using single slice or multislice echo planar imaging at 9.4T.”

According to the news editors, the research concluded: “This demonstrates the potential of using pulsed ASL for multislice perfusion fMRI in functional and pharmacological applications in rat brain.”

For more information on this research see: Optimization of flow-sensitive alternating inversion recovery (FAIR) for perfusion functional MRI of rodent brain. *NMR in Biomedicine*, 2012;25(11):1209-1216. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-1492](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-1492))

The news correspondents report that additional information may be obtained from F.A. Nasrallah, Singapore National University, Yong Loo Lin Sch Med, Dept. of Physiol, Singapore 117595, Singapore. (2012 Dec 03)

**Tufts University, Medford: Low-frequency oscillations measured in the periphery with near-infrared spectroscopy are strongly correlated with blood oxygen level-dependent functional magnetic resonance imaging signals**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators discuss new findings in Chalcogens. According to news reporting originating in Medford, Massachusetts, by NewsRx journalists, research stated, “Low-frequency oscillations (LFOs) in the range of 0.01-0.15 Hz are commonly observed in functional imaging studies, such as blood oxygen level-dependent functional magnetic resonance imaging (BOLD fMRI) and functional near-infrared spectroscopy (fNIRS). Some of these LFOs are nonneuronal and are closely related to autonomic physiological processes.”

The news reporters obtained a quote from the research from Tufts University, “In the current study, we conducted a concurrent resting-state fMRI and NIRS experiment with healthy volunteers. LFO data was collected simultaneously at peripheral sites (middle fingertip and big toes) by NIRS, and centrally in the brain by BOLD fMRI. The cross-correlations of the LFOs collected from the finger, toes, and brain were calculated. Our data show that the LFOs measured in the periphery (NIRS signals) and in the brain (BOLD fMRI) were strongly correlated with varying time delays. This demonstrates that some portion of the LFOs actually reflect systemic physiological circulatory effects.”

According to the news reporters, the research concluded: “Furthermore, we demonstrated that NIRS is effective for measuring the peripheral LFOs, and that these LFOs and the temporal shifts between them are consistent in healthy participants and may serve as useful biomarkers for detecting and monitoring circulatory dysfunction.”

For more information on this research see: Low-frequency oscillations measured in the periphery with near-infrared spectroscopy are strongly correlated with blood oxygen level-dependent functional magnetic resonance imaging signals. *Journal of Biomedical Optics*, 2012;17(10):229-238. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting Y.J. Tong, Tufts University, Dept. of Biomed Engn, Medford, MA 02155, United States. (2012 Dec 03)

## **University of Manchester: Group-averaged anatomical connectivity mapping for improved human white matter pathway visualisation**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Data detailed on Biomedical Engineering have been presented. According to news reporting out of Manchester, United Kingdom, by NewsRx editors, research stated, “Anatomical connectivity mapping (ACM) is a measure of anatomical connectivity obtained by initiating streamline diffusion tractography from all parenchymal voxels and then counting the number of streamlines passing through each voxel of the brain. ACM highlights WM structures that present multiple connections to the rest of the brain but not necessarily strong microstructural orientation coherence.”

Our news journalists obtained a quote from the research from the University of Manchester, “In this study, ACM was used to develop an atlas of the human brain. The ACM template was constructed from 3?T diffusion-weighted data from 19 healthy adults. To account for multiple diffusion directions in a voxel, a high angular resolution diffusion imaging (HARDI) technique, namely Q-ball, was used to model diffusion. To bring data from different subjects into a common space, an algorithm for rotating and averaging the principal directions was implemented, which can be generalized to any application requiring algebraic operations on principal directions derived from any HARDI method. ACM from the average dataset was computed and several white matter connections of interest were identified and highlighted. Fractional anisotropy (FA) from standard diffusion tensor modelling was also derived and FA-modulated colour coded images obtained from the mean tensor were also shown for comparison, highlighting differences and similarities.”

According to the news editors, the research concluded: “The ACM template can serve for educational purposes and as future reference for studies based on the evaluation of ACM in subjects affected by neurological and psychiatric disorders.”

For more information on this research see: Group-averaged anatomical connectivity mapping for improved human white matter pathway visualisation. *NMR in Biomedicine*, 2012;25(11):1224-1233. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news journalists report that additional information may be obtained by contacting M. Cercignani, University of Manchester, Manchester Academy Hlth Sci Center, Manchester M13 9PL, Lancs, United Kingdom. (2012 Dec 03)

## University of Texas Southwestern, Dallas: Metabolism of [U-13C]glucose in human brain tumors in vivo

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators publish new report on Brain Cancer. According to news reporting originating from Dallas, Texas, by NewsRx correspondents, research stated, “Glioblastomas and brain metastases demonstrate avid uptake of 2-[18F]fluoro-2-deoxyglucose by positron emission tomography and display perturbations of intracellular metabolite pools by 1H MRS. These observations suggest that metabolic reprogramming contributes to brain tumor growth in vivo.”

Our news editors obtained a quote from the research from the University of Texas Southwestern, “The Warburg effect, excess metabolism of glucose to lactate in the presence of oxygen, is a hallmark of cancer cells in culture. 2-[18F]Fluoro-2-deoxyglucose-positive tumors are assumed to metabolize glucose in a similar manner, with high rates of lactate formation relative to mitochondrial glucose oxidation, but few studies have specifically examined the metabolic fates of glucose in vivo. In particular, the capacity of human brain cancers to oxidize glucose in the tricarboxylic acid cycle is unknown. Here, we studied the metabolism of human brain tumors in situ. [U-13<sup>2</sup>C]Glucose (uniformly labeled glucose, i.e. d-glucose labeled with 13<sup>2</sup>C in all six carbons) was infused during surgical resection, and tumor samples were subsequently subjected to 13C NMR spectroscopy. The analysis of tumor metabolites revealed lactate production, as expected. We also determined that pyruvate dehydrogenase, turnover of the tricarboxylic acid cycle, anaplerosis and de novo glutamine and glycine synthesis contributed significantly to the ultimate disposition of glucose carbon. Surprisingly, less than 50% of the acetyl-coenzyme A pool was derived from blood-borne glucose, suggesting that additional substrates contribute to tumor bioenergetics.”

According to the news editors, the research concluded: “This study illustrates a convenient approach that capitalizes on the high information content of 13C NMR spectroscopy and enables the analysis of intermediary metabolism in diverse cancers growing in their native microenvironment.”

For more information on this research see: Metabolism of [U-13C]glucose in human brain tumors in vivo. *NMR in Biomedicine*, 2012;25(11):1234-1244. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-1492)

The news editors report that additional information may be obtained by contacting E.A. Maher, Univ Texas SW Med Center Dallas, McDermott Center Human Growth & Dev, Dallas, TX 75390, United States. (2012 Dec 03)

## **Research Institute, Nizhny Novgorod: Criteria for pathology recognition in optical coherence tomography of fallopian tubes**

By a News Reporter-Staff News Editor at Health & Medicine Week – A new study on Optical Coherence Tomography is now available. According to news reporting from Nizhny Novgorod, Russia, by NewsRx journalists, research stated, “An increase of infertility and chronic pelvic pains syndrome, a growing level of latent diseases of this group, as well as a stably high percentage (up to 25% for infertility and up to 60% for the chronic pelvic pains syndrome) of undetermined origin raises the requirement for novel introspective diagnostic techniques. We demonstrate abilities of optical coherence tomography (OCT) as a complementary technique to laparoscopy in diagnostics of fallopian tubes pathologies.”

The news correspondents obtained a quote from the research from Research Institute, “We have acquired OCT images of different parts of fallopian tubes in norm and with morphologically proven pathology. Based on comparative analysis of the OCT data and the results of histological studies, we have worked out the subjective OCT criteria for distinguishing between unaltered and pathologic tissues. The developed criteria are verified in blind recognition tests. Diagnostic efficacy of OCT diagnostics in the case of pelvic inflammatory diseases has been statistically evaluated, and high diagnostic accuracy (88%) is shown. Basing of the subjective criteria, an attempt to develop independent criteria aimed for automated recognition of pathological states in fallopian tubes is undertaken.”

According to the news reporters, the research concluded: “Enhanced diagnostic accuracy (96%) of the developed independent criteria is demonstrated.”

For more information on this research see: Criteria for pathology recognition in optical coherence tomography of fallopian tubes. *Journal of Biomedical Optics*, 2012;17(8):129-133. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting M. Kirillin, Res Inst Traumatol & Orthoped, Nizhny Novgorod, Russia. (2012 Nov 30)

## **BC Cancer Agency, Vancouver: High throughput image cytometry for detection of suspicious lesions in the oral cavity**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news originating from Vancouver, Canada, by NewsRx correspondents, research stated, “The successful management of oral cancer depends upon early detection, which relies heavily on the clinician’s ability to discriminate sometimes subtle alterations of the infrequent premalignant lesions from the more common reactive and inflammatory conditions in the oral mucosa. Even among experienced oral specialists this can be challenging, particularly when using new wide field-of-view direct fluorescence visualization devices clinically introduced for the recognition of at-risk tissue.”

Our news journalists obtained a quote from the research from BC Cancer Agency, “The objective of this study is to examine if quantitative cytometric analysis of oral brushing samples could facilitate the assessment of the risk of visually ambiguous lesions. About 369 cytological samples were collected and analyzed: (1) 148 samples from pathology-proven sites of SCC, carcinoma in situ or severe dysplasia; (2) 77 samples from sites with inflammation, infection, or trauma, and (3) 144 samples from normal sites. These were randomly separated into training and test sets. The best algorithm correctly recognized 92.5% of the normal samples, 89.4% of the abnormal samples, 86.2% of the confounders in the training set as well as 100% of the normal samples, and 94.4% of the abnormal samples in the test set.”

According to the news editors, the research concluded: “These data suggest that quantitative cytology could reduce by more than 85% the number of visually suspect lesions requiring further assessment by biopsy.”

For more information on this research see: High throughput image cytometry for detection of suspicious lesions in the oral cavity. *Journal of Biomedical Optics*, 2012;17(8):244-254. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from C. MacAulay, BC Canc Agcy, Canc Control Res, Vancouver, BC V5Z 1L3, Canada. (2012 Nov 28)

**Boston University: Wavelength-dependent backscattering measurements for quantitative monitoring of apoptosis, part 2: early spectral changes during apoptosis are linked to apoptotic volume decrease**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Optics are presented in a new report. According to news reporting originating in Boston, Massachusetts, by NewsRx journalists, research stated, “Elastic scattering spectroscopy (ESS), in the form of wavelength-dependent backscattering measurements, can be used to monitor apoptosis in cell cultures. Early changes in backscattering upon apoptosis induction are characterized by an overall decrease in spectral slope and begin as early as 10 to 15 min post-treatment, progressing over the next 6 to 8 h.”

The news reporters obtained a quote from the research from Boston University, “The timescale of early scattering changes is consistent with reports of the onset of apoptotic volume decrease (AVD). Modeling cellular scattering with a fixed distribution of sizes and a decreasing index ratio, as well as an increased contribution of the whole cell to cellular scattering, resulting from increased cytoplasmic density, is also consistent with observed spectral changes. Changes in ESS signal from cells undergoing osmotically-induced volume decrease in the absence of apoptosis were similar, but smaller in magnitude, to those of apoptotic cells. Further, blockage of Cl(-) channels, which blocks AVD and delays apoptosis, blocked the early scattering changes, indicating that the early scattering changes during apoptosis result, at least partially, from AVD.”

According to the news reporters, the research concluded: “Work continues to identify the additional sources of early spectral scattering changes that result from apoptosis induction.”

For more information on this research see: Wavelength-dependent backscattering measurements for quantitative monitoring of apoptosis, part 2: early spectral changes during apoptosis are linked to apoptotic volume decrease. *Journal of Biomedical Optics*, 2011;16(11):117002.

Our news correspondents report that additional information may be obtained by contacting C.S. Mulvey, Boston University, Dept. of Biomedical Engineering, Boston, Massachusetts 02215, United States. (2012 Nov 28)



**Concordia University, Montreal: Innovative optical microsystem for static and dynamic tissue diagnosis in minimally invasive surgical operations**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Montreal, Canada, by NewsRx correspondents, research stated, “During conventional surgical tasks, surgeons use their tactile perception in their finger tips to sense the degree of softness of biological tissues to identify tissue types and to feel for any abnormalities. However, in robotic-assisted surgical systems, surgeons are unable to sense this information because only surgical tools interact with tissues.”

Our news editors obtained a quote from the research from Concordia University, “In order to provide surgeons with such useful tactile perception, therefore, a tactile sensor is required that is capable of simultaneously measuring contact force and resulting tissue deformation. Accordingly, this paper discusses the design, prototyping, testing, and validation of an innovative tactile sensor that is capable of measuring the degree of softness of soft objects such as tissues under both static and dynamic loading conditions and which is also magnetic resonance compatible and electrically passive. These unique characteristics of the proposed sensor would also make it a practical choice for use in robotic-assisted surgical platforms.”

According to the news editors, the research concluded: “The prototype version of this sensor was developed by using optical micro-systems technology and, thus far, experimental test results performed on the prototyped sensor have validated its ability to measure the relative softness of artificial tissues.”

For more information on this research see: Innovative optical microsystem for static and dynamic tissue diagnosis in minimally invasive surgical operations. *Journal of Biomedical Optics*, 2012;17(8):150-157. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting R. Ahmadi, Concordia University, Dept. of Mech & Ind Engr, Tactile Sensing & Med Robot Lab, Opt Bio Microsyst Lab, Montreal, PQ H3G 2W1, Canada. (2012 Nov 28)

### **Dermatology Service, New York City: Optimal detection pinhole for lowering speckle noise while maintaining adequate optical sectioning in confocal reflectance microscopes**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from New York City, New York, by NewsRx correspondents, research stated, “Coherent speckle influences the resulting image when narrow spectral line-width and single spatial mode illumination are used, though these are the same light-source properties that provide the best radiance-to-cost ratio.”

Our news editors obtained a quote from the research from Dermatology Service, “However, a suitable size of the detection pinhole can be chosen to maintain adequate optical sectioning while making the probability density of the speckle noise more normal and reducing its effect. The result is a qualitatively better image with improved contrast, which is easier to read.”

According to the news editors, the research concluded: “With theoretical statistics and experimental results, we show that the detection pinhole size is a fundamental parameter for designing imaging systems for use in turbid media.”

For more information on this research see: Optimal detection pinhole for lowering speckle noise while maintaining adequate optical sectioning in confocal reflectance microscopes. *Journal of Biomedical Optics*, 2012;17(8):196-200. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting C. Glazowski, Mem Sloan Kettering, Dermatol Serv, New York, NY 10022, United States. (2012 Nov 28)

### **Harvard University School of Medicine, Boston: Injury depth control from combined wavelength and power tuning in scanned beam laser thermal therapy**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news originating from Boston, Massachusetts, by NewsRx correspondents, research stated, “Laser thermal therapy represents a possible method to treat premalignant epithelial lesions of the esophagus. Dynamically conforming the thermal injury profile to a specific lesion boundary is expected to improve the efficacy of such a treatment and avoid complications.”

Our news journalists obtained a quote from the research from the Harvard University School of Medicine, “In this work, we investigated wavelength tuning as a mechanism to achieve this aimed control over injury depth by using the strong variation of water absorption close to 1900 nm. We developed a numerical model simulating in steps the photon propagation in the tissue, the diffusion of the absorbed heat, and the resulting tissue damage. The model was compared with experimental results on porcine esophageal specimens *ex vivo* and showed good agreement. Combined with power tuning, the wavelength agility in the range of 1860 to 1895 nm extends the injury range compared to a fixed wavelength source beyond 1 mm, while at the same time improving control over shallow depths and avoiding vaporization at the tissue surface.”

According to the news editors, the research concluded: “The combination of two or three discrete wavelengths combined at variable ratios provides similar control, and may provide an improved strategy for the treatment of endothelial lesions.”

For more information on this research see: Injury depth control from combined wavelength and power tuning in scanned beam laser thermal therapy. *Journal of Biomedical Optics*, 2011;16(11):118001.

The news correspondents report that additional information may be obtained from M. Villiger, Harvard Medical School and Massachusetts General Hospital, Wellman Center for Photomedicine, Boston, Massachusetts 02114, United States. (2012 Nov 28)

### **Hebrew University, Rehovot: Surface plasmon-based infrared spectroscopy for cell biosensing**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Rehovot, Israel, by NewsRx journalists, research stated, “Cell morphology is often used as a valuable indicator of the physical condition and general status of living cells. We demonstrate a noninvasive method for morphological characterization of adherent cells.”

The news correspondents obtained a quote from the research from Hebrew University, “We measure infrared reflectivity spectrum at oblique angle from living cells cultured on thin Au film, and utilize the unique properties of the confined infrared waves (i.e., surface plasmon and guided modes) traveling inside the cell layer. The propagation of these waves strongly depends on cell morphology and connectivity. By tracking the resonant wavelength and attenuation of the surface plasmon and guided modes we measure the kinetics of various cellular processes such as (i) cell attachment and spreading on different substrata, (ii) modulation of the outer cell membrane with chlorpromazine, and

(iii) formation of intercellular junctions associated with progressive cell polarization.”

According to the news reporters, the research concluded: “Our method enables monitoring of submicron variations in cell layer morphology in real-time, and in the label-free manner.”

For more information on this research see: Surface plasmon-based infrared spectroscopy for cell biosensing. *Journal of Biomedical Optics*, 2012;17(8):104-111. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting V. Yashunsky, Hebrew University of Jerusalem, Inst Biochem Food Sci & Nutr, Sch Nutr Sci, Robert H Smith Fac Agr Food & Environm, IL-76100 Rehovot, Israel. (2012 Nov 28)

### **Indian Institute of Science, Bangalore: Effective contrast recovery in rapid dynamic near-infrared diffuse optical tomography using $l(1)$ -norm-based linear image reconstruction method**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating from Bangalore, India, by NewsRx correspondents, research stated, “Traditional image reconstruction methods in rapid dynamic diffuse optical tomography employ  $l(2)$ -norm-based regularization, which is known to remove the high-frequency components in the reconstructed images and make them appear smooth. The contrast recovery in these type of methods is typically dependent on the iterative nature of method employed, where the nonlinear iterative technique is known to perform better in comparison to linear techniques (noniterative) with a caveat that nonlinear techniques are computationally complex.”

Our news editors obtained a quote from the research from the Indian Institute of Science, “Assuming that there is a linear dependency of solution between successive frames resulted in a linear inverse problem. This new framework with the combination of  $l(1)$ -norm based regularization can provide better robustness to noise and provide better contrast recovery compared to conventional  $l(2)$ -based techniques. Moreover, it is shown that the proposed  $l(1)$ -based technique is computationally efficient compared to its counterpart ( $l(2)$ -based one).”

According to the news editors, the research concluded: “The proposed framework requires a reasonably close estimate of the actual solution for the initial frame, and any suboptimal estimate leads to erroneous reconstruction results for the subsequent frames.”

For more information on this research see: Effective contrast recovery in rapid dynamic near-infrared diffuse optical tomography using l(1)-norm-based linear image reconstruction method. *Journal of Biomedical Optics*, 2012;17(8):289-298. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting C.B. Shaw, Indian Inst Sci, Supercomp Educ & Res Center, Bangalore 560012, Karnataka, India. (2012 Nov 28)

### **National Taiwan University Hospital and School of Medicine, Taipei: Effects of types and length of soft-segments on the physical properties and blood compatibility of polyurethanes**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Taipei, Taiwan, by NewsRx correspondents, research stated, “Segmented polyurethane (SPU) materials based on different soft-segment component (PPG, PTMO and PBA) and various length of soft-segment (molecular weight of PBA: 500, 700 and 1000) were synthesized in this research. The soft-segment components were synthesized from polyether-polyols (PPG and PTMO) or from polyester-polyol (PBA).”

Our news editors obtained a quote from the research from the National Taiwan University Hospital and School of Medicine, “The physical properties and structure characterization of the synthesized SPUs were fully investigated using differential scanning calorimetry (DSC) analysis, and stress-strain measurements. Blood compatibility was evaluated with the platelet adhesion ratio (PAR) and the morphological observation for adhering platelets. Our results showed that the physical properties and blood compatibility of SPUs were closely related to its composition, which was controlled by (1) the types of the soft-segment component employed and (2) the length of soft segments. Polyether-polyol-based SPUs exhibited greater phase separations, poorer tensile strengths, and better blood compatibility, compared with polyester-polyol-based SPUs.”

According to the news editors, the research concluded: “SPUs with shorter soft-segment component exhibited greater phase mixing, higher tensile strength, but lower blood compatibility of SPUs, as compared with its counterparts with longer soft-segment component.”

For more information on this research see: Effects of types and length of soft-segments on the physical properties and blood compatibility of polyurethanes. *Bio-medical Materials and Engineering*, 2012;22(6):373-82.

The news editors report that additional information may be obtained by contacting C.H. Chang, Dept. of Orthopedics, National Taiwan University Hospital and National Taiwan University College of Medicine, Taipei, Taiwan. (2012 Nov 28)

### **Palacky University, Olomouc: Ultraweak photon emission induced by visible light and ultraviolet A radiation via photoactivated skin chromophores: in vivo charge coupled device imaging**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Olomouc, Czech Republic, by NewsRx correspondents, research stated, “Solar radiation that reaches Earth’s surface can have severe negative consequences for organisms. Both visible light and ultraviolet A (UVA) radiation are known to initiate the formation of reactive oxygen species (ROS) in human skin by photosensitization reactions (types I and II).”

Our news editors obtained a quote from the research from Palacky University, “In the present study, we investigated the role of visible light and UVA radiation in the generation of ROS on the dorsal and the palmar side of a hand. The ROS are known to oxidize biomolecules such as lipids, proteins, and nucleic acids to form electronically excited species, finally leading to ultraweak photon emission. We have employed a highly sensitive charge coupled device camera and a low-noise photomultiplier tube for detection of two-dimensional and one-dimensional ultraweak photon emission, respectively. Our experimental results show that oxidative stress is generated by the exposure of human skin to visible light and UVA radiation. The oxidative stress generated by UVA radiation is claimed to be significantly higher than that by visible light.”

According to the news editors, the research concluded: “Two-dimensional photon imaging can serve as a potential tool for monitoring the oxidative stress in the human skin induced by various stress factors irrespective of its physical or chemical nature.”

For more information on this research see: Ultraweak photon emission induced by visible light and ultraviolet A radiation via photoactivated skin chromophores: in vivo charge coupled device imaging. *Journal of Biomedical Optics*, 2012;17(8):217-224. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting A. Prasad, Palacky Univ, Fac Sci, Dept. of Biophys, Center Reg Hana Biotechnol & Agr Res, Olomouc 78371, Czech Republic. (2012 Nov 28)

### **Purdue University, West Lafayette: Integrated LTCC packaging for use in biomedical devices**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of West Lafayette, Indiana, by NewsRx editors, research stated, “As implantable devices gain more widespread use, medical device manufacturers are constantly looking for novel materials that increase and improve capability and functionality. The packaging needs to be biocompatible, but it is also highly desirable for it to be radio transparent to facilitate wireless telemetry and remote powering.”

Our news journalists obtained a quote from the research from Purdue University, “Low temperature co-fired ceramics (LTCC) provide a viable solution that meets these desired specifications while also having characteristics that support ease of manufacturing such as the ability for molding, shaping, and even embedding components within the material. In this work, inductor coils used for wireless telemetry and powering are integrated into the walls of the LTCC-based package to maximize the size of the passive component while optimizing the miniaturization of the implant. The package designed and fabricated in this work consisted of inductors approximating 20 mH with a quality factor of 7.8 at 2 MHz.”

According to the news editors, the research concluded: “When compared to similar devices in the literature the LTCC inductor out performed these devices when a power-link figure of merit is used for comparison.”

For more information on this research see: Integrated LTCC packaging for use in biomedical devices. *Bio-medical Materials and Engineering*, 2012;22(6):361-72.

Our news journalists report that additional information may be obtained by contacting A.L. Chlebowski, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, IN, United States. (2012 Nov 28)

### **Rice University, Houston: Snapshot spectrally encoded fluorescence imaging through a fiber bundle**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting from Houston, Texas, by NewsRx journalists, research stated, “Fiber optic endomicroscopy is a valuable tool for clinical diagnostics and animal studies because it can capture images of tissue in vivo with subcellular resolution.”

The news correspondents obtained a quote from the research from Rice University, “Current configurations for endomicroscopes have either limited spatial resolution or require a scanning mechanism at the distal end of the fiber, which can slow imaging speed and increase the probe size. We present a novel configuration that provides high contrast 350 x 350 pixel images at 7.2 frames per second, without the need for mechanical scanning at the proximal or distal end of the fiber.”

According to the news reporters, the research concluded: “The proof-of-concept benchtop system is tested in fluorescence mode and can resolve 1.5  $\mu\text{m}$  features of a high resolution 1951 USAF target.”

For more information on this research see: Snapshot spectrally encoded fluorescence imaging through a fiber bundle. *Journal of Biomedical Optics*, 2012;17(8):29-31. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting N. Bedard, Rice University, Dept. of Bioengn, Houston, TX 77005, United States. (2012 Nov 28)

### **Singapore National University: Detection of meibomian glands and classification of meibography images**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting out of Singapore, Singapore, by NewsRx editors, research stated, “Computational methods are presented that can automatically detect the length and width of meibomian glands imaged by infrared meibography without requiring any input from the user. The images are then automatically classified.”

Our news journalists obtained a quote from the research from Singapore National University, “The length of the glands are detected by first normalizing the pixel intensity, extracting stationary points, and then applying morphological operations. Gland widths are detected using scale invariant feature transform and analyzed using Shannon entropy. Features based on the gland lengths and widths are then used to train a linear classifier to accurately differentiate between healthy (specificity 96.1%) and unhealthy (sensitivity 97.9%) meibography images.”

According to the news editors, the research concluded: “The user-free computational method is fast, does not suffer from inter-observer variability, and can be useful in clinical studies where large number of images needs to be analyzed efficiently.”

For more information on this research see: Detection of meibomian glands and classification of meibography images. *Journal of Biomedical Optics*, 2012;17(8):282-288. *Journal of Biomedical Optics* can be



contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting Y.W. Koh, Singapore National University, Yong Loo Lin Sch Med, Singapore 119228, Singapore. (2012 Nov 28)

**Texas A&M University, College Station: Wide-field fast-scanning photoacoustic microscopy based on a water-immersible MEMS scanning mirror**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from College Station, Texas, by NewsRx journalists, research stated, “By offering images with high spatial resolution and unique optical absorption contrast, optical-resolution photoacoustic microscopy (OR-PAM) has gained increasing attention in biomedical research. Recent developments in OR-PAM have improved its imaging speed, but have to sacrifice either the detection sensitivity or field of view or both.”

The news correspondents obtained a quote from the research from Texas A&M University, “We have developed a wide-field fast-scanning OR-PAM by using a water-immersible microelectromechanical systems (MEMS) scanning mirror (MEMS-OR-PAM). In MEMS-OR-PAM, the optical and acoustic beams are confocally configured and simultaneously steered, which ensures the uniform detection sensitivity. A B-scan imaging speed as high as 400 Hz can be achieved over a 3 mm scanning range. Using the system, we imaged the flow dynamics of both red blood cells and carbon particles in a mouse ear in vivo.”

According to the news reporters, the research concluded: “Presented results show that MEMS-OR-PAM could be a powerful tool for studying highly dynamic and time-sensitive biological phenomena.”

For more information on this research see: Wide-field fast-scanning photoacoustic microscopy based on a water-immersible MEMS scanning mirror. *Journal of Biomedical Optics*, 2012;17(8):20-22. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting J.J. Yao, Texas A&M University, Dept. of Elect & Comp Engn, College Stn, TX 77843, United States. (2012 Nov 28)

## **Tokyo Medical and Dental University: Effect of sandblasting on the mechanical properties of Y-TZP zirconia**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Tokyo, Japan, by NewsRx journalists, research stated, “Surface modification techniques affect phase transformation which in turn influences strength of zirconia biomaterial. The study aimed at evaluating the tetragonal to monoclinic (t-m) phase transition of zirconia occurring after sandblasting three different ceramic abrasive materials and its subsequent effect on the strength.”

The news correspondents obtained a quote from the research from Tokyo Medical and Dental University, “Zirconia bars (n=24) were sandblasted using silicon carbide (SiC), alumina (Al<sub>2</sub>O<sub>3</sub>) and zirconia (ZrO<sub>2</sub>) particles. After surface characterization by a scanning electron microscope (SEM) and a laser profilometer, the relative amount of transformed monoclinic (m) phase was analyzed by X-ray diffractometry (XRD) and its corresponding effect on the flexural strength and fatigue strength were determined. Data were analyzed using one-way analysis of variance ANOVA ( $p < 0.05$ ). Furthermore, Weibull statistics was used to analyze the variability of flexural strength. The highest amount of monoclinic content was found after sandblasting with SiC consequently resulting in an increased flexural strength and fracture resistance under cyclic load conditions. Weibull modulus was reduced in all the groups with SiC blasting showing the least degradation of m values.”

According to the news reporters, the research concluded: “The strengthening mechanism that is attributed to sandblasting procedure is influenced by the abrasive material used.”

For more information on this research see: Effect of sandblasting on the mechanical properties of Y-TZP zirconia. *Bio-medical Materials and Engineering*, 2012;22(6):383-98.

Our news journalists report that additional information may be obtained by contacting S. Bhargava, Oral Implantology and Regenerative Dental Medicine, Tokyo Medical and Dental University, Tokyo, Japan Global Center of Excellence Program, Tokyo Medical and Dental University, Tokyo, Japan. (2012 Nov 28)

## **University Medical Center, Utrecht: Mono- and multimodal registration of optical breast images**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating in Utrecht, Netherlands, by NewsRx journalists, research stated, “Optical breast imaging offers the possibility of noninvasive, low cost, and high sensitivity imaging of breast cancers. Poor spatial resolution and a lack of anatomical landmarks in optical images of the breast make interpretation difficult and motivate registration and fusion of these data with subsequent optical images and other breast imaging modalities.”

The news reporters obtained a quote from the research from University Medical Center, “Methods used for registration and fusion of optical breast images are reviewed. Imaging concerns relevant to the registration problem are first highlighted, followed by a focus on both monomodal and multimodal registration of optical breast imaging. Where relevant, methods pertaining to other imaging modalities or imaged anatomies are presented.”

According to the news reporters, the research concluded: “The multimodal registration discussion concerns digital x-ray mammography, ultrasound, magnetic resonance imaging, and positron emission tomography.”

For more information on this research see: Mono- and multimodal registration of optical breast images. *Journal of Biomedical Optics*, 2012;17(8):39-48. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting P.C. Pearlman, Univ Med Center Utrecht, Julius Center Hlth Sci & Primary Care, NL-3508 GA Utrecht, Netherlands. (2012 Nov 28)

## **University of Alberta, Edmonton: Mosaic acquisition and processing for optical-resolution photoacoustic microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Edmonton, Canada, by NewsRx journalists, research stated, “In optical-resolution photo-acoustic microscopy (OR-PAM), data acquisition time is limited by both laser pulse repetition rate (PRR) and scanning speed. Optical-scanning offers high speed, but limited, field of view determined by ultrasound transducer sensitivity.”

The news reporters obtained a quote from the research from the University of Alberta, “In this paper, we propose a hybrid optical and

mechanical-scanning OR-PAM system with mosaic data acquisition and processing. The system employs fast-scanning mirrors and a diode-pumped, nanosecond-pulsed, Ytterbium-doped, 532-nm fiber laser with PRR up to 600 kHz. Data from a sequence of image mosaic patches is acquired systematically, at predetermined mechanical scanning locations, with optical scanning. After all imaging locations are covered, a large panoramic scene is generated by stitching the mosaic patches together.”

According to the news reporters, the research concluded: “Our proposed system is proven to be at least 20 times faster than previous reported OR-PAM systems.”

For more information on this research see: Mosaic acquisition and processing for optical-resolution photoacoustic microscopy. *Journal of Biomedical Optics*, 2012;17(8):14-16. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting P. Shao, University of Alberta, Dept. of Elect & Comp Engn, Edmonton, AB T6G 2V4, Canada. (2012 Nov 28)

### **University of California, Irvine: Evaluation of human sclera after femtosecond laser ablation using two photon and confocal microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Irvine, California, by NewsRx correspondents, research stated, “Glaucoma is the second-leading cause of blindness worldwide and is often associated with elevated intraocular pressure (IOP). Partial thickness intrascleral channels can be created with a femtosecond laser operating at a wavelength of 1700 nm.”

Our news journalists obtained a quote from the research from the University of California, “Such channels have the potential to increase outflow facility and reduce elevated IOP. Analysis of the dimensions and location of these channels is important in understanding their effects. We describe the application of two-photon microscopy and confocal microscopy for noninvasive imaging of the femtosecond laser created partial-thickness scleral channels in human cadaver eyes. High-resolution images, hundreds of microns deep in the sclera, were obtained to allow determination of the shape and dimension of such channels.”

According to the news editors, the research concluded: “This demonstrates that concept of integrating femtosecond laser surgery, and two-photon and confocal imaging has the future potential for image-guided high-precision surgery in transparent and translucent tissue.”

For more information on this research see: Evaluation of human sclera after femtosecond laser ablation using two photon and confocal microscopy. *Journal of Biomedical Optics*, 2012;17(8):116-120. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from H. Sun, University of California, Dept. of Biomed Engrn, Irvine, CA 92697, United States. (2012 Nov 28)

### **University of California, Irvine: Theory and practical recommendations for autocorrelation-based image correlation spectroscopy**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Irvine, California, by NewsRx journalists, research stated, “Image correlation spectroscopy (ICS) is a powerful technique for detecting arrangement of fluorophores in images.”

The news reporters obtained a quote from the research from the University of California, “This tutorial gives background into the mathematical underpinnings of ICS, specifically image autocorrelation. The effects of various artifacts and image processing steps, including background subtraction, noise, and image morphology were examined analytically and their effects on ICS analysis modeled.”

According to the news reporters, the research concluded: “A series of recommendations was built based on this analysis.”

For more information on this research see: Theory and practical recommendations for autocorrelation-based image correlation spectroscopy. *Journal of Biomedical Optics*, 2012;17(8):32-38. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting C. Robertson, University of California, Dept. of Med, Irvine, CA 92697, United States. (2012 Nov 28)

## **University of Cincinnati: Dual-channel in-situ optical imaging system for quantifying lipid uptake and lymphatic pump function**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Cincinnati, Ohio, by NewsRx journalists, research stated, “Nearly all dietary lipids are transported from the intestine to venous circulation through the lymphatic system, yet the mechanisms that regulate this process remain unclear. Elucidating the mechanisms involved in the functional response of lymphatics to changes in lipid load would provide valuable insight into recent implications of lymphatic dysfunction in lipid related diseases.”

The news reporters obtained a quote from the research from the University of Cincinnati, “Therefore, we sought to develop an in situ imaging system to quantify and correlate lymphatic function as it relates to lipid transport. The imaging platform provides the capability of dual-channel imaging of both high-speed bright-field video and fluorescence simultaneously. Utilizing post-acquisition image processing algorithms, we can quantify correlations between vessel pump function, lymph flow, and lipid concentration of mesenteric lymphatic vessels in situ. All image analysis is automated with customized LabVIEW virtual instruments; local flow is measured through lymphocyte velocity tracking, vessel contraction through measurements of the vessel wall displacement, and lipid uptake through fluorescence intensity tracking of an orally administered fluorescently labelled fatty acid analogue, BODIPY FL C-16.”

According to the news reporters, the research concluded: “This system will prove to be an invaluable tool for scientists studying intestinal lymphatic function in health and disease, and those investigating strategies for targeting the lymphatics with orally delivered drugs to avoid first pass metabolism.”

For more information on this research see: Dual-channel in-situ optical imaging system for quantifying lipid uptake and lymphatic pump function. *Journal of Biomedical Optics*, 2012;17(8):255-267. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting T. Kassis, University of Cincinnati, Dept. of Pathol & Lab Med, Cincinnati, OH, United States. (2012 Nov 28)

## **University of Heidelberg: Birefringence of the central cornea in children assessed with scanning laser polarimetry**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Heidelberg, Germany, by NewsRx correspondents, research stated, “Corneal birefringence is a well-known confounding factor with all polarization-sensitive technology used for retinal scanning and other intraocular assessment. It has been studied extensively in adults, but little is known regarding age-related differences.”

Our news journalists obtained a quote from the research from the University of Heidelberg, “Specifically, no information is available concerning corneal birefringence in children. For applications that are geared towards children, such as retinal birefringence scanning for strabismus screening purposes, it is important to know the expected range of both corneal retardance and azimuth in pediatric populations. This study investigated central corneal birefringence in children (ages three and above), by means of scanning laser polarimetry (GDx-VCC &#8482; Carl Zeiss Meditec, Inc.). Children’s measures of corneal retardance and azimuth were compared with those obtained in adults. As with previous studies in adults, corneal birefringence was found to vary widely in children, with corneal retardance ranging from 10 to 77 nm, and azimuth (slow axis) ranging from -11 degrees to 71 degrees (measured nasally downward). No significant differences in central corneal birefringence were found between children and adults, nor were significant age-related differences found in general.”

According to the news editors, the research concluded: “Establishing knowledge of the polarization properties of the central cornea in children allows better understanding, exploitation, or bypassing of these effects in new polarization-sensitive pediatric ophthalmic applications.”

For more information on this research see: Birefringence of the central cornea in children assessed with scanning laser polarimetry. *Journal of Biomedical Optics*, 2012;17(8):225-230. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from K. Irsch, University of Heidelberg, Heidelberg, Germany. (2012 Nov 28)

### **University of Maryland School of Medicine, Baltimore: Target molecule imaging on tissue specimens by fluorescent metal nanoprobe**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Optics. According to news reporting out of Baltimore, Maryland, by NewsRx editors, research stated, “In this paper, fluorescence metal nanoshells (FMNs) were synthesized for target molecule detection on tissue specimens by fluorescence imaging method. FMNs were made with 40 nm silica spherical cores and 10 nm silver shells.”

Our news journalists obtained a quote from the research from the University of Maryland School of Medicine, “Ru(bpy)(3)(2+) complexes were encapsulated in the silica cores for fluorescence properties. Avidin molecules were covalently bound on FMNs and formed avidin-Ag complexes could be site-specially conjugated on bone tissue specimens. Fluorescence intensity and lifetime images were recorded on a time-resolved confocal microscope. Imaging measurements showed that the emissions by avidin-FMN complexes could be distinctly isolated as individuals from the cellular backgrounds on lifetime images even when the tissues were stained with additional organic dyes.”

According to the news editors, the research concluded: “This observation demonstrates that the metal nanoprobe can be used for single target molecule detection on tissues during fluorescence imaging measurements.”

For more information on this research see: Target molecule imaging on tissue specimens by fluorescent metal nanoprobe. *Journal of Biomedical Optics*, 2011;16(11):116004.

Our news journalists report that additional information may be obtained by contacting J. Zhang, University of Maryland School of Medicine, Dept. of Biochemistry and Molecular Biology, Baltimore, Maryland 21201, United States. (2012 Nov 28)

### **University of Pittsburgh: Correction of stain variations in nuclear refractive index of clinical histology specimens**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Optics have been presented. According to news reporting from Pittsburgh, Pennsylvania, by NewsRx journalists, research stated, “For any technique to be adopted into a clinical setting, it is imperative that it seamlessly integrates with well-established clinical diagnostic workflow. We recently developed an optical microscopy technique-spatial-domain low-coherence quantitative phase microscopy (SL-QPM) that can extract the refractive index of the cell nucleus from



the standard histology specimens on glass slides prepared via standard clinical protocols.”

The news correspondents obtained a quote from the research from the University of Pittsburgh, “This technique has shown great potential in detecting cancer with a better sensitivity than conventional pathology. A major hurdle in the clinical translation of this technique is the intrinsic variation among staining agents used in histology specimens, which limits the accuracy of refractive index measurements of clinical samples. In this paper, we present a simple and easily generalizable method to remove the effect of variations in staining levels on nuclear refractive index obtained with SL-QPM.”

According to the news reporters, the research concluded: “We illustrate the efficacy of our correction method by applying it to variously stained histology samples from animal model and clinical specimens.”

For more information on this research see: Correction of stain variations in nuclear refractive index of clinical histology specimens. *Journal of Biomedical Optics*, 2011;16(11):116013.

Our news journalists report that additional information may be obtained by contacting S. Uttam, University of Pittsburgh, Dept. of Medicine, Biomedical Optical Imaging Laboratory (BOIL), Pittsburgh, Pennsylvania 15232, United States. (2012 Nov 28)

### **University of Toronto: Optical assessment of tissue anisotropy in ex vivo distended rat bladders**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting from Toronto, Canada, by NewsRx journalists, research stated, “Microstructural remodelling in epithelial layers of various hollow organs, including changes in tissue anisotropy, are known to occur under mechanical distension and during disease processes. In this paper, we analyze how bladder distension alters wall anisotropy using polarized light imaging (followed by Mueller matrix decomposition).”

The news correspondents obtained a quote from the research from the University of Toronto, “Optical retardance values of different regions of normal rat bladders under different distension pressures are derived. Then optical coherence tomography is used to measure local bladder wall thicknesses, enabling the calculation of the tissue birefringence maps as a measure of the tissue anisotropy. Selected two-photon microscopy is also performed to better understand the compositional origins of the obtained anisotropy results. The dome region of the bladder shows maximum birefringence when the bladder is distended to high pressures, whereas the ventral remains roughly isotropic during distension. In addition, the average anisotropy direction is longitudinal, along the urethra to dome. The derived wall anisotropy trends are

based on birefringence as an intrinsic property of the tissue organization independent of its thickness, to aid in understanding the structure-functions relation in healthy bladders.”

According to the news reporters, the research concluded: “These new insights into the wall microstructure of ex vivo distending bladders may help improve the functionality of the artificially engineered bladder tissues.”

For more information on this research see: Optical assessment of tissue anisotropy in ex vivo distended rat bladders. *Journal of Biomedical Optics*, 2012;17(8):299-306. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting S. Alali, University of Toronto, Dept. of Radiat Oncol, Toronto, ON M5G 2M9, Canada. (2012 Nov 28)

### **Vanderbilt University, Nashville: Sensitivity of Raman spectroscopy to normal patient variability**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting originating from Nashville, Tennessee, by NewsRx correspondents, research stated, “Many groups have used Raman spectroscopy for diagnosing cervical dysplasia; however, there have been few studies looking at the effect of normal physiological variations on Raman spectra. We assess four patient variables that may affect normal Raman spectra: Race/ethnicity, body mass index (BMI), parity, and socioeconomic status.”

Our news editors obtained a quote from the research from Vanderbilt University, “Raman spectra were acquired from a diverse population of 75 patients undergoing routine screening for cervical dysplasia. Classification of Raman spectra from patients with a normal cervix is performed using sparse multinomial logistic regression (SMLR) to determine if any of these variables has a significant effect. Results suggest that BMI and parity have the greatest impact, whereas race/ethnicity and socioeconomic status have a limited effect. Incorporating BMI and obstetric history into classification algorithms may increase sensitivity and specificity rates of disease classification using Raman spectroscopy.”

According to the news editors, the research concluded: “Studies are underway to assess the effect of these variables on disease.”

For more information on this research see: Sensitivity of Raman spectroscopy to normal patient variability. *Journal of Biomedical Optics*, 2011;16(11):117004.

The news editors report that additional information may be obtained by contacting E. Vargis, Vanderbilt University, Dept. of Biomedical Engineering, Nashville, Tennessee 37235, United States. (2012 Nov 28)

**Washington University, St. Louis: Energy enhancement in time-reversed ultrasonically encoded optical focusing using a photorefractive polymer**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in St. Louis, Missouri, by NewsRx journalists, research stated, “Time-reversed ultrasonically encoded (TRUE) optical focusing achieves light focusing into scattering media beyond one transport mean free path, which is desirable in biomedical optics. However, the focused optical energy needs to be increased for broad applications.”

The news reporters obtained a quote from the research from Washington University, “Here, we report the use of a photorefractive polymer (PRP) as the phase conjugate mirror in TRUE optical focusing. The PRP boosted the focused optical energy by similar to 40 times in comparison to the previously used photorefractive Bi12SiO20 crystal.”

According to the news reporters, the research concluded: “As a result, we successfully imaged absorbing objects embedded in the middle plane of a tissue-mimicking phantom having an optical thickness of 120 scattering mean free paths.”

For more information on this research see: Energy enhancement in time-reversed ultrasonically encoded optical focusing using a photorefractive polymer. *Journal of Biomedical Optics*, 2012;17(8):26-28. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting Y. Suzuki, Washington University, Dept. of Biomed Engn, Opt Imaging Lab, St Louis, MO 63130, United States. (2012 Nov 28)

### **Washington University, St. Louis: Forster resonance energy transfer photoacoustic microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating in St. Louis, Missouri, by NewsRx journalists, research stated, “Forster, or fluorescence, resonance energy transfer (FRET) provides fluorescence signals sensitive to intra- and inter-molecular distances in the 1 to 10 nm range. Widely applied in the fluorescence imaging environment, FRET enables visualization of physicochemical processes in molecular interactions and conformations.”

The news reporters obtained a quote from the research from Washington University, “In this paper, we report photoacoustic imaging of FRET, based on nonradiative decay that produces heat and subsequent acoustic waves. Estimates of the energy transfer efficiency by photoacoustic microscopy were compared to those obtained by fluorescence confocal microscopy. The experimental results in tissue phantoms show that photoacoustic microscopy is capable of FRET imaging with an enhanced penetration depth.”

According to the news reporters, the research concluded: “Through its ability to three-dimensionally image tissue with scalable resolution, photoacoustic microscopy could be a beneficial biomedical tool to broaden the in vivo application of FRET.”

For more information on this research see: Forster resonance energy transfer photoacoustic microscopy. *Journal of Biomedical Optics*, 2012;17(8):277-281. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting Y. Wang, Washington University, Dept. of Biomed Engr, Opt Imaging Lab, St Louis, MO 63130, United States. (2012 Nov 28)

### **Boston University: Wavelength-dependent backscattering measurements for quantitative monitoring of apoptosis, part 1: early and late spectral changes are indicative of the presence of apoptosis in cell cultures**

By a News Reporter-Staff News Editor at Life Science Weekly – New research on Biomedical Optics is the subject of a report. According to news reporting from Boston, Massachusetts, by NewsRx journalists, research stated, “Apoptosis, a form of programmed cell death with unique morphological and biochemical features, is dysregulated in cancer and

is activated by many cancer chemotherapeutic drugs. Noninvasive assays for apoptosis in cell cultures can aid in screening of new anticancer agents.”

The news correspondents obtained a quote from the research from Boston University, “We have previously demonstrated that elastic scattering spectroscopy can monitor apoptosis in cell cultures. In this report we present data on monitoring the detailed time-course of scattering changes in a Chinese hamster ovary (CHO) and PC-3 prostate cancer cells treated with staurosporine to induce apoptosis. Changes in the backscattering spectrum are detectable within 10 min, and continue to progress up to 48 h after staurosporine treatment, with the magnitude and kinetics of scattering changes dependent on inducer concentration. Similar responses were observed in CHO cells treated with several other apoptosis-inducing protocols. Early and late scattering changes were observed under conditions shown to induce apoptosis via caspase activity assay and were absent under conditions where apoptosis was not induced. Finally, blocking caspase activity and downstream apoptotic morphology changes prevented late scattering changes.”

According to the news reporters, the research concluded: “These observations demonstrate that early and late changes in wavelength-dependent backscattering correlate with the presence of apoptosis in cell cultures and that the late changes are specific to apoptosis.”

For more information on this research see: Wavelength-dependent backscattering measurements for quantitative monitoring of apoptosis, part 1: early and late spectral changes are indicative of the presence of apoptosis in cell cultures. *Journal of Biomedical Optics*, 2011;16(11):117001.

Our news journalists report that additional information may be obtained by contacting C.S. Mulvey, Boston University, Dept. of Biomedical Engineering, Boston, Massachusetts 02215, United States. (2012 Nov 27)

### **Huazhong University of Science and Technology, Wuhan: In vivo imaging of hemodynamics and oxygen metabolism in acute focal cerebral ischemic rats with laser speckle imaging and functional photoacoustic microscopy**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Wuhan, People’s Republic of China, by NewsRx journalists, research stated, “Stroke is a devastating disease. The changes in cerebral hemodynamics and oxygen metabolism associated with stroke play an important role in pathophysiology study.”

The news correspondents obtained a quote from the research from the Huazhong University of Science and Technology, “But the changes were difficult to describe with a single imaging modality. Here the changes in cerebral blood flow (CBF), cerebral blood volume (CBV), and oxygen saturation (SO<sub>2</sub>) were yielded with laser speckle imaging (LSI) and photoacoustic microscopy (PAM) during and after 3-h acute focal ischemic rats. These hemodynamic measures were further synthesized to deduce the changes in oxygen extraction fraction (OEF). The results indicate that all the hemodynamics except CBV had rapid declines within 40-min occlusion of middle cerebral artery (MCAO). CBV in arteries and veins first increased to the maximum value of 112.42  $\pm$  36.69% and 130.58  $\pm$  31.01% by 15 min MCAO; then all the hemodynamics had a persistent reduction with small fluctuations during the ischemic. When ischemia lasted for 3 h, CBF in arteries, veins decreased to 17  $\pm$  14.65%, 24.52  $\pm$  20.66%, respectively, CBV dropped to 62  $\pm$  18.56% and 59  $\pm$  18.48%. And the absolute SO<sub>2</sub> decreased by 40.52  $\pm$  22.42% and 54.24  $\pm$  11.77%. After 180-min MCAO, the changes in hemodynamics and oxygen metabolism were also quantified.”

According to the news reporters, the research concluded: “The study suggested that combining LSI and PAM provides an attractive approach for stroke detection in small animal studies.”

For more information on this research see: In vivo imaging of hemodynamics and oxygen metabolism in acute focal cerebral ischemic rats with laser speckle imaging and functional photoacoustic microscopy. *Journal of Biomedical Optics*, 2012;17(8):141-149. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting Z.L. Deng, Huazhong University of Science & Technology, Minist Educ, Key Lab Biomed Photon, Wuhan 430074, People's Republic of China. (2012 Nov 27)

### **Tel Aviv University: New noninvasive index for evaluation of the vascular age of healthy and sick people**

By a News Reporter-Staff News Editor at Journal of Technology – Investigators publish new report on Dynamic Light Scattering. According to news reporting originating in Tel Aviv, Israel, by VerticalNews journalists, research stated, “We conducted a study on 861 healthy and sick subjects and demonstrated that some calculated parameters based on measurement of the dynamic light scattering (DLS) signal from the finger correlate highly with chronological age ranging from 1.5 to 85 years old. Measurements of DLS signals were obtained during both occlusion and nonocclusion of blood flow in the finger.”

The news reporters obtained a quote from the research from Tel Aviv University, “For the nonocclusion case we found that the low-frequency component of the DLS signal significantly correlates with the biological age while the high-frequency component of the DLS signal resembles the arterial pulse-wave and does correlate with age. However, the most prominent correlation between the DLS characteristics and age was noted with the stasis stage measurements. We propose that the observed age-related phenomena are caused by alterations in local blood viscosity and interactions of the endothelial cells with erythrocytes. Further, a new noninvasive index based on the age-related optical characteristics was introduced.”

According to the news reporters, the research concluded: “This non-invasive index may be used as a research and diagnostic tool to examine the endothelial and thrombolytic properties of the vascular system.”

For more information on this research see: New noninvasive index for evaluation of the vascular age of healthy and sick people. *Journal of Biomedical Optics*, 2012;17(8):338-344. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting I. Fine, Tel Aviv University, Sackler Sch Med, IL-69978 Tel Aviv, Israel. (2012 Nov 27)

### **University of British Columbia, Vancouver: Hemodynamic and oxidative mechanisms of tourniquet-induced muscle injury: near-infrared spectroscopy for the orthopedics setting**

By a News Reporter-Staff News Editor at Life Science Weekly – New research on Ischemia is the subject of a report. According to news reporting out of Vancouver, Canada, by NewsRx editors, research stated, “During orthopedic procedures, the tourniquets used to maintain bloodless surgical fields cause ischemia and then reperfusion (I/R), leading to oxidative muscle injury. Established methods exist neither for monitoring orthopedic I/R nor for predicting the extent of tourniquet-associated oxidative injury.”

Our news journalists obtained a quote from the research from the University of British Columbia, “To develop a predictive model for tourniquet-associated oxidative muscle injury, this study combined real-time near-infrared spectroscopy (NIRS) monitoring of I/R with Western blotting (WB) for oxidized proteins. We hypothesized strong correlations between NIRS-derived I/R indices and muscle protein oxidation. In 17 patients undergoing ankle fracture repair, a thigh tourniquet was inflated on the injured limb (300 mmHg). Using a continuous-wave (CW) NIRS setup, oxygenated (O(2)Hb), deoxygenated (HHb), and

total (tHb) hemoglobin were monitored bilaterally (tourniquet versus control) in leg muscles. Leg muscle biopsies were collected unilaterally (tourniquet side) immediately after tourniquet inflation (pre) and before deflation (post). Average ischemia duration was  $43.2 \pm 14.6$  min. In post-compared to pre-biopsies, muscle protein oxidation (quantified using WB) increased  $172.3\% \pm 145.7\%$  ( $P < 0.0005$ ). Changes in O(2)Hb and tHb were negatively correlated with protein oxidation (respectively:  $P = 0.040$ ,  $R^2 = 0.25$  and  $P = 0.003$ ,  $R^2 = 0.58$ ). Reoxygenation rate was positively correlated with protein oxidation ( $P = 0.041$ ,  $R^2 = 0.25$ )."

According to the news editors, the research concluded: "These data indicate that using CW NIRS, it is possible to predict orthopedic tourniquet-associated muscle oxidative injury noninvasively."

For more information on this research see: Hemodynamic and oxidative mechanisms of tourniquet-induced muscle injury: near-infrared spectroscopy for the orthopedics setting. *Journal of Biomedical Optics*, 2012;17(8):96-103. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting B. Shadgan, University of British Columbia, Div Orthopaed Trauma, Dept. of Orthopaed, VCHRI, Vancouver, BC V5Z 1L8, Canada. (2012 Nov 27)

## **A near-infrared spectroscopy computational model for cerebral hemodynamics**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators discuss new findings in Hemorrhage. According to news reporting out of Huntsville, Alabama, by NewsRx editors, research stated, "Near infrared spectroscopy (NIRS) is a technique used to detect and measure changes in the concentrations of oxygenated hemoglobin, deoxygenated hemoglobin, and water in tissues based on the differential absorption, scattering, and refraction of the near infrared light. In this imaging technique, the optical properties of tissues are reconstructed from the measurements obtained from the sensors located on the boundary."

Our news journalists obtained a quote from the research, "A computational method for the rapid noninvasive detection and quantification of cerebral hemorrhage is described using the above procedure. CFD Research Corporation's finite volume computational biology code was used to numerically mimic the NIRS procedure by (i) noninvasively 'numerically penetrating' the brain tissues and (ii) reconstructing the optical properties the presence of water, oxygenated, and deoxygenated blood. These numerical noninvasive measurements are then used to predict



the extent and severity of the brain hemorrhage. The paper also discusses ideas to obtain the location and the severity of a localized injury. Two-dimensional and three-dimensional simulations are performed as a proof of concept for the numerical formulation being feasible for the above mentioned detection/quantification.”

According to the news editors, the research concluded: “The results demonstrate that this numerical NIRS formulation can be used as a noninvasive technique for both qualitative and quantitative evaluation of cerebral hemodynamics.”

For more information on this research see: A near-infrared spectroscopy computational model for cerebral hemodynamics. *International Journal for Numerical Methods In Biomedical Engineering*, 2012;28(11):1093-106. (Wiley-Blackwell - <http://www.wiley.com/>; International Journal for Numerical Methods In Biomedical Engineering - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news journalists report that additional information may be obtained by contacting R. Kannan, CFD Research Corporation 215 Wynn Drive, Huntsville, AL, 35805, United States. (2012 Nov 26)

### **Institute of Neuroscience, Kaunas: Computational representation of a realistic head and brain volume conductor model: electroencephalography simulation and visualization study**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Data detailed on Science have been presented. According to news reporting originating in Kaunas, Lithuania, by NewsRx editors, the research stated, “Computational head and brain volume conductor modeling is a practical and non-invasive method to investigate neuroelectrical activity in the brain. Anatomical structures included in a model affect the flow of volume currents and the resulting scalp surface potentials.”

The news reporters obtained a quote from the research from the Institute of Neuroscience, “The influence of different tissues within the head on scalp surface potentials was investigated by constructing five highly detailed, realistic head models from segmented and processed Visible Human Man digital images. The models were: (1) model with 20 different tissues, that is, skin, dense connective tissue (fat), aponeurosis (muscle), outer, middle and inner tables of the scalp, dura matter, arachnoid layer (including cerebrospinal fluid), pia matter, six cortical layers, eye tissue, muscle around the eye, optic nerve, temporal muscle, white matter and internal air, (2) model with three main inhomogeneities, that is, scalp, skull, brain, (3) model with homogeneous scalp

and remaining inhomogeneities, (4) model with homogeneous skull and remaining inhomogeneities, and (5) model with homogeneous brain matter and remaining inhomogeneities. Scalp potentials because of three different dipolar sources in the parietal-occipital lobe were computed for all five models. Results of a forward solution revealed that tissues included in the model and the dipole source location directly affect the simulated scalp surface potentials. The major finding indicates that significant change in the scalp surface potentials is observed when the brain's distinctions are removed."

According to the news reporters, the research concluded: "The other modifications, for example, layers of the scalp and skull are important too, but they have less effect on the overall results."

For more information on this research see: Computational representation of a realistic head and brain volume conductor model: electroencephalography simulation and visualization study. *International Journal for Numerical Methods In Biomedical Engineering*, 2012;28(11):1144-55. (Wiley-Blackwell - <http://www.wiley.com/>; International Journal for Numerical Methods In Biomedical Engineering - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news correspondents report that additional information may be obtained by contacting A. Kybartaitė, Institute of Neurosciences, Lithuanian University of Health Sciences, Kaunas, Lithuania. (2012 Nov 26)

### **National Tsing Hua University, Hsinchu: Application of the laser Doppler flowmeter for measurement of blood pressure and functional parameters of microcirculation**

By a News Reporter-Staff News Editor at Hematology Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Hsinchu, Taiwan, by NewsRx journalists, research stated, "The laser Doppler flowmeter has become an effective tool for the clinical study of microcirculation with non-invasive measurements and excellent velocity resolution. Microcirculation flow measurements cannot be used as reference criteria for circulation function."

The news reporters obtained a quote from the research from National Tsing Hua University, "Thus, the relative change in fingertip microcirculation was measured through inflation and deflation of an automatic sphygmomanometer wrapped around the arm, and the blood pressure and functional parameters of circulation, such as biological zero (BZ), peak flow (PF) and time to peak flow (tp), were determined. For 50 healthy participants, the correlation coefficients for the laser Doppler flowmeter and oscillometric results were 0.950 and 0.838 for systolic and diastolic pressure, respectively. The mean and standard

errors for both methods fell within the range specified in the Association for the Advancement of Medical Instrumentation standards. The BZ of an edema patient was about 5 times higher than normal. For patients with peripheral arterial occlusive disease (PAOD), the PF could not be determined, and the tp was about twice the normal value.”

According to the news reporters, the research concluded: “The accuracy of blood pressure measurements using the laser Doppler flowmeter was comparable to that of the commonly used oscillometric sphygmomanometer, and the physiological circulation functional parameters were useful in identifying signs of edema and PAOD.”

For more information on this research see: Application of the laser Doppler flowmeter for measurement of blood pressure and functional parameters of microcirculation. *Bio-medical Materials and Engineering*, 2012;22(6):351-9.

Our news correspondents report that additional information may be obtained by contacting C.L. Hu, Dept. of Electrical Engineering, National Tsing Hua University, Hsinchu, Taiwan Industrial Technology Research Institute, Hsinchu, Taiwan. (2012 Nov 26)

### **University of Basel: Multimodal recording of brain activity in term newborns during photic stimulation by near-infrared spectroscopy and electroencephalography**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of Basel, Switzerland, by NewsRx editors, research stated, “In this study 14 healthy term newborns (post-natal mean age 2.1 days) underwent photic stimulation during sleep on two different days. Near-infrared spectroscopy (NIRS) and electroencephalography (EEG) was acquired simultaneously.”

Our news journalists obtained a quote from the research from the University of Basel, “The aims of the study were: to determine (i) the sensitivity and (ii) the repeatability of NIRS to detect the hemodynamic response, (iii) the sensitivity and (iv) the repeatability of EEG to detect a visual evoked potential (VEP), (v) to analyze optical data for the optical neuronal signal, and (vi) to test whether inadequate stimulation could be reason for absent hemodynamic responses. The results of the study were as follows. (i) Sensitivity of NIRS was 61.5% to detect hemodynamic responses; (ii) their reproducibility was 41.7%. A VEP was detected (iii) in 96.3% of all subjects with (iv) a reproducibility of 92.3%. (v) In two measurements data met the criteria for an optical neuronal signal. The noise level was 9.6. 10(-5)% change in optical density. (vi) Insufficient stimulation was excluded as reason for absent hemodynamic responses.”

According to the news editors, the research concluded: “NIRS is an promising tool to study cognitive activation and development of the brain. For clinical application, however, the sensitivity and reproducibility on an individual level needs to be improved.”

For more information on this research see: Multimodal recording of brain activity in term newborns during photic stimulation by near-infrared spectroscopy and electroencephalography. *Journal of Biomedical Optics*, 2012;17(8):307-314. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting M. Biallas, University of Basel, Core Program Struct Biol & Biophys, Biozentrum, CH-4056 Basel, Switzerland. (2012 Nov 26)

### **Institute of Neuroscience and Medicine, Juelich: Diffusion kurtosis imaging and log-normal distribution function imaging enhance the visualisation of lesions in animal stroke models**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedicine. According to news reporting originating from Juelich, Germany, by NewsRx correspondents, research stated, “In this work, we report a case study of a stroke model in animals using two methods of quantification of the deviations from Gaussian behaviour: diffusion kurtosis imaging (DKI) and log-normal distribution function imaging (LNDFI). The affected regions were predominantly in grey rather than in white matter.”

Our news editors obtained a quote from the research from the Institute of Neuroscience and Medicine, “The parameter maps were constructed for metrics quantifying the apparent diffusivity (evaluated from conventional diffusion tensor imaging, DKI and LNDFI) and for those quantifying the degree of deviations (mean kurtosis and a parameter  $s$  characterising the width of the distribution). We showed that both DKI and LNDFI were able to dramatically enhance the visualisation of ischaemic lesions in comparison with conventional methods. The largest relative change in the affected versus healthy regions was observed in the mean kurtosis values. The average changes in the mean kurtosis and  $s$  values in the lesions were a factor of two to three larger than the relative changes observed in the mean diffusivity.”

According to the news editors, the research concluded: “The applied methods promise valuable perspectives in the assessment of stroke.”

For more information on this research see: Diffusion kurtosis imaging and log-normal distribution function imaging enhance

the visualisation of lesions in animal stroke models. *Nmr In Biomedicine*, 2012;25(11):1295-304. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

The news editors report that additional information may be obtained by contacting F. Grinberg, Institute of Neuroscience and Medicine - 4, Forschungszentrum Juelich GmbH, Juelich, Germany. (2012 Nov 21)

### **A liquid chromatography-tandem mass spectrometry assay for the determination of nemonoxacin (TG-873870), a novel nonfluorinated quinolone, in human plasma and urine and its application to a single-dose pharmacokinetic study in healthy Chinese volunte**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Pharmacokinetics is now available. According to news reporting originating from Beijing, People's Republic of China, by NewsRx correspondents, research stated, "Nemonoxacin (TG-873870) is a novel C-8-methoxy nonfluorinated quinolone with higher activity than ciprofloxacin, levofloxacin and moxifloxacin against Gram-positive pathogens including methicillin-susceptible or methicillin-resistant *Staphylococcus aureus* and *Streptococcus pneumoniae* with various resistant phenotypes. A rapid, sensitive and selective liquid chromatography-tandem mass spectrometric (LC-MS/MS) method was developed and validated to determine the concentration of nemonoxacin in human plasma and urine."

Our news editors obtained a quote from the research, "Protein precipitation and liquid-liquid extraction were employed for plasma and urine sample preparations, respectively, and extract was then injected into the system. Separation was performed on a C18 reversed-phase column using acetonitrile:0.1% formic acid as a mobile phase. Both analyte and internal standard (gatifloxacin) were determined using electrospray ionization and the MS data acquisition via the selected reaction monitoring in positive-ion mode. The lower limit of quantification was 5?ng/mL and the calibration curves were linear in the concentration range of 51000?ng/mL. The accuracy, precision, selectivity, linearity, recovery, matrix effect and stability were validated for TG-873870 in human plasma and urine."

According to the news editors, the research concluded: "The method was successfully applied to a pharmacokinetic study enrolling 12 healthy Chinese volunteers administered nemonoxacin malate capsules."

For more information on this research see: A liquid chromatography-tandem mass spectrometry assay for the determination of nemonoxacin

(TG-873870), a novel nonfluorinated quinolone, in human plasma and urine and its application to a single-dose pharmacokinetic study in healthy Chinese volunteers. *Biomedical Chromatography*, 2012;26(11):1333-1340. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/1099-1099-0801>)

The news editors report that additional information may be obtained by contacting B.N. Guo, TaiGen Biopharmaceut Co Beijing Ltd, Beijing 100020, People's Republic of China. (2012 Nov 14)

### **University of Auckland: Mechanics of the foot Part 1: A continuum framework for evaluating soft tissue stiffening in the pathologic foot**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Auckland, New Zealand, by NewsRx correspondents, research stated, “Soft tissue stiffening is a common mechanical observation reported in foot pathologies including diabetes mellitus and gout. These material changes influence the spatial distribution of stress and affect blood flow, which is essential to nutrient entry and waste removal.”

Our news editors obtained a quote from the research from the University of Auckland, “An anatomically-based subject-specific foot model was developed to explore the influence of tissue stiffening on plantar pressure and internal von Mises stress at heel-strike, midstance and toe-off. This work draws on the model database developed for the Physiome project consisting of muscles, bones, soft tissue and other structures such as sensory nerves. The anisotropic structure of soft tissue was embedded in a single continuum as an efficient model for finite soft tissue deformation, and customisation methods were used to capture the unique foot profile. The model was informed by kinetics from an instrumented treadmill and kinematics from motion capture, synchronised together. Foot sole pressure predictions were evaluated against a commercial pressure platform. Key outcomes showed that internal stress can be up to 1.6 times the surface pressure with implications for internal soft tissue damage not observed at the surface. The main nerve branch stimulated during gait was the lateral plantar nerve.”

According to the news editors, the research concluded: “This subject-specific modelling framework can play an integral part in therapeutic treatments by informing assistive strategies such as mechanical noise stimulation and orthotics.”

For more information on this research see: Mechanics of the foot Part 1: A continuum framework for evaluating soft tissue stiffening in the pathologic foot. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(10):1056-1070. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

The news editors report that additional information may be obtained by contacting J.W. Fernandez, University of Auckland, Auckland Bioengn Inst, Auckland 1, New Zealand. (2012 Nov 14)

### **University of Auckland: Mechanics of the foot Part 2: A coupled solid-fluid model to investigate blood transport in the pathologic foot**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Auckland, New Zealand, by NewsRx journalists, research stated, “A coupled computational model of the foot consisting of a three-dimensional soft tissue continuum and a one-dimensional (1D) transient blood flow network is presented in this article. The primary aim of the model is to investigate the blood flow in major arteries of the pathologic foot where the soft tissue stiffening occurs.”

The news correspondents obtained a quote from the research from the University of Auckland, “It has been reported in the literature that there could be up to about five-fold increase in the mechanical stiffness of the plantar soft tissues in pathologic (e.g. diabetic) feet compared with healthy ones. The increased stiffness results in higher tissue hydrostatic pressure within the plantar area of the foot when loaded. The hydrostatic pressure acts on the external surface of blood vessels and tend to reduce the flow cross-section area and hence the blood supply. The soft tissue continuum model of the foot was modelled as a tricubic Hermite finite element mesh representing all the muscles, skin and fat of the foot and treated as incompressible with transversely isotropic properties. The details of the mechanical model of soft tissue are presented in the companion paper, Part 1. The deformed state of the soft tissue continuum because of the applied ground reaction force at three foot positions (heel-strike, midstance and toe-off) was obtained by solving the Cauchy equations based on the theory of finite elasticity using the Galerkin finite element method. The geometry of the main arterial network in the foot was represented using a 1D Hermite cubic finite element mesh. The flow model consists of 1D NavierStokes equations

and a nonlinear constitutive equation to describe vessel radiustransmural pressure relation. The latter was defined as the difference between the fluid and soft tissue hydrostatic pressure. Transient flow governing equations were numerically solved using the two-step LaxWendroff finite difference method. The geometry of both the soft tissue continuum and arterial network is anatomically-based and was developed using the data derived from visible human images and magnetic resonance images of a healthy male volunteer.”

According to the news reporters, the research concluded: “Simulation results reveal that a two-fold increase in tissue stiffness leads to about 28% reduction in blood flow to the affected region.C.”

For more information on this research see: Mechanics of the foot Part 2: A coupled solid-fluid model to investigate blood transport in the pathologic foot. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(10):1071-1081. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2040-7947](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2040-7947))

Our news journalists report that additional information may be obtained by contacting K. Mithraratne, University of Auckland, Auckland Bioengn Inst, Auckland 1, New Zealand. (2012 Nov 14)

**Chinese Academy of Science, Shanghai: Simultaneous determination of atractylenolide II and atractylenolide III by liquid chromatography-tandem mass spectrometry in rat plasma and its application in a pharmacokinetic study after oral administration of Atractylodes Macrocephala Rhizoma ext**

By a News Reporter-Staff News Editor at Pharma Business Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Shanghai, People’s Republic of China, by NewsRx journalists, research stated, “Atractylenolide II (AII) and atractylenolide III (AIII) are the major active components in Atractylodes Macrocephala Rhizoma (AMR). In this study, a sensitive, rapid and selective liquid chromatographytandem mass spectrometry (LC-MS/MS) method was developed and validated for the simultaneous determination of AII and AIII in rat plasma using loliolide as internal standard (IS).”

The news reporters obtained a quote from the research from the Chinese Academy of Science, “After protein precipitation with ethyl acetate,



the analytes were injected into an LC-MS/MS system for quantification. Chromatography was performed using a C18 column, eluting with water and acetonitrile (45:55, v/v) at 0.2 mL/min. All analytes including IS were monitored under positive ionization conditions by multiple reaction monitoring with an electrospray ionization source. The validated method was successfully applied to the pharmacokinetic study of AII and AIII in rat plasma after oral administration of AMR extract.”

According to the news reporters, the research concluded: “The results provided a meaningful basis for evaluating the clinical applications of traditional Chinese medicine.”

For more information on this research see: Simultaneous determination of atractylenolide II and atractylenolide III by liquid chromatography-tandem mass spectrometry in rat plasma and its application in a pharmacokinetic study after oral administration of *Atractylodes Macrocephala* Rhizoma ext. *Biomedical Chromatography*, 2012;26(11):1386-1392. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - [http://onlinelibrary.wiley.com/journal/](http://onlinelibrary.wiley.com/journal/10.1002/) 10.1002/ (ISSN) 1099-0801)

Our news correspondents report that additional information may be obtained by contacting Y.Y. Shi, Chinese Academy Sci, Shanghai Res Center Modernizat Tradit Chinese Med, Natl Engn Lab TCM Standardizat Technol, Shanghai Inst Mat Med, Shanghai 201203, People’s Republic of China. (2012 Nov 12)

### **University of London Imperial College: Collaborative Gaze Channelling for Improved Cooperation During Robotic Assisted Surgery**

By a News Reporter-Staff News Editor at Medical Devices & Surgical Technology Week – Investigators publish new report on Robotics. According to news reporting originating in London, United Kingdom, by NewsRx journalists, research stated, “The use of multiple robots for performing complex tasks is becoming a common practice for many robot applications. When different operators are involved, effective cooperation with anticipated manoeuvres is important for seamless, synergistic control of all the end-effectors.”

The news reporters obtained a quote from the research from the University of London Imperial College, “In this paper, the concept of Collaborative Gaze Channelling (CGC) is presented for improved control of surgical robots for a shared task. Through eye tracking, the fixations of each operator are monitored and presented in a shared surgical workspace. CGC permits remote or physically separated collaborators

to share their intention by visualising the eye gaze of their counterparts, and thus recovers, to a certain extent, the information of mutual intent that we rely upon in a vis-A-vis working setting. In this study, the efficiency of surgical manipulation with and without CGC for controlling a pair of bimanual surgical robots is evaluated by analysing the level of coordination of two independent operators. Fitts' law is used to compare the quality of movement with or without CGC. A total of 40 subjects have been recruited for this study and the results show that the proposed CGC framework exhibits significant improvement ( $p < 0.05$ ) on all the motion indices used for quality assessment. This study demonstrates that visual guidance is an implicit yet effective way of communication during collaborative tasks for robotic surgery."

According to the news reporters, the research concluded: "Detailed experimental validation results demonstrate the potential clinical value of the proposed CGC framework."

For more information on this research see: Collaborative Gaze Channelling for Improved Cooperation During Robotic Assisted Surgery. *Annals of Biomedical Engineering*, 2012;40(10):2156-2167. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting K.W. Kwok, University of London Imperial College, Hamlyn Center Robot Surg, London SW7 2AZ, United Kingdom. (2012 Nov 11)

### **Wroclaw University of Technology: Morphological characterization of cardiac induced intracranial pressure (ICP) waves in patients with overdrainage of cerebrospinal fluid and negative ICP**

By a News Reporter-Staff News Editor at Pediatrics Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Wroclaw, Poland, by VerticalNews journalists, research stated, "Symptomatic overdrainage of cerebrospinal fluid (CSF) can be seen in shunted hydrocephalus patients and in non-shunted patients with spontaneous intracranial hypotension (SIN). In these patients, intracranial pressure (ICP) monitoring often reveals negative static ICP, while it is less understood how the pulsatile ICP (cardiac induced ICP waves) is affected."

The news correspondents obtained a quote from the research from the Wroclaw University of Technology, "This latter aspect is addressed in the present study. A set of 40 ICP recordings from paediatric and

adult hydrocephalus patients were randomly selected. Each cardiac induced ICP wave was automatically identified and manually verified by the beginning and ending diastolic minimum pressures and the systolic maximum pressure. The ICP wave parameters (static pressure, amplitude, rise time, rise time coefficient, downward coefficient, wave duration, and area-under-curve) were then automatically computed. The material of 40 ICP recordings provided a total of 3,192,166 cardiac induced ICP waves (1,292,522 in paediatric patients and 1,899,644 in adult patients)."

According to the news reporters, the research concluded: "No apparent changes in ICP wave parameters were seen when mean ICP became negative, except that the parameters amplitude, rise time coefficient, downward coefficient and area under curve somewhat increased when mean ICP was below -15 mmHg."

For more information on this research see: Morphological characterization of cardiac induced intracranial pressure (ICP) waves in patients with overdrainage of cerebrospinal fluid and negative ICP. *Medical Engineering & Physics*, 2012;34(8):1066-1070. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting P.K. Eide, Wroclaw Univ Technol, PL-50370 Wroclaw, Poland. (2012 Nov 10)

### **University of Erlangen: An integrated segmentation and analysis approach for QCT of the knee to determine subchondral bone mineral density and texture**

By a News Reporter-Staff News Editor at Health & Medicine Week – Fresh data on Bone Research are presented in a new report. According to news reporting originating in Erlangen, Germany, by NewsRx journalists, research stated, "We have developed a new integrated approach for quantitative computed tomography of the knee in order to quantify bone mineral density (BMD) and subchondral bone structure. The present framework consists of image acquisition and reconstruction, 3-D segmentation, determination of anatomic coordinate systems, and reproducible positioning of analysis volumes of interest (VOI)."

The news reporters obtained a quote from the research from the University of Erlangen, "Novel segmentation algorithms were developed to identify growth plates of the tibia and femur and the joint space with high reproducibility. Five different VOIs with varying distance to the

articular surface are defined in the epiphysis. Each VOI is further subdivided into a medial and a lateral part. In each VOI, BMD is determined. In addition, a texture analysis is performed on a high-resolution computed tomography (CT) reconstruction of the same CT scan in order to quantify subchondral bone structure. Local and global homogeneity, as well as local and global anisotropy were measured in all VOIs. Overall short-term precision of the technique was evaluated using double measurements of 20 osteoarthritic cadaveric human knees. Precision errors for volume were about 2-3% in the femur and 3-5% in the tibia. Precision errors for BMD were about 1-2% lower.”

According to the news reporters, the research concluded: “Homogeneity parameters showed precision errors up to about 2% and anisotropy parameters up to about 4%.”

For more information on this research see: An integrated segmentation and analysis approach for QCT of the knee to determine subchondral bone mineral density and texture. *Ieee Transactions On Biomedical Engineering*, 2012;59(9):2449-58.

Our news correspondents report that additional information may be obtained by contacting P. Zerfass, Institute of Medical Physics, University of Erlangen-Nuernberg, 91052 Erlangen, Germany. (2012 Nov 09)

### **University of Arizona, Tucson: Microwave-Induced Thermoacoustic Imaging Model for Potential Breast Cancer Detection**

By a News Reporter-Staff News Editor at Women’s Health Weekly – A new study on Breast Cancer is now available. According to news reporting out of Tucson, Arizona, by NewsRx editors, research stated, “In this study, we develop a complete microwave-induced thermoacoustic imaging (TAI) model for potential breast cancer imaging application. Acoustic pressures generated by different breast tissue targets are investigated by finite-difference time-domain simulations of the entire TAI process including the feeding antenna, matching mechanism, fluidic environment, 3-D breast model, and acoustic transducer.”

Our news journalists obtained a quote from the research from the University of Arizona, “Simulation results achieve quantitative relationships between the input microwave peak power and the resulting specific absorption rate as well as the output acoustic pressure. Microwave frequency dependence of the acoustic signals due to different breast tissues is established across a broadband frequency range (2.3-12 GHz), suggesting key advantages of spectroscopic TAI compare to TAI at a single frequency. Reconstructed thermoacoustic images are consistent with the modeling results.”

According to the news editors, the research concluded: “This model will contribute to design, optimization, and safety evaluation of microwave-induced TAI and spectroscopy.”

For more information on this research see: Microwave-Induced Thermoacoustic Imaging Model for Potential Breast Cancer Detection. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2782-2791. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting X. Wang, University of Arizona, Dept. of Radiol, Tucson, AZ 85724, United States. (2012 Nov 08)

### **Aalborg University: Spike detection and clustering with unsupervised wavelet optimization in extracellular neural recordings**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating in Aalborg, Denmark, by NewsRx journalists, research stated, “Automatic and accurate detection of action potentials of unknown waveforms in noisy extracellular neural recordings is an important requirement for developing brain-computer interfaces. This study introduces a new, wavelet-based manifestation variable that combines the wavelet shrinkage denoising with multiscale edge detection for robustly detecting and finding the occurrence time of action potentials in noisy signals.”

The news reporters obtained a quote from the research from Aalborg University, “To further improve the detection performance by eliminating the dependence of the method to the choice of the mother wavelet, we propose an unsupervised optimization for best basis selection. Moreover, another unsupervised criterion based on a correlation similarity measure was defined to update the wavelet selection during the clustering to improve the spike sorting performance. The proposed method was compared to several previously proposed methods by using a wide range of realistic simulated data as well as selected experimental recordings of intracortical signals from freely moving rats. The detection performance of the proposed method substantially surpassed previous methods for all signals tested.”

According to the news reporters, the research concluded: “Moreover, updating the wavelet selection for the clustering task was shown to improve the classification performance with respect to maintaining the same wavelet as for the detection stage.”

For more information on this research see: Spike detection and clustering with unsupervised wavelet optimization in extracellular neural recordings. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2576-85.

Our news correspondents report that additional information may be obtained by contacting V. Shalchyan, Dept. of Health Science and Technology, Faculty Medicine, Aalborg University, Aalborg, Denmark. (2012 Nov 07)

### **Bilkent University, Ankara: A Simple Analytical Expression for the Gradient Induced Potential on Active Implants During MRI**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Ankara, Turkey, by NewsRx journalists, research stated, “During magnetic resonance imaging, there is an interaction between the time-varying magnetic fields and the active implantable medical devices (AIMD). In this study, in order to express the nature of this interaction, simplified analytical expressions for the electric fields induced by time-varying magnetic fields are derived inside a homogeneous cylindrical volume.”

The news reporters obtained a quote from the research from Bilkent University, “With these analytical expressions, the gradient induced potential on the electrodes of the AIMD can be approximately calculated if the position of the lead inside the body is known. By utilizing the fact that gradient coils produce linear magnetic field in a volume of interest, the simplified closed form electric field expressions are defined. Using these simplified expressions, the induced potential on an implant electrode has been computed approximately for various lead positions on a cylindrical phantom and verified by comparing with the measured potentials for these sample conditions. In addition, the validity of the method was tested with isolated frog leg stimulation experiments.”

According to the news reporters, the research concluded: “As a result, these simplified expressions may help in assessing the gradient-induced stimulation risk to the patients with implants.”

For more information on this research see: A Simple Analytical Expression for the Gradient Induced Potential on Active Implants During MRI. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2845-2851. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes

Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting E.A. Turk, Bilkent University, Dept. of Mol Biol & Genet, TR-06800 Ankara, Turkey. (2012 Nov 07)

### **Brown University, Providence: Prediction of Imagined Single-Joint Movements in a Person With High-Level Tetraplegia**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Providence, Rhode Island, by NewsRx correspondents, research stated, “Cortical neuroprostheses for movement restoration require developing models for relating neural activity to desired movement. Previous studies have focused on correlating single-unit activities (SUA) in primary motor cortex to volitional arm movements in able-bodied primates.”

Our news editors obtained a quote from the research from Brown University, “The extent of the cortical information relevant to arm movements remaining in severely paralyzed individuals is largely unknown. We record intracortical signals using a microelectrode array chronically implanted in the precentral gyrus of a person with tetraplegia, and estimate positions of imagined single-joint arm movements. Using visually guided motor imagery, the participant imagined performing eight distinct single-joint arm movements, while SUA, multipike trains (MSP), multiunit activity, and local field potential time (LFPrms), and frequency signals (LFPstft) were recorded. Using linear system identification, imagined joint trajectories were estimated with 20-60% variance explained, with wrist flexion/extension predicted the best and pronation/supination the poorest. Statistically, decoding of MSP and LFPstft yielded estimates that equaled those of SUA. Including multiple signal types in a decoder increased prediction accuracy in all cases.”

According to the news editors, the research concluded: “We conclude that signals recorded from a single restricted region of the precentral gyrus in this person with tetraplegia contained useful information regarding the intended movements of upper extremity joints.”

For more information on this research see: Prediction of Imagined Single-Joint Movements in a Person With High-Level Tetraplegia. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2755-2765. *IEEE Transactions on Biomedical Engineering* can be contacted at:

Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting A.B. Ajiboye, Brown University, Dept. of Neurosci Brain Sci Program, Providence, RI 02912, United States. (2012 Nov 07)

### **China University of Science and Technology, Anhui: Computing motor unit number index of the first dorsal interosseous muscle with two different contraction tasks**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Anhui, People’s Republic of China, by NewsRx journalists, research stated, “Motor unit number index (MUNIX) is a recently developed novel neurophysiological technique providing an index proportional to the number of motor units in a muscle. The MUNIX is derived from maximum M wave and voluntary surface electromyogram (EMG) recordings.”

The news reporters obtained a quote from the research from the China University of Science and Technology, “The objective of this study was to address a practical question for computing MUNIX in the first dorsal interosseous (FDI), a multifunctional muscle that generates torque about the second metacarpophalangeal joint, i.e., how will different lines of muscle activation influence its MUNIX estimates? To address this question, the MUNIX technique was applied in the FDI muscle of 15 neurologically intact subjects, using surface EMG signals from index finger abduction and flexion, respectively, while the maximum M wave remained the same. Across all subjects, the average MUNIX value of the FDI muscle was 228 +/- 45 for index finger abduction, slightly smaller than the MUNIX estimate of 251 +/- 56 for index finger flexion. Different FDI muscle activation patterns resulted in an approximately 10% difference in MUNIX estimates. The findings from this study suggest that appropriate definition of voluntary activation of the FDI muscle should be kept to ensure consistency in measurements and avoid source of error. The current study is limited by only assessing neurologically intact muscles.”

According to the news reporters, the research concluded: “It is important to perform a similar analysis for patients with amyotrophic lateral sclerosis (ALS), given that ALS is the primary intention of the MUNIX method as a potential follow-up measurement for motor unit loss.”

For more information on this research see: Computing motor unit number index of the first dorsal interosseous muscle with two different



contraction tasks. *Medical Engineering & Physics*, 2012;34(8):1209-1212. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting P. Zhou, China University of Science & Technology, Inst Biomed Engn, Hefei 230026, Anhui, People's Republic of China. (2012 Nov 07)

### **City University of Hong Kong: Specific Absorption Rate Evaluation for Passengers Using Wireless Communication Devices Inside Vehicles With Different Handedness, Passenger Counts, and Seating Locations**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Hong Kong, People's Republic of China, by NewsRx correspondents, research stated, "Radiation from mobile phones inside vehicles, which are semiopen metallic enclosures with irregular shapes and apertures, has been a major concern and has warranted investigation in past years. In this paper, the specific absorption rate (SAR) induced in mobile phone users inside a vehicle was evaluated using different scenarios, including handedness, passenger counts, and seating locations."

Our news editors obtained a quote from the research from the City University of Hong Kong, "A computer simulation for SAR distributions in a human body was performed based on the finite-difference time-domain method. The SAR values in mobile phone users in free space were also compared to those inside a vehicle; results illustrated that the maximum SAR induced for mobile phone users in a vehicle is 5% higher than those in free space, but the SAR results showed no significant difference for the handedness."

According to the news editors, the research concluded: "By comparing the SAR values between mobile phone users and nonusers inside a vehicle with a passenger count and seating locations, it was observed that the SAR values around the nonusers' body varied much in different situations, and were higher than those in free space, in some circumstances."

For more information on this research see: Specific Absorption Rate Evaluation for Passengers Using Wireless Communication Devices Inside Vehicles With Different Handedness, Passenger Counts, and Seating Locations. *IEEE Transactions on Biomedical Engineering*,

2012;59(10):2905-2912. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting S.W. Leung, City University of Hong Kong, Dept. of Elect Engn, Kowloon, Hong Kong, People's Republic of China. (2012 Nov 07)

### **Federal University, Florianopolis: Sinusoidal Signal Analysis of Electroporation in Biological Cells**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Florianopolis, Brazil, by NewsRx journalists, research stated, “Conductivity measurements in suspensions of biological cells have been used since many years for electroporation effectiveness evaluation. However, conductivity modeling by means of instantaneous values of current and voltage during pulse application does not take into account the effects of the sample reactance and the dielectric dispersion of the medium.”

The news correspondents obtained a quote from the research from Federal University, “This can lead to misinterpretation in the electroporation analysis. The electrical modeling and characterization of electroporation using sinusoidal signal analysis at 10 kHz proposed in this paper allows us to avoid distortions due to reactive effects of the sample. A simple equation establishes the relation between suspension conductivity and membrane conductance. This model was used in experiments with suspensions of yeast cells and applied electric fields of up to 450 kV/m for 1 ms.”

According to the news reporters, the research concluded: “The analysis using the proposed model resulted in membrane conductance values of up to 8000 S/m(2) and allowed estimating the distribution profile of conductance on the cell membrane.”

For more information on this research see: Sinusoidal Signal Analysis of Electroporation in Biological Cells. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2965-2973. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting A. Ramos, Federal University of Santa Catarina,

Inst Biomed Engn, Dept. of Elect Engn, BR-88040900 Florianopolis, SC, Brazil. (2012 Nov 07)

### **Genomics Research Institute, Phoenix: Evaluating Dynamic Effects of Copy Number Alterations on Gene Expression Using a Single Transcription Model**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Phoenix, Arizona, by NewsRx journalists, research stated, “DNA copy number alterations (CNAs) are known to be related to genetic diseases, including cancer. The unlimited transcription (UT) model, in which transcription occurs permissively with a simple activation probability, has been proposed to investigate long-term effects of CNAs on gene expression values.”

The news correspondents obtained a quote from the research from Genomics Research Institute, “Queueing theory was applied, and the copy-number-gene-expression relationship has been shown to be generally nonlinear in the UT model. However, the dynamic effects of CNAs on transcription and the underlying disorders related to diseases remain greatly unknown. Since most genes in a single cell are permissively transcribed in short periods of time interspersed by long periods of limited transcription, an alternative model for transcription in the restrictive state is needed for unraveling the effects of CNAs on gene expression levels with time. To address these issues, herein a single transcription (ST) model is proposed, in which bound TFs are assumed to be unloaded immediately after stimulating a transcription. Using the Laplace-Stieltjes transform and numerical analysis, the relationship between DNA copy number and gene expression level is evaluated. Dynamic modeling reveals that CNAs would potentially alter, or even reverse, the burst-like gene expression modifications while shifting from the ST model to the UT model. Moreover, functional disorders in transcriptional oscillation due to CNAs are shown via simulation.”

According to the news reporters, the research concluded: “This paper demonstrates how mathematical theories could be helpful to interpret statistical findings from real data and achieve a better understanding of cancer biology.”

For more information on this research see: Evaluating Dynamic Effects of Copy Number Alterations on Gene Expression Using a Single Transcription Model. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2726-2736. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical

and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting F.H. Hsu, Translat Genom Res Inst, Phoenix, AZ 85004, United States. (2012 Nov 07)

### **Iran University of Science and Technology, Tehran: A Decentralized Modular Control Framework for Robust Control of FES-Activated Walker-Assisted Paraplegic Walking Using Terminal Sliding Mode and Fuzzy Logic Control**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting from Tehran, Iran, by NewsRx journalists, research stated, “A major challenge to developing functional electrical stimulation (FES) systems for paraplegic walking and widespread acceptance of these systems is the design of a robust control strategy that provides satisfactory tracking performance. The systems need to be robust against time-varying properties of neuromusculoskeletal dynamics, day-to-day variations, subject-to-subject variations, external disturbances, and must be easily applied without requiring offline identification during different experimental sessions.”

The news correspondents obtained a quote from the research from the Iran University of Science and Technology, “Another major problem related to walker-assisted FES-activated walking concerns the high metabolic rate and upper body effort that limit the clinical applications of FES systems. In this paper, we present a novel decentralized modular control framework for robust control of walker-assisted FES-activated walking. For each muscle-joint dynamics, an independent module control is designed, and the dynamics of the plant are identified online. This process requires no prior knowledge about the dynamics of the plant to be controlled and no offline learning phase. The module is based on adaptive fuzzy terminal sliding mode control and fuzzy logic control. The module control adjusts both pulse-amplitude and pulsewidth of the stimulation signal in such a way that upper body effort is minimized and the lower extremity walking pattern lies within a defined boundary of the reference trajectory. The proposed control strategy has been evaluated on three paraplegic subjects. The results showed that accurate tracking performance and smooth walking pattern were achieved.”

According to the news reporters, the research concluded: “This favorable performance was obtained without requiring offline identification, manual adjustments, and predefined ON/OFF timing of the muscles.”

For more information on this research see: A Decentralized Modular Control Framework for Robust Control of FES-Activated Walker-Assisted Paraplegic Walking Using Terminal Sliding Mode and Fuzzy Logic Control. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2818-2827. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting V. Nekoukar, Iran Univ Sci & Technol, Iran Neurol Technol Center, Dept. of Biomed Engn, Tehran 1684613114, Iran. (2012 Nov 07)

### **Mackay Memorial Hospital, Tamsui: Finite element analysis of the dental implant using a topology optimization method**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Tamsui, Taiwan, by NewsRx correspondents, research stated, “In recent years, many attempts have been made to optimize the shape of dental implants. The purpose of this study took advantage of the topology optimization in the finite element (FE) method to look for redundant material distribution on a dental threaded implant and redesigned a new implant macrogeometry with the evaluation of its biomechanical functions.”

Our news editors obtained a quote from the research from Mackay Memorial Hospital, “Three-dimensional FE models were created of a first molar section of the maxilla and embedded with an implant, abutment and a superstructure by using the commercial software ANSYS 11.0. The final design of a new implant was shaped by topology optimization, and four FE models namely traditional implants with bonded (TB) and contact (TC) interfaces, and new implants with bonded (NB) and contact (NC) interfaces, were established. Material properties of compact and cancellous bone were modeled as fully orthotropy and transversely isotropy respectively. Oblique (200-N vertical and 40-N horizontal) occlusal loading was applied on the central and distal fossa

of the crown. The FE model estimated that the volume of the new implant could be reduced by 17.9% of the traditional one and the biomechanical performances were similar, such as the stress of the implant, stress of the implant-bone complex, lower displacement, and greater stiffness than the traditional implant. The advantages of the new implant increased the space to allow more new bone ingrowth or assist in fusing more bone graft into the bone sustaining the implant stability and saved material.”

According to the news editors, the research concluded: “Its disadvantage was higher stress level compared with that of the traditional implant.”

For more information on this research see: Finite element analysis of the dental implant using a topology optimization method. *Medical Engineering & Physics*, 2012;34(7):999-1008. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting C.L. Chang, Mackay Memorial Hospital, Dept. of Biomed Res, Tamsui, Taipei County, Taiwan. (2012 Nov 07)

### **Massachusetts Institute of Technology, Cambridge: A Real-Time Automated Point-Process Method for the Detection and Correction of Erroneous and Ectopic Heartbeats**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of Cambridge, Massachusetts, by NewsRx editors, research stated, “The presence of recurring arrhythmic events (also known as cardiac dysrhythmia or irregular heartbeats), as well as erroneous beat detection due to low signal quality, significantly affects estimation of both time and frequency domain indices of heart rate variability (HRV). A reliable, real-time classification and correction of ECG-derived heartbeats is a necessary prerequisite for an accurate online monitoring of HRV and cardiovascular control.”

Our news journalists obtained a quote from the research from the Massachusetts Institute of Technology, “We have developed a novel point-process-based method for real-time R-R interval error detection and correction. Given an R-wave event, we assume that the length of the next R-R interval follows a physiologically motivated, time-varying inverse Gaussian probability distribution. We then devise an instantaneous automated detection and correction procedure for erroneous and

arrhythmic beats by using the information on the probability of occurrence of the observed beat provided by the model. We test our algorithm over two datasets from the PhysioNet archive. The Fantasia normal rhythm database is artificially corrupted with known erroneous beats to test both the detection procedure and correction procedure. The benchmark MIT-BIH Arrhythmia database is further considered to test the detection procedure of real arrhythmic events and compare it with results from previously published algorithms. Our automated algorithm represents an improvement over previous procedures, with best specificity for the detection of correct beats, as well as highest sensitivity to missed and extra beats, artificially misplaced beats, and for real arrhythmic events.”

According to the news editors, the research concluded: “A near-optimal heartbeat classification and correction, together with the ability to adapt to time-varying changes of heartbeat dynamics in an online fashion, may provide a solid base for building a more reliable real-time HRV monitoring device.”

For more information on this research see: A Real-Time Automated Point-Process Method for the Detection and Correction of Erroneous and Ectopic Heartbeats. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2828-2837. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting L. Citi, MIT, Dept. of Brain & Cognit Sci, Cambridge, MA 02139, United States. (2012 Nov 07)

### **Massachusetts Institute of Technology, Cambridge: Stochastic System Identification of Skin Properties: Linear and Wiener Static Nonlinear Methods**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Cambridge, Massachusetts, by NewsRx journalists, research stated, “Wiener static nonlinear system identification was used to study the linear dynamics and static nonlinearities in the response of skin and underlying tissue under indentation in vivo. A device capable of measuring the dynamic mechanical properties of bulk skin tissue was developed and it incorporates a custom-built Lorentz force actuator that measures the dynamic compliance between the input force (< 12 N) and the output displacement (< 20 mm).”

The news correspondents obtained a quote from the research from the Massachusetts Institute of Technology, “A simple linear stochastic system identification technique produced a variance accounted for (VAF) of 75-81% and Wiener static nonlinear techniques increased the VAF by 5%. Localized linear techniques increased the VAF to 85-95% with longer tests. Indentation experiments were conducted on 16 test subjects to determine device sensitivity and repeatability. Using the device, the coefficient of variation of test metrics was found to be as low as 2% for a single test location. The measured tissue stiffness was 300 N/m near the surface and 4.5 kN/m for high compression. The damping ranged from 5 to 23 N s/m. The bulk skin properties were also shown to vary significantly with gender and body mass index.”

According to the news reporters, the research concluded: “The device and techniques used in this research can be applied to consumer product analysis, medical diagnosis and tissue research.”

For more information on this research see: Stochastic System Identification of Skin Properties: Linear and Wiener Static Nonlinear Methods. *Annals of Biomedical Engineering*, 2012;40(10):2277-2291. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting Y. Chen, MIT, Dept. of Mech Engn, Cambridge, MA 02139, United States. (2012 Nov 07)

### **National Technical University, Athens: A novel method for the generation of multi-block computational structured grids from medical imaging of arterial bifurcations**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Athens, Greece, by NewsRx correspondents, research stated, “In this study a description of a new approach, for the generation of multi-block structured computational grids on patient-specific bifurcation geometries is presented.”

Our news journalists obtained a quote from the research from National Technical University, “The structured grid generation technique is applied to data obtained by medical imaging examination, resulting in a surface conforming, high quality, multi-block structured grid of the branching geometry. As a case study application a patient specific abdominal aorta bifurcation is selected.”

According to the news editors, the research concluded: “For the evaluation of the grid produced by the novel method, a grid convergence study and a comparison between the grid produced by the method and



unstructured grids produced by commercial meshing software are carried out.”

For more information on this research see: A novel method for the generation of multi-block computational structured grids from medical imaging of arterial bifurcations. *Medical Engineering & Physics*, 2012;34(8):1157-1166. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from E. Makris, National Technical University of Athens, Sch Mech Engn, Athens 15780, Greece. (2012 Nov 07)

### **Peking University, Beijing: Personalized tooth shape estimation from radiograph and cast**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Beijing, People’s Republic of China, by NewsRx journalists, research stated, “Three-dimensional geometric information of teeth is usually needed in pre-and postoperative diagnoses of orthodontic dentistry. The computerized tomography can provide comprehensive 3-D teeth geometries.”

The news correspondents obtained a quote from the research from Peking University, “However, there is still a discussion on computed tomography (CT) as a routine in orthodontic dentistry due to radiation dose. Moreover, the CT is useless when a dentist needs to extract 3-D structures from old archive files with only radiographs and casts, where patient’s teeth changed ever since. In this paper, we propose a reconstruction framework for patient-specific teeth based on an integration of 2-D radiographs and digitized casts. The reconstruction is under a template-fitting framework. The shape and orientation of teeth templates are tuned in accordance with patient’s radiographs. Specially, the tooth root morphology is controlled by 2-D contours in radiographs. With ray tracing and a contour plane assumption, 2-D root contours in radiographs are projected back to 3-D space, and guide tooth root deformations. Moreover, the template’s crown is deformed nonrigidly to fit digitized casts that bear patient’s crown details.”

According to the news reporters, the research concluded: “The system allows 3-D tooth reconstruction with patient-specific geometric details from just casts and 2-D radiographs.”

For more information on this research see: Personalized tooth shape estimation from radiograph and cast. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2400-11.

Our news journalists report that additional information may be obtained by contacting Y. Pei, Key Laboratory of Machine Perception (MOE), Dept. of Machine Intelligence, Peking University, Beijing 100871, People's Taiwan. (2012 Nov 07)

### **Portland State University: Shoulder and elbow joint angle tracking with inertial sensors**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Portland, Oregon, by NewsRx journalists, research stated, “Wearable inertial systems have recently been used to track human movement in and outside of the laboratory. Continuous monitoring of human movement can provide valuable information relevant to individuals’ level of physical activity and functional ability.”

The news reporters obtained a quote from the research from Portland State University, “Traditionally, orientation has been calculated by integrating the angular velocity from gyroscopes. However, a small drift in the measured velocity leads to increasing integration error over time. To compensate that drift, complementary data from accelerometers are normally fused into tracking systems using the Kalman or extended Kalman filter. In this study, we combine kinematic models designed for control of robotic arms with state-space methods to continuously estimate the angles of human shoulder and elbow using two wearable inertial measurement units. We use the unscented Kalman filter to implement the nonlinear state-space inertial tracker. Shoulder and elbow joint angles obtained from 8 subjects using our inertial tracker were compared to the angles obtained from an optical-tracking reference system. On average, there was an RMS angle error of less than 8°; for all shoulder and elbow angles. The average correlation coefficient for all movement tasks among all subjects was  $r=0.95$ . This agreement between our inertial tracker and the optical reference system was obtained for both regular and fast-speed movement of the arm.”

According to the news reporters, the research concluded: “The same method can be used to track movement of other joints.”

For more information on this research see: Shoulder and elbow joint angle tracking with inertial sensors. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2635-41.

Our news correspondents report that additional information may be obtained by contacting M. El-Gohary, Dept. of Electrical and Computer Engineering, Portland State University, Portland OR 97201, United States. (2012 Nov 07)

## Rehabilitation Institute of Chicago: Estimates of Acausal Joint Impedance Models

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting from Chicago, Illinois, by NewsRx journalists, research stated, “Estimates of joint or limb impedance are commonly used in the study of how the nervous system controls posture and movement, and how that control is altered by injury to the neural or musculoskeletal systems. Impedance characterizes the dynamic relationship between an imposed perturbation of joint position and the torques generated in response.”

The news correspondents obtained a quote from the research from the Rehabilitation Institute of Chicago, “While there are many practical reasons for estimating impedance rather than its inverse, admittance, it is an acausal representation of the limb mechanics that can lead to difficulties in interpretation or use. The purpose of this study was to explore the acausal nature of nonparametric estimates of joint impedance representations to determine how they are influenced by common experimental and computational choices. This was accomplished by deriving discrete-time realizations of first and second-order derivatives to illustrate two key difficulties in the physical interpretation of impedance impulse response functions. These illustrations were provided using both simulated and experimental data. It was found that the shape of the impedance impulse response depends critically on the selected sampling rate, and on the bandwidth and noise characteristics of the position perturbation used during the estimation process.”

According to the news reporters, the research concluded: “These results provide important guidelines for designing experiments in which nonparametric estimates of impedance will be obtained, especially when those estimates are to be used in a multistep identification process.”

For more information on this research see: Estimates of Acausal Joint Impedance Models. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2913-2921. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting D.T. Westwick, Rehabil Inst Chicago, Sensory Motor Performance Program, Chicago, IL 60611, United States. (2012 Nov 07)

### **School of Engineering, Hanover: Creation of a human head phantom for testing of electroencephalography equipment and techniques**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Hanover, New Hampshire, by NewsRx journalists, research stated, “We have designed and fabricated an anatomically accurate human head phantom that is capable of generating realistic electric scalp potential patterns. This phantom was developed for performance evaluation of new electroencephalography (EEG) caps, hardware, and measurement techniques that are designed for environments high in electromagnetic and mechanical noise.”

The news correspondents obtained a quote from the research from the School of Engineering, “The phantom was fabricated using conductive composite materials that mimic the electrical and mechanical properties of scalp, skull, and brain. The phantom prototype was calibrated and testing was conducted using a 32-electrode EEG cap. Test results show that the phantom is able to generate diverse scalp potential patterns using a finite number of dipole antennas internal to the phantom.”

According to the news reporters, the research concluded: “This phantom design could provide a valuable test platform for wearable EEG technology.”

For more information on this research see: Creation of a human head phantom for testing of electroencephalography equipment and techniques. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2628-34.

Our news journalists report that additional information may be obtained by contacting T.J. Collier, Thayer School of Engineering at Dartmouth, Hanover, NH 03755, United States. (2012 Nov 07)

### **Sensory-Motor Systems Laboratory, Zurich: Model-based estimation of knee stiffness**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Zurich, Switzerland, by NewsRx journalists, research stated, “During natural locomotion, the stiffness of the human knee is modulated continuously and subconsciously according to the demands of activity and terrain. Given modern actuator technology, powered transfemoral prostheses could theoretically provide a similar degree of sophistication and function.”

The news correspondents obtained a quote from the research from Sensory-Motor Systems Laboratory, “However, experimentally quantifying knee stiffness modulation during natural gait is challenging. Alternatively, joint stiffness could be estimated in a less disruptive manner using electromyography (EMG) combined with kinetic and kinematic measurements to estimate muscle force, together with models that relate muscle force to stiffness. Here we present the first step in that process, where we develop such an approach and evaluate it in isometric conditions, where experimental measurements are more feasible. Our EMG-guided modeling approach allows us to consider conditions with antagonistic muscle activation, a phenomenon commonly observed in physiological gait. Our validation shows that model-based estimates of knee joint stiffness coincide well with experimental data obtained using conventional perturbation techniques.”

According to the news reporters, the research concluded: “We conclude that knee stiffness can be accurately estimated in isometric conditions without applying perturbations, which presents an important step toward our ultimate goal of quantifying knee stiffness during gait.”

For more information on this research see: Model-based estimation of knee stiffness. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2604-12.

Our news journalists report that additional information may be obtained by contacting S. Pfeifer, Sensory-Motor Systems Laboratory, ETH Zurich, Zurich, Switzerland. (2012 Nov 07)

### **Southeast University, Jiangsu: Comprehensive common spatial patterns with temporal structure information of EEG data: minimizing nontask related EEG component**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Jiangsu, People’s Republic of China, by NewsRx journalists, research stated, “In the context of electroencephalogram (EEG)-based brain-computer interfaces (BCI), common spatial patterns (CSP) is widely used for spatially filtering multichannel EEG signals. CSP is a supervised learning technique depending on only labeled trials.”

The news reporters obtained a quote from the research from Southeast University, “Its generalization performance deteriorates due to overfitting occurred when the number of training trials is small. On the other hand, a large number of unlabeled trials are relatively easy to obtain. In this paper, we contribute a comprehensive learning scheme of CSP (cCSP) that learns on both labeled and unlabeled trials. cCSP

regularizes the objective function of CSP by preserving the temporal relationship among samples of unlabeled trials in terms of linear representation. The intrinsically temporal structure is characterized by an  $l(1)$  graph. As a result, the temporal correlation information of unlabeled trials is incorporated into CSP, yielding enhanced generalization capacity. Interestingly, the regularizer of cCSP can be interpreted as minimizing a nontask related EEG component, which helps cCSP alleviate nonstationarities.”

According to the news reporters, the research concluded: “Experiment results of single-trial EEG classification on publicly available EEG datasets confirm the effectiveness of the proposed method.”

For more information on this research see: Comprehensive common spatial patterns with temporal structure information of EEG data: minimizing nontask related EEG component. *Ieee Transactions On Biomedical Engineering*, 2012;59(9):2496-505.

Our news correspondents report that additional information may be obtained by contacting H. Wang, Key Laboratory of Child Development and Learning Science of Ministry of Education, Research Center for Learning Science, Southeast University, Nanjing, Jiangsu 210096, People's Taiwan. (2012 Nov 07)

### **Technical University, Dresden: Simultaneous determination of drugs in human autopsy material using phase-optimized liquid chromatography**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Chromatography. According to news reporting out of Dresden, Germany, by NewsRx editors, research stated, “In legal medicine in many cases drugs are detected in autopsy material without connection to the cause of death, and until now no further investigations have taken place. In our study more than 50 drugs were measured directly in several compartments.”

Our news journalists obtained a quote from the research from Technical University, “The deceased had received continual therapeutic treatment, treatment during an operation or an unsuccessful emergency therapy. Liquid-liquid extraction and an LC-MS/MS method were developed for the determination of these drug concentrations. When measuring many transitions in a biological matrix, two problems should be excluded: ion suppression and too few measurement points per peak. A relatively short operation time and sufficient separation were achieved by column, eluent and gradient optimization with POPLC (phase-optimized liquid chromatography). Various autopsy materials from about 170 cases were investigated. In particular, in nine cases with four or more simultaneously determined drugs, their distribution in the compartments is very interesting for pharmacokinetic

examinations. The distribution patterns of the drugs in the compartments of one individual deceased were compared. This meant that the great differences between subjects that are normally encountered these studies could be excluded.”

According to the news editors, the research concluded: “Measurements of drug concentrations in human autopsy material deepens knowledge of the respective drugs’ pharmacokinetics.”

For more information on this research see: Simultaneous determination of drugs in human autopsy material using phase-optimized liquid chromatography. *Biomedical Chromatography*, 2012;26(12):1608-16. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-0801](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-0801))

Our news journalists report that additional information may be obtained by contacting R. Oertel, Institute of Clinical Pharmacology, Medical Faculty Carl Gustav Carus, Technical University Dresden, Fiedlerstr 27, 01307, Dresden, Germany. (2012 Nov 07)

### **UPMC, Paris: Methodology for jointly assessing myocardial infarct extent and regional contraction in 3-D CMRI**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting out of Paris, France, by NewsRx editors, research stated, “Automated extraction of quantitative parameters from cardiac magnetic resonance images is crucial for the management of patients with myocardial infarct. This paper proposes a postprocessing procedure to jointly analyze Cine and delayed-enhanced (DE) acquisitions, in order to provide an automatic quantification of myocardial contraction and enhancement parameters and a study of their relationship.”

Our news journalists obtained a quote from the research from UPMC, “For that purpose, the following processes are performed: 1) DE/Cine temporal synchronization and 3-D scan alignment, 2) 3-D DE/Cine rigid registration in a region about the heart, 3) myocardium segmentation on Cine-MRI and superimposition of the epicardial and endocardial contours on the DE images, 4) quantification of the myocardial infarct extent (MIE), 5) study of the regional contractile function using a new index, the amplitude to time ratio (ATR). The whole procedure was applied to ten patients with clinically proven myocardial infarction. The comparison between the MIE and the visually assessed regional function scores demonstrated that the MIE is highly related to the severity of the wall motion abnormality. In addition, it was shown that the newly developed regional myocardial contraction parameter (ATR) decreases significantly in delayed enhanced regions.”

According to the news editors, the research concluded: “This largely automated approach enables the combined study of regional MIE and left ventricular function.”

For more information on this research see: Methodology for jointly assessing myocardial infarct extent and regional contraction in 3-D CMRI. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2650-9.

Our news journalists report that additional information may be obtained by contacting Y. Chenoune, UPMC, Inserm U678 Research Unit, 75634 Paris, France. (2012 Nov 07)

### **University Duisburg-Essen: Variable power combiner for RF mode shimming in 7-T MR imaging**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news originating from Duisburg, Germany, by NewsRx correspondents, research stated, “This contribution discusses the utilization of RF power in an MRI system with RF mode shimming which enables the superposition of circularly polarized modes of a transmit RF coil array driven by a Butler matrix. Since the required power for the individual modes can vary widely, mode-shimming can result in a significant underutilization of the total available RF power.”

Our news journalists obtained a quote from the research from University Duisburg-Essen, “A variable power combiner (VPC) is proposed to improve the power utilization: it can be realized as a reconfiguration of the MRI transmit system by the inclusion of one additional matrix network which receives the power from all transmit amplifiers at its input ports and provides any desired (combined) power distribution at its output ports by controlling the phase and amplitude of the amplifiers’ input signals. The power distribution at the output ports of the VPC is then fed into the ‘mode’ ports of the coil array Butler matrix in order to superimpose the spatial modes at the highest achievable power utilization. The VPC configuration is compared to the standard configuration of the transmit chain of our MRI system with 8 transmit channels and 16 coils. In realistic scenarios, improved power utilization was achieved from 17% to 60% and from 14% to 55% for an elliptical phantom and a region of interest in the abdomen, respectively, and an increase of the power utilization of 1 dB for a region of interest in the upper leg.”

According to the news editors, the research concluded: “In general, it is found that the VPC allows significant improvement in power utilization when the shimming solution demands only a few modes to be energized, while the technique can yield loss in power utilization in cases with many modes required at high power level.”



For more information on this research see: Variable power combiner for RF mode shimming in 7-T MR imaging. *Ieee Transactions On Biomedical Engineering*, 2012;59(9):2549-57.

The news correspondents report that additional information may be obtained from P. Yazdanbakhsh, University Duisburg-Essen, 45141 Duisburg, Germany. (2012 Nov 07)

### **University Hospital, Basel: Polydimethylsiloxane embedded mouse aorta ex vivo perfusion model: proof-of-concept study focusing on atherosclerosis**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Optics is the subject of a report. According to news reporting from Basel, Switzerland, by NewsRx journalists, research stated, “Existing mouse artery ex vivo perfusion models have utilized arteries such as carotid, uterine, and mesenteric arteries, but not the aorta. However, the aorta is the principal vessel analyzed for atherosclerosis studies in vivo.”

The news correspondents obtained a quote from the research from University Hospital, “We have devised a mouse aorta ex vivo perfusion model that can bridge this gap. Aortas from apoE((-/-)) mice are embedded in a transparent, gas-permeable, and elastic polymer matrix [polydimethylsiloxane (PDMS)] and artificially perfused with cell culture medium under cell culture conditions. After 24 h of artificial ex vivo perfusion, no evidence of cellular apoptosis is detected. Utilizing a standard confocal microscope, it is possible to image specific receptor targeting of cells in atherosclerotic plaques during 24 h. Imaging motion artifacts are minimal due to the polymer matrix embedding. Re-embedding of the aorta enables tissue sectioning and immuno-histochemical analysis. The ex vivo data are validated by comparison with in vivo experiments. This model can save animal lives via production of multiple endpoints in a single experiment, is easy to apply, and enables straightforward comparability with pre-existing atherosclerosis in vivo data.”

According to the news reporters, the research concluded: “It is suited to investigate atherosclerotic disease in particular and vascular biology in general.”

For more information on this research see: Polydimethylsiloxane embedded mouse aorta ex vivo perfusion model: proof-of-concept study focusing on atherosclerosis. *Journal of Biomedical Optics*, 2012;17(7):076006.

Our news journalists report that additional information may be obtained by contacting X. Wang, University Hospital Basel, Nanomedicine Group, Clinic for Intensive Care, Petersgraben 4, CH-4031 Basel, Switzerland. (2012 Nov 07)

## **University of British Columbia, Vancouver: A Sign-Component-Based Framework for Chinese Sign Language Recognition Using Accelerometer and sEMG Data**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of Vancouver, Canada, by NewsRx editors, research stated, “Identification of constituent components of each sign gesture can be beneficial to the improved performance of sign language recognition (SLR), especially for large-vocabulary SLR systems. Aiming at developing such a system using portable accelerometer (ACC) and surface electromyographic (sEMG) sensors, we propose a framework for automatic Chinese SLR at the component level.”

Our news journalists obtained a quote from the research from the University of British Columbia, “In the proposed framework, data segmentation, as an important preprocessing operation, is performed to divide a continuous sign language sentence into subword segments. Based on the features extracted from ACC and sEMG data, three basic components of sign subwords, namely the hand shape, orientation, and movement, are further modeled and the corresponding component classifiers are learned. At the decision level, a sequence of subwords can be recognized by fusing the likelihoods at the component level. The overall classification accuracy of 96.5% for a vocabulary of 120 signs and 86.7% for 200 sentences demonstrate the feasibility of interpreting sign components from ACC and sEMG data and clearly show the superior recognition performance of the proposed method when compared with the previous SLR method at the subword level.”

According to the news editors, the research concluded: “The proposed method seems promising for implementing large-vocabulary portable SLR systems.”

For more information on this research see: A Sign-Component-Based Framework for Chinese Sign Language Recognition Using Accelerometer and sEMG Data. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2695-2704. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting Y. Li, University of British Columbia, Dept. of Elect & Comp Engr, Vancouver, BC V6T 1Z4, Canada. (2012 Nov 07)

## **University of California, Los Angeles: Intracranial hypertension prediction using extremely randomized decision trees**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Los Angeles, California, by NewsRx editors, research stated, “Intracranial pressure (ICP) elevation (intracranial hypertension, IH) in neurocritical care is typically treated in a reactive fashion; it is only delivered after bedside clinicians notice prolonged ICP elevation. A proactive solution is desirable to improve the treatment of intracranial hypertension.”

Our news journalists obtained a quote from the research from the University of California, “Several studies have shown that the waveform morphology of the intracranial pressure pulse holds predictors about future intracranial hypertension and could therefore be used to alert the bedside clinician of a likely occurrence of the elevation in the immediate future. In this paper, a computational framework is proposed to predict prolonged intracranial hypertension based on morphological waveform features computed from the ICP. A key contribution of this work is to exploit an ensemble classifier method based on extremely randomized decision trees (Extra-Trees).”

According to the news editors, the research concluded: “Experiments on a representative set of 30 patients admitted for various intracranial pressure related conditions demonstrate the effectiveness of the predicting framework on ICP pulses acquired under clinical conditions and the superior results of the proposed approach in comparison to linear and AdaBoost classifiers.”

For more information on this research see: Intracranial hypertension prediction using extremely randomized decision trees. *Medical Engineering & Physics*, 2012;34(8):1058-1065. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting F. Scalzo, University of California, David Geffen Sch Med, Dept. of Neurosurg, Neurosurg Neural Syst & Dynam Lab, Los Angeles, CA 90095, United States. (2012 Nov 07)

## University of California, Los Angeles: Regional Prediction of Tissue Fate in Acute Ischemic Stroke

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Los Angeles, California, by NewsRx journalists, research stated, “Early and accurate prediction of tissue outcome is essential to the clinical decision-making process in acute ischemic stroke. We present a quantitative predictive model of tissue fate that combines regional imaging features available after onset.”

The news correspondents obtained a quote from the research from the University of California, “A key component is the use of cuboids randomly sampled during the learning process. Models trained with time-to-maximum feature (Tmax) computed from perfusion weighted images (PWI) are compared to the ones obtained from the apparent diffusion coefficient (ADC). The prediction task is formalized as a regression problem where the inputs are the local cuboids extracted from Tmax or ADC images at onset, and the output is the segmented FLAIR intensity of the tissue 4 days after intervention. Experiments on 25 acute stroke patients demonstrate the effectiveness of the proposed approach in predicting tissue fate.”

According to the news reporters, the research concluded: “Results on our dataset show the superiority of the regional model vs. a single-voxel-based approach, indicate that PWI regional models outperform ADC models, and demonstrates that a nonlinear regression model significantly improves the results in comparison to a linear model.”

For more information on this research see: Regional Prediction of Tissue Fate in Acute Ischemic Stroke. *Annals of Biomedical Engineering*, 2012;40(10):2177-2187. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting F. Scalzo, University of California, David Geffen Sch Med, Dept. of Neurol & Neurosurg, Los Angeles, CA 90095, United States. (2012 Nov 07)

## **University of Colorado, Boulder: The design and characterization of a testing platform for quantitative evaluation of tread performance on multiple biological substrates**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Boulder, Colorado, by NewsRx journalists, research stated, “In this study, an experimental platform is developed to quantitatively measure the performance of robotic wheel treads in a dynamic environment. The platform imposes a dynamic driving condition for a single robot wheel, where the wheel is rotated on a translating substrate, thereby inducing slip.”

The news correspondents obtained a quote from the research from the University of Colorado, “The normal force of the wheel can be adjusted mechanically, while the rotational velocity of the wheel and the translational velocity of the substrate can be controlled using an open-loop control system. Wheel slip and translational speed can be varied autonomously while wheel traction force is measured using a load cell. The testing platform is characterized by testing one micropatterned polydimethylsiloxane (PDMS) tread on three substrates (dry synthetic tissue, hydrated synthetic tissue, and excised porcine small bowel tissue), at three normal forces (0.10, 0.20, and 0.30 N), 13 slip ratios (-0.30 to 0.30 in increments of 0.05), and three translational speeds (2, 3, and 6 mm/s). Additionally, two wheels (micropatterned and smooth PDMS) are tested on beef liver at the same three normal forces and translational speeds for a tread comparison. An analysis of variance revealed that the platform can detect statistically significant differences between means when observing normal forces, translational speeds, slip ratios, treads, and substrates. The variance due to within (platform error,  $p=1$ ) and between trials (human error,  $p=0.152$ ) is minimal when compared to the normal force ( $p=0.036$ ), translational speed ( $p=0.059$ ), slip ratio ( $p=0$ ), tread ( $p=0.004$ ), and substrate variances ( $p=0$ ).”

According to the news reporters, the research concluded: “This precision testing platform can be used to determine wheel tread performance differences on the three substrates and for each of the studied parameters. Future use of the platform could lead to an optimized micropattern-based mobility system, under given operating conditions, for implementation on a robotic capsule endoscope.”

For more information on this research see: The design and characterization of a testing platform for quantitative evaluation of tread performance on multiple biological substrates. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2524-30.

Our news journalists report that additional information may be obtained by contacting L.J. Sliker, Dept. of Mechanical Engineering, University of Colorado Boulder, Boulder, CO 80309, United States. (2012 Nov 07)

### **University of Essex, Colchester: A two-stage four-class BCI based on imaginary movements of the left and the right wrist**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating in Colchester, United Kingdom, by NewsRx journalists, research stated, “This paper presents a new concept of a two-modality, four-class brain-computer interface (BCI) classifier based on motor imagination of the left and the right wrist. The noninvasive BCI combines classification of movements of the same limb (wrist flexion and extension) with classification of movements of different limbs, i.e., left and right wrist.”

The news reporters obtained a quote from the research from the University of Essex, “Results were obtained from ten right-handed neurologically healthy volunteers. Subjects were not allowed to practice real movements before performing movement imagination. The mean classification accuracy for four different classes was 63 +/- 10%. Classification accuracy in four out of ten subjects was  $\geq$  70%. A two-stage four-class classifier showed significantly better classification results ( $p = 0.014$ ) than a single four-class classifier. Classifiers were based on Elman’s neural networks and features were a selected set of absolute values of Gabor coefficients (GCs), calculated from the Independent Components, rather than the EEG signals’ time series. The most representative features for classification between movements of different limbs were in the alpha and the beta range, while for classification between movements of the same limb they were in the delta and the gamma range.”

According to the news reporters, the research concluded: “There was no statistically significant difference between classification accuracy of movements of the right vs. the left wrist.”

For more information on this research see: A two-stage four-class BCI based on imaginary movements of the left and the right wrist. *Medical Engineering & Physics*, 2012;34(7):964-971. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting A. Vuckovic, University of Essex, Sch Comp Sci

& Elect Engn, Colchester CO4 3SQ, Essex, United Kingdom. (2012 Nov 07)

## **University of Florida, Gainesville: Quantifying Cognitive State From EEG Using Dependence Measures**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Gainesville, Florida, by NewsRx journalists, research stated, “The exquisite human ability to perceive facial features has been explained by the activity of neurons particularly responsive to faces, found in the fusiform gyrus and the anterior part of the superior temporal sulcus. This study hypothesizes and demonstrates that it is possible to automatically discriminate face processing from processing of a simple control stimulus based on processed EEGs in an online fashion with high temporal resolution using measures of statistical dependence applied on steady-state visual evoked potentials.”

The news correspondents obtained a quote from the research from the University of Florida, “Correlation, mutual information, and a novel measure of association, referred to as generalized measure of association (GMA), were applied on filtered current source density data. Dependences between channel locations were assessed for two separate conditions elicited by distinct pictures (a face and a Gabor grating) flickering at a rate of 17.5 Hz. Filter settings were chosen to minimize the distortion produced by bandpassing parameters on dependence estimation. Statistical analysis was performed for automated stimulus classification using the Kolmogorov-Smirnov test. Results show active regions in the occipito-parietal part of the brain for both conditions with a greater dependence between occipital and inferotemporal sites for the face stimulus. GMA achieved a higher performance in discriminating the two conditions. Because no additional face-like stimuli were examined, this study established a basic difference between one particular face and one nonface stimulus.”

According to the news reporters, the research concluded: “Future work may use additional stimuli and experimental manipulations to determine the specificity of the current connectivity results.”

For more information on this research see: Quantifying Cognitive State From EEG Using Dependence Measures. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2773-2781. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting B. Fadlallah, University of Florida, NIMH Center Study Emot & Attent, Gainesville, FL 32611, United States. (2012 Nov 07)

### **University of Illinois, Urbana: In Vivo Demonstration of Surgical Task Assistance Using Miniature Robots**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Robotics have been published. According to news reporting originating from Urbana, Illinois, by NewsRx correspondents, research stated, “Laparoscopy is beneficial to patients as measured by less painful recovery and an earlier return to functional health compared to conventional open surgery. However, laparoscopy requires the manipulation of long, slender tools from outside the patient’s body.”

Our news editors obtained a quote from the research from the University of Illinois, “As a result, laparoscopy generally benefits only patients undergoing relatively simple procedures. An innovative approach to laparoscopy uses miniature in vivo robots that fit entirely inside the abdominal cavity. Our previous work demonstrated that a mobile, wireless robot platform can be successfully operated inside the abdominal cavity with different payloads (biopsy, camera, and physiological sensors). We hope that these robots are a step toward reducing the invasiveness of laparoscopy. The current study presents design details and results of laboratory and in vivo demonstrations of several new payload designs (clamping, cautery, and liquid delivery).”

According to the news editors, the research concluded: “Laboratory and in vivo cooperation demonstrations between multiple robots are also presented.”

For more information on this research see: In Vivo Demonstration of Surgical Task Assistance Using Miniature Robots. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2866-2873. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting J.A. Hawks, University of Illinois, Dept. of Mech Sci & Engn, Urbana, IL 61801, United States. (2012 Nov 07)



## **University of Maribor: Heartbeat and Respiration Detection From Optical Interferometric Signals by Using a Multimethod Approach**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Maribor, Slovenia, by NewsRx correspondents, research stated, “In this paper, a multimethod approach for heartbeat and respiration detection from an optical interferometric signal is proposed. Optical interferometer is a sensitive device that detects physical changes of optical-fiber length due to external perturbations.”

Our news editors obtained a quote from the research from the University of Maribor, “When in direct or indirect contact with human body (e. g., hidden in a bed mattress), mechanical and acoustic activity of cardiac muscle and respiration reflect in the interferometric signal, enabling entirely unobtrusive monitoring of heartbeat and respiration. A novel, two-phased multimethod approach was developed for this purpose. The first phase selects best performing combinations of detection methods on a training set of signals. The second phase applies the selected methods to test set of signals and fuses all the detections of vital signs. The test set consisted of 14 subjects cycling an ergometer until reaching their submaximal heart rate.”

According to the news editors, the research concluded: “The following resting periods were analyzed showing high efficiency (98.18 +/- 1.40% sensitivity and 97.04 +/- 4.95% precision) and accuracy (mean absolute error of beat-to-beat intervals 22 +/- 9 ms) for heartbeat detection, and acceptable efficiency (90.06 +/- 7.49% sensitivity and 94.21 +/- 3.70% precision) and accuracy (mean absolute error of intervals between respiration events 0.33 +/- 0.14 s) for respiration detection.”

For more information on this research see: Heartbeat and Respiration Detection From Optical Interferometric Signals by Using a Multimethod Approach. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2922-2929. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting S. Sprager, University of Maribor, Fac Elect Engn & Comp Sci, SI-2000 Maribor, Slovenia. (2012 Nov 07)

## **University of Montreal: Assessment of reproducibility of thigh marker ranking during walking and landing tasks**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Montreal, Canada, by NewsRx journalists, research stated, “The aim of this paper is to analyse the repeatability of marker deformation and marker ranking across subjects and motor tasks. A method based on the solidification of the thigh with optimized rototranslation was applied which used 26 markers placed on the left thigh.”

The news correspondents obtained a quote from the research from the University of Montreal, “During five trials of landing and five trials of walking for eight participants, the deformation between the actual positions of the 26 markers and the recalled positions from solidification were calculated. Markers were then sorted and ranked from the most deformed to the least deformed. Like previous studies, marker deformation found in this paper is subject and movement-dependant. The reproducibility of the marker rankings was assessed using Kendall’s coefficient of concordance. Results highlighted that the marker ranking was similar between the trials of landing and between the trials of walking.”

According to the news reporters, the research concluded: “Moreover, for walking and landing the rankings were consistent across the eight subjects.”

For more information on this research see: Assessment of reproducibility of thigh marker ranking during walking and landing tasks. *Medical Engineering & Physics*, 2012;34(8):1200-1208. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting T. Monnet, University of Montreal, Dept. of Kinesiol, CEPSUM 2100, Montreal, PQ H3C 3J7, Canada. (2012 Nov 07)

## **University of Porto, Oporto: Heartbeat Classification Using Morphological and Dynamic Features of ECG Signals**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating in Oporto, Portugal, by NewsRx journalists, research stated, “In this paper, we propose a new approach for heartbeat classification based on a combination of morphological and dynamic features. Wavelet transform and independent component analysis (ICA)

are applied separately to each heartbeat to extract morphological features.”

The news reporters obtained a quote from the research from the University of Porto, “In addition, RR interval information is computed to provide dynamic features. These two different types of features are concatenated and a support vector machine classifier is utilized for the classification of heartbeats into one of 16 classes. The procedure is independently applied to the data from two ECG leads and the two decisions are fused for the final classification decision.”

According to the news reporters, the research concluded: “The proposed method is validated on the baseline MITBIH arrhythmia database and it yields an overall accuracy (i.e., the percentage of heartbeats correctly classified) of 99.3% (99.7% with 2.4% rejection) in the ‘class-oriented’ evaluation and an accuracy of 86.4% in the ‘subject-oriented’ evaluation, comparable to the state-of-the-art results for automatic heartbeat classification.”

For more information on this research see: Heartbeat Classification Using Morphological and Dynamic Features of ECG Signals. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2930-2941. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting C. Ye, University of Porto, Dept. of Comp Sci, Fac Sci, Inst Telecomunicacoes, P-4099 Oporto, Portugal. (2012 Nov 07)

### **University of Rhode Island, Kingston: Toward Design of an Environment-Aware Adaptive Locomotion-Mode-Recognition System**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Kingston, Rhode Island, by NewsRx correspondents, research stated, “In this study, we aimed to improve the performance of a locomotion-mode-recognition system based on neuromuscular-mechanical fusion by introducing additional information about the walking environment. Linear-discriminant-analysis-based classifiers were first designed to identify a lower limb prosthesis user’s locomotion mode based on electromyographic signals recorded from residual leg muscles and ground reaction forces measured from the prosthetic pylon.”

Our news editors obtained a quote from the research from the University of Rhode Island, “Nine transfemoral amputees who wore a passive hydraulic knee or powered prosthetic knee participated in this study. Information about the walking terrain was simulated and modeled as prior probability based on the principle of maximum entropy and integrated into the discriminant functions of the classifier. When the correct prior knowledge of walking terrain was simulated, the classification accuracy for each locomotion mode significantly increased and no task transitions were missed. In addition, simulated incorrect prior knowledge did not significantly reduce system performance, indicating that our design is robust against noisy and imperfect prior information. Furthermore, these observations were independent of the type of prosthesis applied.”

According to the news editors, the research concluded: “The promising results in this study may assist the further development of an environment-aware adaptive system for locomotion-mode recognition for powered lower limb prostheses or orthoses.”

For more information on this research see: Toward Design of an Environment-Aware Adaptive Locomotion-Mode-Recognition System. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2716-2725. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting L. Du, University of Rhode Island, Dept. of Elect Comp & Biomed Engn, Kingston, RI 02881, United States. (2012 Nov 07)

### **University of Sao Paulo, Ribeirao Preto: Development of an AMR-ACB Array for Gastrointestinal Motility Studies**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Ribeirao Preto, Brazil, by NewsRx correspondents, research stated, “The association between anisotropic magnetoresistive (AMR) sensor and AC biosusceptometry (ACB) to evaluate gastrointestinal motility is presented. The AMR-ACB system was successfully characterized in a bench-top study, and in vivo results were compared with those obtained by means of simultaneous manometry.”

Our news editors obtained a quote from the research from the University of Sao Paulo, “Both AMR-ACB and manometry techniques presented high temporal cross correlation between the two periodicals signals ( $R = 0.9 \pm 0.1$ ;  $P \leq 0.05$ ). The contraction frequencies using

AMR-ACB were 73.9 +/- 7.6 mHz and using manometry were 73.8 +/- 7.9 mHz during the baseline ( $r = 98$ ,  $p < 0.05$ ). The amplitude of contraction using AMR-ACB was 396 +/- 108  $\mu$ T.s and using manometry were 540 +/- 198 mmHg.s during the baseline. The amplitudes of signals for AMR-ACB and manometric recordings were similarly increased to 86.4% and 89.3% by neostigmine, and also decreased to 27.2% and 21.4% by hyoscine butylbromide in all animals, respectively.”

According to the news editors, the research concluded: “The AMR-ACB array is nonexpensive, portable, and has high-spatiotemporal resolution to provide helpful information about gastrointestinal tract.”

For more information on this research see: Development of an AMR-ACB Array for Gastrointestinal Motility Studies. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2737-2743. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting F.C. Paixao, University of Sao Paulo, BR-14015000 Ribeirao Preto, SP, Brazil. (2012 Nov 07)

### **University of Saskatchewan, Saskatoon: Modeling of cell cultures in perfusion bioreactors**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Saskatoon, Canada, by NewsRx correspondents, research stated, “Cultivating cells and tissues in bioreactors is a critical step in forming artificial tissues or organs prior to transplantation. Among various bioreactors, the perfusion bioreactor is known for its enhanced convection through the cell-scaffold constructs.”

Our news editors obtained a quote from the research from the University of Saskatchewan, “Knowledge of mass transfer is essential for controlling the cell culture process; however, obtaining this information remains a challenging task. In this research, a novel mathematical model is developed to represent the nutrient transport and cell growth in a 3-D scaffold cultivated in a perfusion bioreactor. Numerical methods are employed to solve the equations involved, with a focus on identifying the effect of factors such as porosity, culturing time, and flow rate, which are controllable in the scaffold fabrication and culturing process, on cell cultures. To validate the new model, the results from the model simulations were compared to the experimental results extracted from the literature.”

According to the news editors, the research concluded: “With the validated model, further simulations were carried out to investigate the glucose and oxygen distribution and the cell growth within the cell-scaffold construct in a perfusion bioreactor, thus providing insight into the cell culture process.”

For more information on this research see: Modeling of cell cultures in perfusion bioreactors. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2568-75.

The news editors report that additional information may be obtained by contacting X. Yan, Dept. of Mechanical Engineering, University of Saskatchewan, Saskatoon, SK, Canada. (2012 Nov 07)

### **University of Toronto: Design and evaluation of a novel microphone-based mechanomyography sensor with cylindrical and conical acoustic chambers**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating in Toronto, Canada, by NewsRx journalists, research stated, “Mechanomyography has recently been proposed as a control modality for alternative access technologies for individuals with disabilities. However, MMG recordings are highly susceptible to contamination from limb movements.”

The news reporters obtained a quote from the research from the University of Toronto, “Pressure-based transducers are touted to be the most robust to external movement although there is some debate about their optimal chamber geometry, in terms of low frequency gain and spectral flatness. To investigate the question of preferred geometry, transducers with cylindrical and conical chambers of varying dimensions were designed, manufactured and tested. Using a computer-controlled electrodynamic shaker, the frequency response of each chamber geometry was empirically derived. Of the cylindrical chambers, the highest gain and the flattest frequency response was exhibited by a chamber 10 mm in diameter and 5-7 mm in height. However, conical chambers offered an average rise in gain of  $6.79 \pm 1.06$  dB/Hz over that achievable with cylindrical geometries. The highest gain and flattest response was achieved with a transducer consisting of a low-frequency MEMS microphone, a 4  $\mu$ m aluminized mylar membrane and a rigid conical chamber 7 mm in diameter and 5 mm in height.”

According to the news reporters, the research concluded: “This design is recommended for MMG applications where limb movement is prevalent.”

For more information on this research see: Design and evaluation of a novel microphone-based mechanomyography sensor with cylindrical and conical acoustic chambers. *Medical Engineering & Physics*,

2012;34(8):1184-1190. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting A.O. Posatskiy, University of Toronto, Dept. of Mech & Ind Engn, Toronto, ON, Canada. (2012 Nov 07)

### **University of Toronto: Visualization of trunk muscle synergies during sitting perturbations using self-organizing maps (SOM)**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news originating from Toronto, Canada, by NewsRx correspondents, research stated, “The purpose of this study was to demonstrate the use of the self-organizing map (SOM) method for visualization, modeling, and comparison of trunk neuromuscular synergies during perturbed sitting. Thirteen participants were perturbed at the level of the sternum, in eight directions during sitting.”

Our news journalists obtained a quote from the research from the University of Toronto, “Electromyographic (EMG) responses of ten trunk muscles involved in postural control were recorded. The SOM was used to encode the EMG responses on a 2-D projection (i.e., visualization). The result contains similar patterns mapped close together on the plot therefore forming clusters of data. Such visualization of ten EMG responses, following eight directional perturbations, allows for comparisons of direction-dependent postural synergies. Direction-dependent neuromuscular response models for each muscle were then constructed from the SOM visualization. The results demonstrated that the SOM was able to encode neuromuscular responses, and the SOM visualization showed direction-dependent differences in the postural synergies. Moreover, each muscle was modeled using the SOM-based method, and derived models showed that all muscles, except for one, produced a Gaussian fit for direction-dependent responses.”

According to the news editors, the research concluded: “Overall, SOM analysis offers a reverse engineering method for exploration and comparison of complex neuromuscular systems, which can describe postural synergies at a glance.”

For more information on this research see: Visualization of trunk muscle synergies during sitting perturbations using self-organizing maps (SOM). *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2516-23.

The news correspondents report that additional information may be obtained from M. Milosevic, Institute of Biomaterials and Biomedical Engineering, University of Toronto, Toronto, ON, Canada. (2012 Nov 07)

### **University of Tubingen: Hydraulic Driven Fast and Precise Nonmagnetic Tactile Stimulator for Neurophysiological and MEG Measurements**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Tubingen, Germany, by NewsRx journalists, research stated, “Electric stimulation of the peripheral nerves is well established as a diagnostic and research tool to analyze the somatosensory system. However, electric stimulation has some disadvantages.”

The news correspondents obtained a quote from the research from the University of Tubingen, “Electric stimulation of the median nerve triggers action potentials in all fiber populations of the nerve. Electric stimulation further creates artifacts and causes discomfort which is usually not well tolerated in the awake child. Therefore, the development of a more specific stimulation has constantly been a goal in recent years. There have been several approaches in the past to deliver somatic stimulation. However, all of them failed short in some aspects. In this study, a new type of somatosensory stimulator device was developed and compared against the gold standard of electric stimulation. The stimulation is achieved by repetitive tactile stimulation of the index finger using a blunt needle. In contrast to all previous approaches, we use a hydraulic system to move the needle up and downward. Given that water is very well suited to conduct pressure pulses it is possible to place the tactile stimulator device holding the needle close to the subject and the hydraulic driving system outside a critical area. Using a phantom, we showed that our stimulator is capable of delivering a stimulus precise on the submillisecond time scale. In addition, we test our stimulator on a healthy adult and compare the results against the electric stimulation. We can show the feasibility of measuring the electric responses of the peripheral nerve and while using MEG also the response of the primary somatosensory cortex. The tactile stimulation showed a more spatially focused activation of the primary somatosensory cortex when compared against the electric stimulation.”

According to the news reporters, the research concluded: “The proposed high-precision tactile stimulator will make it possible to analyze the somatosensory system noninvasively in children in the future.”

For more information on this research see: Hydraulic Driven Fast and Precise Nonmagnetic Tactile Stimulator for Neurophysiological and MEG Measurements. *IEEE Transactions on Biomedical Engineering*,



2012;59(10):2852-2858. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting P.J. Broser, University of Tübingen, MEG Center, Dept. of Clin Psychol, D-72076 Tübingen, Germany. (2012 Nov 07)

### **University of Zaragoza: Evaluation of migration forces of a retrievable filter: Experimental setup and finite element study**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating from Zaragoza, Spain, by NewsRx correspondents, research stated, “The aim of this paper is to provide a computational study of migration forces of a retrievable filter (Gunther Tulip inferior vena cava filter). Using an experimental setup and finite element simulation, the migration forces and stress at the end of the anchored hooks in the struts were estimated.”

Our news editors obtained a quote from the research from the University of Zaragoza, “After that, the estimation value of migration stress ( $\tau_{rup}$ ) was used to analyze the effect of different mechanical factors (strut thickness, vena cava diameter) in the migration of the IVC filter. Our results show that the migration stress is  $\tau_{rup} = 4.37 \text{ N/mm}^2$ . Using this value we obtain that the filter with higher strut diameter ( $\phi(\text{strut}) = 0.45 \text{ mm}$ ) shows the maximal migration forces in every cava diameter. On the other hand, the value of the migration force decreases when the cava diameter increases.”

According to the news editors, the research concluded: “In addition, the finite element simulations also show that there are contact between the struts of the filter and the vein in regions close to the anchors.”

For more information on this research see: Evaluation of migration forces of a retrievable filter: Experimental setup and finite element study. *Medical Engineering & Physics*, 2012;34(8):1167-1176. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting A. Garcia, University of Zaragoza, Fac Vet, GITMI, E-50009 Zaragoza, Spain. (2012 Nov 07)

## **Vanderbilt University, Nashville: A Manually Operated, Advance Off-Stylet Insertion Tool for Minimally Invasive Cochlear Implantation Surgery**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting from Nashville, Tennessee, by NewsRx journalists, research stated, “The current technique for cochlear implantation (CI) surgery requires a mastoidectomy to gain access to the cochlea for electrode array insertion. It has been shown that microstereotactic frames can enable an image-guided, minimally invasive approach to CI surgery called percutaneous cochlear implantation (PCI) that uses a single drill hole for electrode array insertion, avoiding a more invasive mastoidectomy.”

The news correspondents obtained a quote from the research from Vanderbilt University, “Current clinical methods for electrode array insertion are not compatible with PCI surgery because they require a mastoidectomy to access the cochlea; thus, we have developed a manually operated electrode array insertion tool that can be deployed through a PCI drill hole. The tool can be adjusted using a preoperative CT scan for accurate execution of the advance off-stylet (AOS) insertion technique and requires less skill to operate than is currently required to implant electrode arrays.”

According to the news reporters, the research concluded: “We performed three cadaver insertion experiments using the AOS technique and determined that all insertions were successful using CT and microdissection.”

For more information on this research see: A Manually Operated, Advance Off-Stylet Insertion Tool for Minimally Invasive Cochlear Implantation Surgery. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2792-2800. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting L.B. Kratchman, Vanderbilt University, Dept. of Biomed Engn, Nashville, TN 37235, United States. (2012 Nov 07)

## Washington University, St. Louis: Estimating Electrical Conductivity Tensors of Biological Tissues Using Microelectrode Arrays

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting out of St. Louis, Missouri, by NewsRx editors, research stated, “Finding the electrical conductivity of tissue is highly important for understanding the tissue’s structure and functioning. However, the inverse problem of inferring spatial conductivity from data is highly ill-posed and computationally intensive.”

Our news journalists obtained a quote from the research from Washington University, “In this paper, we propose a novel method to solve the inverse problem of inferring tissue conductivity from a set of transmembrane potential and stimuli measurements made by microelectrode arrays (MEA). We first formalize the discrete forward model of transmembrane potential propagation, based on a reaction-diffusion model with an anisotropic inhomogeneous electrical conductivity-tensor field. Then, we propose a novel parallel optimization algorithm for solving the complex inverse problem of estimating the electrical conductivity-tensor field. Specifically, we propose a single-step approximation with a parallel block-relaxation optimization routine that simplifies the joint tensor field estimation problem into a set of computationally tractable subproblems, allowing the use of efficient standard optimization tools.”

According to the news editors, the research concluded: “Finally, using numerical examples of several electrical conductivity field topologies and noise levels, we analyze the performance of our algorithm, and discuss its application to real measurements obtained from smooth-muscle cardiac tissue, using data collected with a high-resolution MEA system.”

For more information on this research see: Estimating Electrical Conductivity Tensors of Biological Tissues Using Microelectrode Arrays. *Annals of Biomedical Engineering*, 2012;40(10):2140-2155. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting E. Gilboa, Washington University, Sch Med, Dept. of Med, Div Gen Med Sci, St Louis, MO 63110, United States. (2012 Nov 07)

### **Zhejiang University, Hangzhou: A finite difference method for the design of gradient coils in MRI—an initial framework**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Hangzhou, People’s Republic of China, by NewsRx correspondents, research stated, “This paper proposes a finite-difference (FD)-based method for the design of gradient coils in MRI. The design method first uses the FD approximation to describe the continuous current density of the coil space and then employs the stream function method to extract the coil patterns.”

Our news editors obtained a quote from the research from Zhejiang University, “During the numerical implementation, a linear equation is constructed and solved using a regularization scheme. The algorithm details have been exemplified through biplanar and cylindrical gradient coil design examples. The design method can be applied to unusual coil designs such as ultrashort or dedicated gradient coils.”

According to the news editors, the research concluded: “The proposed gradient coil design scheme can be integrated into a FD-based electromagnetic framework, which can then provide a unified computational framework for gradient and RF design and patient-field interactions.”

For more information on this research see: A finite difference method for the design of gradient coils in MRI—an initial framework. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2412-21.

The news editors report that additional information may be obtained by contacting M. Zhu, Dept. of Biomedical Engineering, Key Laboratory for Biomedical Engineering of Ministry of Education, Zhejiang University, Hangzhou, People’s Taiwan. (2012 Nov 07)

### **Harvard University, Boston: Influences of supra-physiological temperatures on microstructure and mechanical properties of skin tissue**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Boston, Massachusetts, by NewsRx journalists, research stated, “Thermal therapies under supra-physiological temperatures are increasingly used to treat skin diseases (e.g., superficial melanoma, removal of port-wine stains pigmented and cutaneous lesions). The efficacy of these therapies depends on the thermal and mechanical loadings that skin experiences during the treatment process.”

The news reporters obtained a quote from the research from Harvard University, “Therefore, it is of great significance to better understand

the role of thermally induced changes in skin mechanical behavior and microstructure. In this study, rabbit belly skin was thermally damaged by immersing skin samples into saline solutions with controlled temperatures. We investigated the effect of thermal damage on skin mechanical behavior. We quantified the changes in skin microstructure (i.e., fiber, fibril) using histological staining and transmission electron microscopy (TEM). The results indicate that (i) the elastic modulus of skin, obtained by the uniaxial tensile test, decreased with increasing heating temperature; (ii) the skin tensile behavior was correlated with its microstructure changes induced by thermal denaturation of collagen fibers under supra-physiological temperatures; (iii) skin thermal damage predicted using the Arrhenius burn integration quantitatively agrees well with the evolution of the microstructure (i.e., percentage of the collagen area in Hematoxylin and Eosin (H&E) staining results)."

According to the news reporters, the research concluded: "This study provides a better understanding of the coupled bio-thermo-mechanical behavior of skin tissue that could help to improve clinical thermal therapies."

For more information on this research see: Influences of supra-physiological temperatures on microstructure and mechanical properties of skin tissue. *Medical Engineering & Physics*, 2012;34(8):1149-1156. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting M. Lin, Harvard University, Brigham & Women's Hospital, HST Center Biomed Engr, Dept. of MedMed Sch, Boston, MA 02115, United States. (2012 Nov 06)

### **New Jersey Institute of Technology, Newark: Transillumination imaging for blood oxygen saturation estimation of skin lesions**

By a News Reporter-Staff News Editor at Life Science Weekly – Researchers detail new data in Biomedical Engineering. According to news originating from Newark, New Jersey, by NewsRx correspondents, research stated, "Detecting the early stages of melanoma can be greatly assisted by an accurate estimate of subsurface blood volume and blood oxygen saturation, indicative of angiogenesis. Visualization of this blood volume present beneath a skin lesion can be achieved through the transillumination of the skin."

Our news journalists obtained a quote from the research from the New Jersey Institute of Technology, “As the absorption of major chromophores in the skin is wavelength dependent, multispectral imaging can provide the needed information to separate out relative amounts of each chromophore. However, a critical challenge to this strategy is relating the pixel intensities observed in a given image to the wavelength-dependent total absorption existing at each spatial location. Consequently, in this paper, we develop an extension to Beer’s law, estimated through a novel voxel-based, parallel processing Monte Carlo simulation of light propagation in skin which takes into account the specific geometry of our transillumination imaging apparatus. We then use this relation in a linear mixing model, solved using a multispectral image set, for chromophore separation and oxygen saturation estimation of an absorbing object located at a given depth within the medium. Validation is performed through the Monte Carlo simulation, as well as by imaging on a skin phantom.”

According to the news editors, the research concluded: “Results show that subsurface oxygen saturation can be reasonably estimated with good implications for the reconstruction of 3-D skin lesion volumes using transillumination toward early detection of malignancy.”

For more information on this research see: Transillumination imaging for blood oxygen saturation estimation of skin lesions. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2660-7.

The news correspondents report that additional information may be obtained from B. D’Alessandro, Dept. of Electrical and Computer Engineering, New Jersey Institute of Technology, Newark, NJ 07102, United States. (2012 Nov 06)

### **University of Oxford: Forecasting Depression in Bipolar Disorder**

By a News Reporter-Staff News Editor at Ivy League Week – Investigators discuss new findings in Biomedical Engineering. According to news originating from Oxford, United Kingdom, by NewsRx correspondents, research stated, “Bipolar disorder is characterized by recurrent episodes of mania and depression and affects about 1% of the adult population. The condition can have a major impact on an individual’s ability to function and is associated with a long-term risk of suicide.”

Our news journalists obtained a quote from the research from the University of Oxford, “In this paper, we report on the use of self-rated mood data to forecast the next week’s depression ratings. The data used in the study have been collected using SMS text messaging and comprises one time series of approximately weekly mood ratings for each patient. We find a wide variation between series: some exhibit a large change in mean over the monitored period and there is a variation in

correlation structure. Almost half of the time series are forecast better by unconditional mean than by persistence. Two methods are employed for forecasting: exponential smoothing and Gaussian process regression. Neither approach gives an improvement over a persistence baseline. We conclude that the depression time series from patients with bipolar disorder are very heterogeneous and that this constrains the accuracy of automated mood forecasting across the set of patients.”

According to the news editors, the research concluded: “However, the dataset is a valuable resource and work remains to be done that might result in clinically useful information and tools.”

For more information on this research see: Forecasting Depression in Bipolar Disorder. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2801-2807. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from P.J. Moore, University of Oxford, Dept. of Psychiat, Oxford OX1 3LB, United Kingdom. (2012 Nov 06)

### **Lund University: An Echo State Neural Network for QRST Cancellation During Atrial Fibrillation**

By a News Reporter-Staff News Editor at Network Weekly News – Investigators publish new report on Heart Diseases and Conditions. According to news reporting from Lund, Sweden, by VerticalNews journalists, research stated, “A novel method for QRST cancellation during atrial fibrillation (AF) is introduced for use in recordings with two or more leads. The method is based on an echo state neural network which estimates the time-varying, nonlinear transfer function between two leads, one lead with atrial activity and another lead without, for the purpose of canceling ventricular activity.”

The news correspondents obtained a quote from the research from Lund University, “The network has different sets of weights that define the input, hidden, and output layers, of which only the output set is adapted for every new sample to be processed. The performance is evaluated on ECG signals, with simulated f-waves added, by determining the root mean square error between the true f-wave signal and the estimated signal, as well as by evaluating the dominant AF frequency. When compared to average beat subtraction (ABS), being the most widely used method for QRST cancellation, the performance is found to be significantly better with an error reduction factor of 0.24-0.43, depending on f-wave amplitude. The estimates of dominant AF

frequency are considerably more accurate for all f-wave amplitudes than the AF estimates based on ABS.”

According to the news reporters, the research concluded: “The novel method is particularly well suited for implementation in mobile health systems where monitoring of AF during extended time periods is of interest.”

For more information on this research see: An Echo State Neural Network for QRST Cancellation During Atrial Fibrillation. *IEEE Transactions on Biomedical Engineering*, 2012;59(10):2950-2957. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting A. Petrenas, Lund University, Dept. of Elect & Informat Technol, SE-22100 Lund, Sweden. (2012 Nov 05)

### **McLean Hospital, Belmont: Isolating the sources of widespread physiological fluctuations in functional near-infrared spectroscopy signals**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators publish new report on Biomedical Optics. According to news reporting out of Belmont, Massachusetts, by NewsRx editors, research stated, “Physiological fluctuations at low frequency (<0.1 Hz) are prominent in functional near-infrared spectroscopy (fNIRS) measurements in both resting state and functional task studies. In this study, we used the high spatial resolution and full brain coverage of functional magnetic resonance imaging (fMRI) to understand the origins and commonalities of these fluctuations.”

Our news journalists obtained a quote from the research from McLean Hospital, “Specifically, we applied a newly developed method, regressor interpolation at progressive time delays, to analyze concurrently recorded fNIRS and fMRI data acquired both in a resting state study and in a finger tapping study. The method calculates the voxel-wise correlations between blood oxygen level dependent (BOLD) fMRI and fNIRS signals with different time shifts and localizes the areas in the brain that highly correlate with the fNIRS signal recorded at the surface of the head. The results show the wide spatial distribution of this physiological fluctuation in BOLD data, both in task and resting states.”

According to the news editors, the research concluded: “The brain areas that are highly correlated with global physiological fluctuations



observed by fNIRS have a pattern that resembles the venous system of the brain, indicating the blood fluctuation from veins on the brain surface might strongly contribute to the overall fNIRS signal.”

For more information on this research see: Isolating the sources of widespread physiological fluctuations in functional near-infrared spectroscopy signals. *Journal of Biomedical Optics*, 2011;16(10):106005.

Our news journalists report that additional information may be obtained by contacting Y. Tong, McLean Hospital, Brain Imaging Center, 115 Mill Street, Belmont, Massachusetts 02478, United States. (2012 Nov 05)

### **University of Malta, Msida: Complex-valued spatial filters for SSVEP-based BCIs with phase coding**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting from Msida, Malta, by NewsRx journalists, research stated, “Brain-computer interface (BCI) systems based on steady-state visual evoked potentials (SSVEPs) have gained considerable popularity because of the robustness and high information transfer rate these can provide. Typical SSVEP setups make use of visual targets flashing at different frequencies, where a user’s choice is determined from the SSVEPs elicited by the user gazing at a specific target.”

The news correspondents obtained a quote from the research from the University of Malta, “The range of stimulus frequencies available for such setups is limited by a variety of factors, including the strength of the evoked potentials as well as user comfort and safety with light stimuli flashing at those frequencies. One way to tackle this limitation is by introducing targets flickering at the same frequency but with different phases. In this paper, we propose the use of the analytic common spatial patterns (ACSPs) method to discriminate between phase coded SSVEP targets, and we demonstrate that the complex-valued spatial filters used for discrimination can exceed the performance of existing techniques.”

According to the news reporters, the research concluded: “Furthermore, the ACSP method also yields a set of spatial patterns, separable into amplitude and phase components, that provide insight into the underlying brain activity.”

For more information on this research see: Complex-valued spatial filters for SSVEP-based BCIs with phase coding. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2486-95.

Our news journalists report that additional information may be obtained by contacting O. Falzon, Centre for Biomedical Cybernetics, University of Malta, Msida, Malta. (2012 Nov 05)

## **Washington University, St. Louis: Electrocardiographic textbooks based on template hearts warped using ultrasonic images**

By a News Reporter-Staff News Editor at Cardiovascular Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating from St. Louis, Missouri, by NewsRx correspondents, research stated, “Advances in technology make the application of sophisticated approaches to assessing electrical condition of the heart practical. Estimates of cardiac electrical features inferred from body-surface electrocardiographic (ECG) maps are now routinely found in a clinical setting, but errors in those inverse solutions are especially sensitive to the accuracy of heart model geometry and placement within the torso.”

Our news editors obtained a quote from the research from Washington University, “The use of a template heart model allows for accurate generation of individualized heart models and also permits effective comparison of inferred electrical features among multiple subjects. A collection of features mapped onto a common template forms a textbook of anatomically specific ECG variability. Our template warping process to individualize heart models based on a template heart uses ultrasonic images of the heart from a conventional, phased-array system. We chose ultrasound because it is nonionizing, less expensive, and more convenient than MR or CT imaging. To find the orientation and position in the torso model of each image, we calibrated the ultrasound probe by imaging a custom phantom consisting of multiple N-fiducials and computing a transformation between ultrasound coordinates and measurements of the torso surface. The template heart was warped using a mapping of corresponding landmarks identified on both the template and the ultrasonic images. Accuracy of the method is limited by patient movement, tracking error, and image analysis. We tested our approach on one normal control and one obese diabetic patient using the mixed-boundary-value inverse method and compared results from both on the template heart. We believe that our novel textbook approach using anatomically specific heart and torso models will facilitate the identification of electrophysiological biomarkers of cardiac dysfunction.”

According to the news editors, the research concluded: “Because the necessary data can be acquired and analyzed within about 30 min, this framework has the potential for becoming a routine clinical procedure.”

For more information on this research see: Electrocardiographic textbooks based on template hearts warped using ultrasonic images. *Ieee Transactions On Bio-medical Engineering*, 2012;59(9):2531-7.

The news editors report that additional information may be obtained by contacting R.M. Arthur, Dept. of Electrical and Systems Engineering, School of Engineering, Washington University in St Louis, St Louis, MO 63130, United States. (2012 Nov 05)

### **Massachusetts Institute of Technology, Cambridge: Analysis and design of rolling-contact joints for evaluating bone plate performance**

By a News Reporter-Staff News Editor at Health & Medicine Week – A new study on Medical Engineering and Physics is now available. According to news reporting from Cambridge, Massachusetts, by NewsRx journalists, research stated, “An apparatus for testing maxillofacial bone plates has been designed using a rolling contact joint. First, a free-body representation of the fracture fixation techniques utilizing bone plates is used to illustrate how rolling contact joints accurately simulate in vivo biomechanics.”

The news correspondents obtained a quote from the research from the Massachusetts Institute of Technology, “Next, a deterministic description of machine functional requirements is given, and is then used to drive the subsequent selection and design of machine elements. Hertz contact stress and fatigue analysis for two elements are used to ensure that the machine will both withstand loads required to deform different plates, and maintain a high cycle lifetime for testing large numbers of plates. Additionally, clinically relevant deformations are presented to illustrate how stiffness is affected after a deformation is applied, and to highlight improvements made by the machine over current testing standards, which do not adequately re-create in vivo loading conditions. The machine performed as expected and allowed for analysis of bone plates in both deformed and un-deformed configurations to be conducted. Data for deformation experiments is presented to show that the rolling-contact testing machine leads to improved loading configurations, and thus a more accurate description of plate performance.”

According to the news reporters, the research concluded: “A machine for evaluation of maxillofacial bone plates has been designed, manufactured, and used to accurately simulate in vivo loading conditions to more effectively evaluate the performance of both new and existing bone plates.”

For more information on this research see: Analysis and design of rolling-contact joints for evaluating bone plate performance. *Medical Engineering & Physics*, 2012;34(7):1009-18. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting A.H. Slocum, Dept. of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139, United States. (2012 Nov 02)

### **Medical College of Wisconsin, Milwaukee: Prediction of visceral response to multi-directional loading as measured by the chestband**

By a News Reporter-Staff News Editor at Health & Medicine Week – Data detailed on Medical Engineering and Physics have been presented. According to news originating from Milwaukee, Wisconsin, by NewsRx correspondents, research stated, “Thoracic and abdominal injury outcomes are correlated to chestband-derived uniaxial metrics in post-mortem human specimen (PMHS) experiments. Yet, uniaxial metrics may neglect deformations remote from the measurement site which still may be relevant to injury risk in motor vehicle crashes.”

Our news journalists obtained a quote from the research from the Medical College of Wisconsin, “Using 2D chestband contours from PMHS experiments, visceral strain and strain energy density responses were examined using a planar viscoelastic finite element model. The model was exercised by applying to the periphery 21 subject-specific PMHS chestband deformation patterns representing four boundary conditions: (a) lateral impact with close-proximity torso airbag, (b) stationary close-proximity torso airbag loading, &#169; flat rigid lateral impact, and (d) antero-lateral oblique rigid impact. ANOVA determined that mean peak responses were dependent on boundary condition ( $p < 0.002$ ). Using matched-pair experiment injury outcomes, 50% risk of visceral trauma corresponded to localized strain and strain energy density of 1.55 and 33.0 kJ/m<sup>3</sup> ( $p < 0.1$ ). Although strains were large, model response demonstrated sensitivity to impact boundary conditions and observed PMHS trauma.”

According to the news editors, the research concluded: “This model formulation is useful for comparative examination of injury risk from torso deformations measured experimentally using the chestband device.”

For more information on this research see: Prediction of visceral response to multi-directional loading as measured by the chestband. *Medical Engineering & Physics*, 2012;34(7):906-13. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from J.J. Hallman, Dept. of Neurosurgery, Medical College of Wisconsin, Milwaukee, WI 53295, United States. (2012 Nov 02)

## Mid America Heart Institute, Kansas City: Stratification of risk in thin cap fibroatheromas using peak plaque stress estimates from idealized finite element models

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Medical Engineering and Physics is the subject of a report. According to news reporting out of Kansas City, Missouri, by NewsRx editors, research stated, “Thin cap fibroatheroma (TCFA) in coronary arteries is believed to be associated with plaque rupture leading to cardiovascular death and non-fatal myocardial infarction. Catheter-based imaging platforms can identify TCFA but detection algorithms lack specificity.”

Our news journalists obtained a quote from the research from Mid America Heart Institute, “Here we report results of an exploratory study of the variability in TCFA plaque attributes and effects on peak von Mises stress of TCFA using idealized finite element models. A total of 1272 idealized TCFA finite element models were developed by strategically varying attribute dimensions -external elastic membrane diameter, lumen diameter, necrotic core thickness, fibrous cap thickness, and necrotic core angle -obtained from a global registry of subjects undergoing percutaneous coronary intervention with Virtual Histology intravascular ultrasound. Peak stress exhibited parabolic or higher order proportionality with lumen diameter, sigmoidal proportionality with necrotic core thickness, inverse hyperbolic proportionality with fibrous cap thickness, and skewed sinusoidal proportionality with necrotic core angle. Each of these relationships was governed by highly sensitive, complex, and interdependent influences of various attributes on plaque stress. An over 7-fold increase in peak stress from 101 to 788kPa was observed in models of coronary dimensions commonly encountered in clinical practice. Peak stress of intramural TCFA within this common coronary artery subset did not exceed 300kPa for fibrous cap thickness greater than 100m and necrotic core angle outside 90-120°; range, indicating low risk of rupture.”

According to the news editors, the research concluded: “This exploratory study demonstrated the complex and interdependent influence of plaque attributes on the peak stress of TCFA.”

For more information on this research see: Stratification of risk in thin cap fibroatheromas using peak plaque stress estimates from idealized finite element models. *Medical Engineering & Physics*, 2012;34(9):1330-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting W.J. Dolla, Saint Luke’s Mid America Heart Institute, Kansas City, MO, United States. (2012 Nov 02)

## **National Central University, Taoyuan: The effects of flute shape and thread profile on the insertion torque and primary stability of dental implants**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Medical Engineering and Physics have been published. According to news reporting from Taoyuan, Taiwan, by NewsRx journalists, research stated, “Easy insertion of the implant and stable bone purchase is essential for an ideal dental implantation. At the implant tip, the cutting flutes and conical profile are respectively designed to reduce insertion resistance and facilitate the initial insertion.”

The news correspondents obtained a quote from the research from National Central University, “However, the tapered tip might reduce the self-tapping and bone-purchasing abilities of the flutes and the tip threads. Using sawbone blocks as standard specimens, this study experimentally measures the insertion torque, holding power, and bending strength of eight varieties of implant (4 shapes x 2 profiles). The bony contact, interfacial mechanism, and the altered shape of the flutes, at different section planes, are used to explain the experimental results. The results reveal that the bone-implant gaps at the tip region significantly suppress both the self-tapping and bone-purchasing abilities of the flutes and the tip threads. This makes initial insertion of the conical implant easier. However, the conical implant eventually requires a higher insertion torque and holding power, due to tighter bony contact, at the tail threads. The bowl-fluted design has the least flute space to store the squeezed bone chips, so both insertion torque and bending strength are significantly higher. For the conical group, the holding powers of three flute designs are nearly comparable.”

According to the news reporters, the research concluded: “Overall, the conical implant with bowl flutes is the optimal design, with a lower resistance to initial insertion and higher stability, for final instrumentation.”

For more information on this research see: The effects of flute shape and thread profile on the insertion torque and primary stability of dental implants. *Medical Engineering & Physics*, 2012;34(7):797-805. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting S.W. Wu, Dept. of Mechanical Engineering, National Central University, Taoyuan, Taiwan. (2012 Nov 02)

## **Shandong University, Jinan: Analysis of fatigue and tremor during sustained maximal grip contractions using Hilbert-Huang Transformation**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Medical Engineering and Physics. According to news reporting originating in Jinan, People's Republic of China, by NewsRx journalists, research stated, "The objective of this study was to evaluate muscle fatigue and tremor during a Sustained Maximal Grip Contraction (SMGC) using the Hilbert-Huang Transformation (HHT). Thirty-nine healthy subjects volunteered for the study and performed a 25-s SMGC."

The news reporters obtained a quote from the research from Shandong University, "Fatigue parameters such as the relative force output (RFO) were calculated from the residual of SMGC after applying Empirical Mode Decomposition (EMD). Using the energy spectrum of the Intrinsic Mode Functions (IMF) obtained using HHT, isometric force tremor was identified from the 4 to 12 Hz region in IMF3 and IMF4. Data were analysed for five consecutive 5-s epochs to identify changes in fatigue and tremor over time. The HHT method was able to identify a greater resistance to fatigue in women compared to men ( $p=0.05$ ) and in non-dominant hands compared to dominant hands ( $p=0.05$ ). Consistent with the results for fatigue, women had less tremor than men ( $p=0.05$ ), while non-dominant hands trembled less than did dominant hands ( $p=0.05$ ). Higher levels of tremor were observed for non-fatigue-resistant subjects for both 10-15 s and 15-20 s epochs ( $p=0.05$ ). The HHT is an appropriate method to identify both fatigue and tremor during SMGC."

According to the news reporters, the research concluded: "It would be of interest to apply this method to the study the elderly or patients with neuromuscular disorders."

For more information on this research see: Analysis of fatigue and tremor during sustained maximal grip contractions using Hilbert-Huang Transformation. *Medical Engineering & Physics*, 2012;34(7):832-40. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting K. Li, Institute of Biomedical Engineering, Shandong University, 73 Ave Jingshi, 250061 Jinan, People's Taiwan. (2012 Nov 02)

## **University of Boras: Influence of electrode mismatch on Cole parameter estimation from total right side electrical bioimpedance spectroscopy measurements**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Medical Engineering and Physics have been published. According to news reporting originating in Boras, Sweden, by NewsRx journalists, research stated, “Applications based on measurements of Electrical Bioimpedance (EBI) spectroscopy analysis, like assessment of body composition, have proliferated in the past years. Currently Body Composition Assessment (BCA) based in Bioimpedance Spectroscopy (BIS) analysis relies on an accurate estimation of the Cole parameters  $R(0)$  and  $R(8)$ .”

The news reporters obtained a quote from the research from the University of Boras, “A recent study by Bogonez-Franco et al. has proposed electrode mismatch as source of remarkable artefacts in BIS measurements. Using Total Right Side BIS measurements from the aforementioned study, this work has focused on the influence of electrode mismatch on the estimation of  $R(0)$  and  $R(8)$  using the Non-Linear Least Square curve fitting technique on the modulus of the impedance. The results show that electrode mismatch on the voltage sensing electrodes produces an overestimation of the impedance spectrum leading to a wrong estimation of the parameters  $R(0)$  and  $R(8)$ , and consequently obtaining values around 4% larger than the values obtained from BIS without electrode mismatch. The specific key factors behind electrode mismatch or its influence on the analysis of single and spectroscopy measurements have not been investigated yet, no compensation or correction technique is available to overcome the deviation produced on the EBI measurement.”

According to the news reporters, the research concluded: “Since textile-enabled EBI applications using dry tetrodes, i.e. textile electrodes with dry skin-electrode interfaces and potentially large values of electrode polarization impedance are more prone to produce electrode mismatch, the lack of a correction or compensation technique might hinder the proliferation of textile-enabled EBI applications for personalized healthcare monitoring.”

For more information on this research see: Influence of electrode mismatch on Cole parameter estimation from total right side electrical bioimpedance spectroscopy measurements. *Medical Engineering & Physics*, 2012;34(7):1024-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - <http://www.elsevier.com/locate/medengphys>)

Our news correspondents report that additional information may be obtained by contacting R. Buendia, School of Engineering, University of Boras, SE-501 90 Boras, Sweden. (2012 Nov 02)



## University of Minho, Braga: Wireless instrumentation system based on dry electrodes for acquiring EEG signals

By a News Reporter-Staff News Editor at Health & Medicine Week – Fresh data on Medical Engineering and Physics are presented in a new report. According to news reporting originating from Braga, Portugal, by NewsRx correspondents, research stated, “This paper presents a complete non-invasive Wireless acquisition system based on dry electrodes for electroencephalograms (WiDE-EEG) with emphasis in the electronic system design. The WiDE-EEG is composed by a 2.4 GHz radio-frequency (RF) transceiver, biopotential acquisition electronics and dry electrodes.”

Our news editors obtained a quote from the research from the University of Minho, “The WiDE-EEG can acquire electroencephalogram (EEG) signals from 5 unipolar channels, with a resolution of 16 bits and minimum analog amplitude of 9.98 V(pp), at a sampling rate of 1000 samples/s/channel and sends them to a processing unit through RF in a 10 m range. The analog channels were optimized for EEG signals (with amplitudes in the range 70-100 V) and present the following characteristics: a signal gain of 66 dB and a common mode rejection ratio of 56.5 dB. Each electrode is composed by 16 microtip structures that were fabricated through bulk micromachining of a<100>-type silicon substrate in a potassium hydroxide (KOH) solution. The microtips present solid angles of 54.7°; a height of 100-200 nm and 2 mm spaced apart. The electrodes have a thin layer (obtained by sputtering) of iridium oxide (IrO) to guaranty their biocompatibility and improve the contact with the skin. These dry electrodes are in direct contact with the electrolyte fluids of the inner skin layers, and avoid the use of conductive gels. The complete WiDE-EEG occupies a volume of 9 cm x 8.5 cm x 1 cm, which makes it suitable for true mobility of the subjects and at the same time allows high data transfer rates. Since the WiDE-EEG is battery-powered, it overcomes the need of galvanic isolation for ensuring patient safety observed on conventional EEG instrumentation systems. The WiDE-EEG presents a total power consumption of 107 mW, divided as follows: the acquisition system contributes with 10 mW per channel, whereas the commercial MICAz module contributes with 57 mW (e.g., 24 mW from the microcontroller and 33 mW from the RF chip).”

According to the news editors, the research concluded: “The WiDE-EEG also presents autonomy of about 25 h with two class AA 1.5 V batteries.”

For more information on this research see: Wireless instrumentation system based on dry electrodes for acquiring EEG signals. *Medical Engineering & Physics*, 2012;34(7):972-81. (Elsevier

- [www.elsevier.com](http://www.elsevier.com/wps/product/cws_home/30456); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting N.S. Dias, Life and Health Sciences Research Institute (ICVS), School of Health Sciences, University of Minho, Braga, Portugal. (2012 Nov 02)

### **University of Simon Bolivar, Caracas: Orientation of orthotropic material properties in a femur FE model: a method based on the principal stresses directions**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Medical Engineering and Physics. According to news reporting originating from Caracas, Venezuela, by NewsRx correspondents, research stated, “Most work done on bone simulation has modeled the tissue as inhomogeneous and isotropic even though it is a recognized anisotropic material. Some recent investigations have included orthotropic behavior in bone finite elements (FE) models; however the problem regarding the orientation of these properties along the irregular bone anatomy remains.”

Our news editors obtained a quote from the research from the University of Simon Bolivar, “In this work, a procedure to orientate orthotropic properties in a proximal femur FE model using the directions of the principal stresses produced by a physiological load scheme was developed. Two heterogeneous material models, one isotropic and one orthotropic, were employed to test their influence on the mechanical behavior of the bone model. In the developed orthotropic material, the mechanical properties are aligned with the highest principal stress produced from the successive application of a multi load scenario corresponding to 10%, 30% and 45% of the gait cycle. A solid match between anatomical structures in the proximal femur and the corresponding directions of the main principal stress of the elements of the model suggests that the developed methodology works accurately.”

According to the news editors, the research concluded: “The differences found in the stress distributions were small (maximum 7.6%); nevertheless the changes in the strain distributions were important (maximum 27%) and located in areas of clinical relevance.”

For more information on this research see: Orientation of orthotropic material properties in a femur FE model: a method based on the principal stresses directions. *Medical Engineering & Physics*, 2012;34(7):914-9. (Elsevier - [www.elsevier.com](http://www.elsevier.com/wps/product/cws_home/30456); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting T. San Antonio, Grupo de Biomecanica, Universidad Simon Bolivar, Caracas, Venezuela. (2012 Nov 02)

### **Chang Gung University, Taoyuan: Solvent-free fabrication of three dimensionally aligned polycaprolactone microfibers for engineering of anisotropic tissues**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Taoyuan, Taiwan, by NewsRx journalists, research stated, “Fabrication of aligned microfiber scaffolds is critical in successful engineering of anisotropic tissues such as tendon, ligaments and nerves. Conventionally, aligned microfiber scaffolds are two dimensional and predominantly fabricated by electrospinning which is solvent dependent.”

The news reporters obtained a quote from the research from Chang Gung University, “In this paper, we report a novel technique, named microfiber melt drawing, to fabricate a bundle of three dimensionally aligned polycaprolactone microfibers without using any organic solvent. This technique is simple yet effective. It has been demonstrated that polycaprolactone microfibers of 10  $\mu$ m fiber diameter can be directly drawn from a 2 mm orifice. Orifice diameter, temperature and take-up speed significantly influence the final linear density and fiber diameter of the microfibers. Mechanical test suggests that mechanical properties such as stiffness and breaking force of microfiber bundles can be easily adjusted by the number of fibers. In vitro study shows that these microfibers are able to support the proliferation of human dermal fibroblasts over 7 days. In vivo result of Achilles tendon repair in a rabbit model shows that the microfibers were highly infiltrated by tendon tissue as early as in 1 month, besides, the repaired tendon have a well-aligned tissue structure under the guidance of aligned microfibers.”

According to the news reporters, the research concluded: “However whether these three dimensionally aligned microfibers can induce three dimensionally aligned cells remains inconclusive.”

For more information on this research see: Solvent-free fabrication of three dimensionally aligned polycaprolactone microfibers for engineering of anisotropic tissues. *Biomedical Microdevices*, 2012;14(5):863-872. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news correspondents report that additional information may be obtained by contacting J. An, Chang Gung University, Dept. of Chem & Mat Engn, Tao Yuan, Taiwan. (2012 Oct 31)

## **Cornell University, Ithaca: Multiscale modeling of platelet adhesion and thrombus growth**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Ithaca, New York, by NewsRx journalists, research stated, “Our hemostatic system, when called to action, depends on the complex arrangement of a tightly regulated and extensive network of molecules with versatile functionality. Experimental methods have demonstrated marked improvement through enhanced condition-control and monitoring.”

The news reporters obtained a quote from the research from Cornell University, “However, this approach continues to provide limited explanations of the role of individual elements or of a specific component within the entire system. To fill this void, multiscale simulations based on high throughput computing and comprehensive mathematical models are showing their strength in not only revealing hidden physiological mechanisms but also predicting pharmacological/phenotypical outcome in hemostasis reactions based on quantitative analysis. In this review article, we present up-to-date computational methods that simulate the process of platelet adhesion and thrombus growth, compare and summarize their advantages and drawbacks, verify their predictive power, and project their future directions.”

According to the news reporters, the research concluded: “We provide an in-depth summary of one such computational method-Platelet Adhesive Dynamics (PAD)-and discuss its application in simulating platelet aggregation and thrombus development.”

For more information on this research see: Multiscale modeling of platelet adhesion and thrombus growth. *Annals of Biomedical Engineering*, 2012;40(11):2345-54. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting W. Wang, Dept. of Biomedical Engineering, Cornell University, 205 Weill Hall, Ithaca, NY, 14853, United States. (2012 Oct 31)

## **Institute for Biomechanics, Zurich: Toward mechanical systems biology in bone**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Zurich, Switzerland, by NewsRx correspondents, research stated, “Cyclic mechanical loading is perhaps the most important physiological factor regulating bone mass and shape in a way which balances optimal strength with minimal weight. This bone adaptation process spans multiple length and time scales.”

Our news journalists obtained a quote from the research from Institute for Biomechanics, “Forces resulting from physiological exercise at the organ scale are sensed at the cellular scale by osteocytes, which reside inside the bone matrix. Via biochemical pathways, osteocytes orchestrate the local remodeling action of osteoblasts (bone formation) and osteoclasts (bone resorption). Together these local adaptive remodeling activities sum up to strengthen bone globally at the organ scale. To resolve the underlying mechanisms it is required to identify and quantify both cause and effect across the different scales. Progress has been made at the different scales experimentally. Computational models of bone adaptation have been developed to piece together various experimental observations at the different scales into coherent and plausible mechanisms. However additional quantitative experimental validation is still required to build upon the insights which have already been achieved.”

According to the news editors, the research concluded: “In this review we discuss emerging as well as state of the art experimental and computational techniques and how they might be used in a mechanical systems biology approach to further our understanding of the mechanisms governing load induced bone adaptation, i.e., ways are outlined in which experimental and computational approaches could be coupled, in a quantitative manner to create more reliable multiscale models of bone.”

For more information on this research see: Toward mechanical systems biology in bone. *Annals of Biomedical Engineering*, 2012;40(11):2475-87. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from A. Trussel, Institute for Biomechanics, ETH Zurich, Wolfgang-Pauli-Strasse 10, 8093, Zurich, Switzerland. (2012 Oct 31)

## **Johns Hopkins University School of Medicine, Baltimore: Multiscale imaging and computational modeling of blood flow in the tumor vasculature**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Baltimore, Maryland, by NewsRx correspondents, research stated, “The evolution in our understanding of tumor angiogenesis has been the result of pioneering imaging and computational modeling studies spanning the endothelial cell, microvasculature and tissue levels. Many of these primary data on the tumor vasculature are in the form of images from pre-clinical tumor models that provide a wealth of qualitative and quantitative information in many dimensions and across different spatial scales.”

Our news editors obtained a quote from the research from the Johns Hopkins University School of Medicine, “However, until recently, the visualization of changes in the tumor vasculature across spatial scales remained a challenge due to a lack of techniques for integrating micro- and macroscopic imaging data. Furthermore, the paucity of three-dimensional (3-D) tumor vascular data in conjunction with the challenges in obtaining such data from patients presents a serious hurdle for the development and validation of predictive, multiscale computational models of tumor angiogenesis. In this review, we discuss the development of multiscale models of tumor angiogenesis, new imaging techniques capable of reproducing the 3-D tumor vascular architecture with high fidelity, and the emergence of ‘image-based models’ of tumor blood flow and molecular transport. Collectively, these developments are helping us gain a fundamental understanding of the cellular and molecular regulation of tumor angiogenesis that will benefit the development of new cancer therapies.”

According to the news editors, the research concluded: “Eventually, we expect this exciting integration of multiscale imaging and mathematical modeling to have widespread application beyond the tumor vasculature to other diseases involving a pathological vasculature, such as stroke and spinal cord injury.”

For more information on this research see: Multiscale imaging and computational modeling of blood flow in the tumor vasculature. *Annals of Biomedical Engineering*, 2012;40(11):2425-41. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting E. Kim, Dept. of Biomedical Engineering, The Johns Hopkins University School of Medicine, Baltimore, MD, United States. (2012 Oct 31)

## **Johns Hopkins University, Baltimore: Vision-based proximity detection in retinal surgery**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting out of Baltimore, Maryland, by NewsRx editors, research stated, “In retinal surgery, surgeons face difficulties such as indirect visualization of surgical targets, physiological tremor, and lack of tactile feedback, which increase the risk of retinal damage caused by incorrect surgical gestures. In this context, intraocular proximity sensing has the potential to overcome current technical limitations and increase surgical safety.”

Our news journalists obtained a quote from the research from Johns Hopkins University, “In this paper, we present a system for detecting unintentional collisions between surgical tools and the retina using the visual feedback provided by the ophthalmic stereo microscope. Using stereo images, proximity between surgical tools and the retinal surface can be detected when their relative stereo disparity is small. For this purpose, we developed a system comprised of two modules. The first is a module for tracking the surgical tool position on both stereo images. The second is a disparity tracking module for estimating a stereo disparity map of the retinal surface. Both modules were specially tailored for coping with the challenging visualization conditions in retinal surgery.”

According to the news editors, the research concluded: “The potential clinical value of the proposed method is demonstrated by extensive testing using a silicon phantom eye and recorded rabbit in vivo data.”

For more information on this research see: Vision-based proximity detection in retinal surgery. *Ieee Transactions On Bio-medical Engineering*, 2012;59(8):2291-301.

Our news journalists report that additional information may be obtained by contacting R. Richa, Laboratory of Computational Sensing and Robotics, The Johns Hopkins University, Baltimore, MD 21218, United States. (2012 Oct 31)

## **King’s College, London: The multi-scale modelling of coronary blood flow**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news originating from London, United Kingdom, by NewsRx correspondents, research stated, “Coronary flow is governed by a number of determinants including network anatomy, systemic afterload and the mechanical interaction with the myocardium throughout the cardiac cycle. The range of spatial scales and multi-physics nature of coronary perfusion

highlights a need for a multiscale framework that captures the relevant details at each level of the network.”

Our news journalists obtained a quote from the research from King’s College, “The goal of this review is to provide a compact and accessible introduction to the methodology and current state of the art application of the modelling frameworks that have been used to study the coronary circulation. We begin with a brief description of the seminal experimental observations that have motivated the development of mechanistic frameworks for understanding how myocardial mechanics influences coronary flow. These concepts are then linked to an overview of the lumped parameter models employed to test these hypotheses. We then outline the full and reduced-order (3D and 1D) continuum mechanics models based on the Navier-Stokes equations and highlight, with examples, their application regimes. At the smaller spatial scales the case for the importance of addressing the microcirculation is presented, with an emphasis on the poroelastic approach that is well-suited to bridge an existing gap in the development of an integrated whole heart model.”

According to the news editors, the research concluded: “Finally, the recent accomplishments of the wave intensity analysis and related approaches are presented and the clinical outlook for coronary flow modelling discussed.”

For more information on this research see: The multi-scale modelling of coronary blood flow. *Annals of Biomedical Engineering*, 2012;40(11):2399-413. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from J. Lee, Dept. of Biomedical Engineering, King’s College London, King’s Health Partners, St Thomas’ Hospital, London, SE1 7EH, UK. (2012 Oct 31)

### **Medical College of Wisconsin, Milwaukee: Multiscale modeling and data integration in the virtual physiological rat project**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Milwaukee, Wisconsin, by NewsRx correspondents, research stated, “It has become increasingly evident that the descriptions of many complex diseases are only possible by taking into account multiple influences at different physiological scales. To do this with computational models often requires the integration of several models that have overlapping scales (genes to molecules, molecules to cells, cells to tissues).”



Our news journalists obtained a quote from the research from the Medical College of Wisconsin, “The Virtual Physiological Rat (VPR) Project, a National Institute of General Medical Sciences (NIGMS) funded National Center of Systems Biology, is tasked with mechanistically describing several complex diseases and is therefore identifying methods to facilitate the process of model integration across physiological scales. In addition, the VPR has a considerable experimental component and the resultant data must be integrated into these composite multiscale models and made available to the research community. A perspective of the current state of the art in model integration and sharing along with archiving of experimental data will be presented here in the context of multiscale physiological models.”

According to the news editors, the research concluded: “It was found that current ontological, model and data repository resources and integrative software tools are sufficient to create composite models from separate existing models and the example composite model developed here exhibits emergent behavior not predicted by the separate models.”

For more information on this research see: Multiscale modeling and data integration in the virtual physiological rat project. *Annals of Biomedical Engineering*, 2012;40(11):2365-78. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from D.A. Beard, Biotechnology and Bioengineering Center and Center for Computational Medicine, Medical College of Wisconsin, Milwaukee, WI, United States. (2012 Oct 31)

### **School of Computing, Middlesbrough: A stable and real-time nonlinear elastic approach to simulating guidewire and catheter insertions based on Cosserat rod**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating in Middlesbrough, United Kingdom, by NewsRx journalists, research stated, “Interventional Radiology procedures (e.g., angioplasty, embolization, stent graft placement) provide minimally invasive therapy to treat a wide range of conditions. These procedures involve the use of flexible tipped guidewires to advance diagnostic or therapeutic catheters into a patient’s vascular or visceral anatomy.”

The news reporters obtained a quote from the research from the School of Computing, “This paper presents a real-time physically based hybrid modeling approach to simulating guidewire insertions. The long, slender body of the guidewire shaft is simulated using nonlinear elastic Cosserat rods, and the shorter flexible tip composed of a straight, curved, or angled design is modeled using a more efficient generalized

bending model. Therefore, the proposed approach efficiently computes intrinsic dynamic behaviors of guidewire interactions within vascular structures. The efficacy of the proposed method is demonstrated using detailed numerical simulations inside 3-D blood vessel structures derived from preprocedural volumetric data. A validation study compares positions of four physical guidewires deployed within a vascular phantom, with the co-ordinates of the corresponding simulated guidewires within a virtual model of the phantom. An optimization algorithm is also implemented to further improve the accuracy of the simulation.”

According to the news reporters, the research concluded: “The presented simulation model is suitable for interactive virtual reality-based training and for treatment planning.”

For more information on this research see: A stable and real-time nonlinear elastic approach to simulating guidewire and catheter insertions based on Cosserat rod. *Ieee Transactions On Bio-medical Engineering*, 2012;59(8):2211-8.

Our news correspondents report that additional information may be obtained by contacting W.e.n. Tang, School of Computing, the University of Teesside, Middlesbrough, UK. (2012 Oct 31)

### **Stanford University: Noninvasive measurement of physiological signals on a modified home bathroom scale**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting from Stanford, California, by NewsRx journalists, research stated, “A commercial bathroom scale with both handlebar and footpad electrodes was modified to enable measurement of four physiological signals: the ballistocardiogram (BCG), electrocardiogram (ECG), lower body impedance plethysmogram (IPG), and lower body electromyogram (EMG). The BCG, which describes the reaction of the body to cardiac ejection of blood, was measured using the strain gauges in the scale.”

The news correspondents obtained a quote from the research from Stanford University, “The ECG was detected using handlebar electrodes with a two-electrode amplifier. For the lower body IPG, the two electrodes under the subject’s toes were driven with an ac current stimulus, and the resulting differential voltage across the heels was measured and demodulated synchronously with the source. The voltage signal from the same two footpad electrodes under the heels was passed through a passive low-pass filter network into another amplifier, and the output was the lower body EMG signal. The signals were measured from nine healthy subjects, and the average signal-to-noise ratio (SNR) while the subjects were standing still was estimated for the four signals as follows: BCG, 7.6 dB; ECG, 15.8 dB; IPG, 10.7 dB. During periods of

motion, the decrease in SNR for the BCG signal was found to be correlated to the increase in rms power for the lower body EMG ( $r=0.89$ ,  $p<0.01$ ). The EMG could, thus, be used to flag noise-corrupted segments of the BCG, increasing the measurement robustness.”

According to the news reporters, the research concluded: “This setup could be used for monitoring the cardiovascular health of patients at home.”

For more information on this research see: Noninvasive measurement of physiological signals on a modified home bathroom scale. *Ieee Transactions On Bio-medical Engineering*, 2012;59(8):2137-43.

Our news journalists report that additional information may be obtained by contacting O.T. Inan, Dept. of Electrical Engineering, Stanford University, Stanford, CA 94305, United States. (2012 Oct 31)

### **Tel Aviv University: The influence of ischemic factors on the migration rates of cell types involved in cutaneous and subcutaneous pressure ulcers**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Tel Aviv, Israel, by NewsRx correspondents, research stated, “A pressure ulcer (PU) is a localized injury to the skin and/or to underlying tissues, typically over a weight-bearing bony prominence. PUs often develop in ischemic tissues.”

Our news editors obtained a quote from the research from Tel Aviv University, “Other than being relevant to the etiology of PUs, ischemic factors such as glucose levels, acidity and temperature could potentially affect healing processes as well, particularly, the rate of damage repair. Using an in vitro cell culture model, the goal of the present study was to determine the influence of ischemic factors: low temperature (35  $\pm$  1°C), low glucose (1 g/L) and acidic pH (6.7) on the migration rate of NIH3T3 fibroblasts, 3T3L1 preadipocytes and C2C12 myoblasts, which could all be affected by PUs. Cell migration into a local damage site, produced by crushing cells under a micro-indenter, was monitored over ~16 h under controlled temperature and pH conditions. We found that in the NIH3T3 cultures, acidosis significantly hindered the migration rate as well as delayed the times for onset and end of mass cell migration. The effects of temperature and glucose however were not significant. Additionally, under control conditions (temperature 37  $\pm$  1°C, glucose 4.5 g/L, pH 7.6), migration rates and times differed significantly across the different cell types.”

According to the news editors, the research concluded: “The present findings motivate further studies related to the effects of pH levels on migration performances, particularly in PU where bacterial contamination-associated with an acidic environment-is involved.”

For more information on this research see: The influence of ischemic factors on the migration rates of cell types involved in cutaneous and subcutaneous pressure ulcers. *Annals of Biomedical Engineering*, 2012;40(9):1929-39. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting G. Topman, Dept. of Biomedical Engineering, Faculty of Engineering, Tel Aviv University, 69978, Tel Aviv, Israel. (2012 Oct 31)

### **University of California, Los Angeles: Application of a rat hindlimb model: a prediction of force spaces reachable through stimulation of nerve fascicles**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of Los Angeles, California, by NewsRx editors, research stated, “A device to generate standing or locomotion through chronically placed electrodes has not been fully developed due in part to limitations of clinical experimentation and the high number of muscle activation inputs of the leg. We investigated the feasibility of functional electrical stimulation paradigms that minimize the input dimensions for controlling the limbs by stimulating at nerve fascicles, utilizing a model of the rat hindlimb, which combined previously collected morphological data with muscle physiological parameters presented herein.”

Our news journalists obtained a quote from the research from the University of California, “As validation of the model, we investigated the suitability of a lumped-parameter model for the prediction of muscle activation during dynamic tasks. Using the validated model, we found that the space of forces producible through activation of muscle groups sharing common nerve fascicles was nonlinearly dependent on the number of discrete muscle groups that could be individually activated (equivalently, the neuroanatomical level of activation). Seven commonly innervated muscle groups were sufficient to produce 78% of the force space producible through individual activation of the 42 modeled hindlimb muscles.”

According to the news editors, the research concluded: “This novel, neuroanatomically derived reduction in input dimension emphasizes the potential to simplify controllers for functional electrical stimulation to improve functional recovery after a neuromuscular injury.”

For more information on this research see: Application of a rat hindlimb model: a prediction of force spaces reachable through stimulation of nerve fascicles. *Ieee Transactions On Bio-medical Engineering*, 2011;58(12):3328-38.

Our news journalists report that additional information may be obtained by contacting W.L. Johnson, Dept. of Mechanical and Aerospace Engineering, University of California, Los Angeles, CA 90024, United States. (2012 Oct 31)

### **University of Michigan, Ann Arbor: An EEG-based study of discrete isometric and isotonic human lower limb muscle contractions**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Ann Arbor, Michigan, by NewsRx journalists, research stated, “Electroencephalography (EEG) combined with independent component analysis enables functional neuroimaging in dynamic environments including during human locomotion. This type of functional neuroimaging could be a powerful tool for neurological rehabilitation.”

The news correspondents obtained a quote from the research from the University of Michigan, “It could enable clinicians to monitor changes in motor control related cortical dynamics associated with a therapeutic intervention, and it could facilitate noninvasive electrocortical control of devices for assisting limb movement to stimulate activity dependent plasticity. Understanding the relationship between electrocortical dynamics and muscle activity will be helpful for incorporating EEG-based functional neuroimaging into clinical practice. The goal of this study was to use independent component analysis of high-density EEG to test whether we could relate electrocortical dynamics to lower limb muscle activation in a constrained motor task.”

According to the news reporters, the research concluded: “A secondary goal was to assess the trial-by-trial consistency of the electrocortical dynamics by decoding the type of muscle action.”

For more information on this research see: An EEG-based study of discrete isometric and isotonic human lower limb muscle contractions. *Journal of Neuroengineering and Rehabilitation*, 2012;9():35. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Neuroengineering and Rehabilitation* - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

Our news journalists report that additional information may be obtained by contacting J.T. Gwin, Human Neuromechanics Laboratory, School of Kinesiology, University of Michigan, Ann Arbor, MI, United States. (2012 Oct 31)

## **University of Southern California, Los Angeles: Recovery of macular pigment spectrum in vivo using hyperspectral image analysis**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news reporting from Los Angeles, California, by NewsRx journalists, research stated, “We investigated the feasibility of a novel method for hyperspectral mapping of macular pigment (MP) in vivo. Six healthy subjects were recruited for noninvasive imaging using a snapshot hyperspectral system.”

The news correspondents obtained a quote from the research from the University of Southern California, “The three-dimensional full spatial-spectral data cube was analyzed using non-negative matrix factorization (NMF), wherein the data was decomposed to give spectral signatures and spatial distribution, in search for the MP absorbance spectrum. The NMF was initialized with the in vitro MP spectrum and rank 4 spectral signature decomposition was used to recover the MP spectrum and optical density in vivo. The recovered MP spectra showed two peaks in the blue spectrum, characteristic of MP, giving a detailed in vivo demonstration of these absorbance peaks. The peak MP optical densities ranged from 0.08 to 0.22 (mean 0.15 $\pm$ 0.05) and became spatially negligible at diameters 1100 to 1760 m (4 to 6 deg) in the normal subjects. This objective method was able to exploit prior knowledge (the in vitro MP spectrum) in order to extract an accurate in vivo spectral analysis and full MP spatial profile, while separating the MP spectra from other ocular absorbers.”

According to the news reporters, the research concluded: “Snapshot hyperspectral imaging in combination with advanced mathematical analysis provides a simple cost-effective approach for MP mapping in vivo.”

For more information on this research see: Recovery of macular pigment spectrum in vivo using hyperspectral image analysis. *Journal of Biomedical Optics*, 2011;16(10):106008.

Our news journalists report that additional information may be obtained by contacting A.A. Fawzi, University of Southern California, Doheny Eye Institute, Keck School of Medicine, Dept. of Ophthalmology, 1450 San Pablo Ave, Suite 3614, Los Angeles, California 90033, United States. (2012 Oct 31)

## **University of Virginia, Charlottesville: Multiscale models of cell signaling**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Charlottesville, Virginia, by NewsRx journalists, research stated, “Computational models of signal transduction face challenges of scale below the resolution of a single cell. Here, we organize these challenges around three key interfaces for multiscale models of cell signaling: molecules to pathways, pathways to networks, and networks to outcomes.”

The news correspondents obtained a quote from the research from the University of Virginia, “Each interface requires its own set of computational approaches and systems-level data, and no single approach or dataset can effectively bridge all three interfaces. This suggests that realistic ‘whole-cell’ models of signaling will need to agglomerate different model types that span critical intracellular scales.”

According to the news reporters, the research concluded: “Future multiscale models will be valuable for understanding the impact of signaling mutations or population variants that lead to cellular diseases such as cancer.”

For more information on this research see: Multiscale models of cell signaling. *Annals of Biomedical Engineering*, 2012;40(11):2319-27. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting S.S. Bajikar, Dept. of Biomedical Engineering, University of Virginia, Charlottesville, VA, 22908, United States. (2012 Oct 31)

## **National Chi Nan University, Nantou: Detecting the effect of targeted anti-cancer medicines on single cancer cells using a poly-silicon wire ion sensor integrated with a confined sensitive window**

By a News Reporter-Staff News Editor at Cancer Weekly – New research on Silicon is the subject of a report. According to news reporting out of Nantou, Taiwan, by NewsRx editors, research stated, “A mold-cast polydimethylsiloxane (PDMS) confined window was integrated with a poly-silicon wire (PSW) ion sensor. The PSW sensor surface inside the confined window was coated with a 3-aminopropyltriethoxysilane (gamma-APTES) sensitive layer which allowed a single living cell to be cultivated.”

Our news journalists obtained a quote from the research from National Chi Nan University, “The change in the microenvironment due to

the extracellular acidification of the single cell could then be determined by measuring the current flowing through the PSW channel. Based on this, the PSW sensor integrated with a confined sensitive window was used to detect the apoptosis as well as the effect of anti-cancer medicines on the single living non-small-lung-cancer (NSLC) cells including lung adenocarcinoma cancer cells A549 and H1299, and lung squamous-cell carcinoma CH27 cultivated inside the confined window. Single human normal cells including lung fibroblast cells WI38, lung fibroblast cells MRC5, and bronchial epithelium cell Beas-2B were tested for comparison. Two targeted anti-NSCLC cancer medicines, Iressa and Staurosporine, were used in the present study. It was found that the PSW sensor can be used to accurately detect the apoptosis of single cancer cells after the anti-cancer medicines were added.”

According to the news editors, the research concluded: “It was also found that Staurosporine is more effective than Iressa in activating the apoptosis of cancer cells.”

For more information on this research see: Detecting the effect of targeted anti-cancer medicines on single cancer cells using a poly-silicon wire ion sensor integrated with a confined sensitive window. *Biomedical Microdevices*, 2012;14(5):839-848. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); *Biomedical Microdevices* - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting Y.L. Wu, Natl Chi Nan Univ, Dept. of Appl Mat & Optoelect Engn, Puli, Nantou, Taiwan. (2012 Oct 30)

### **Yale University School of Medicine, New Haven: 13C MRS studies of neuroenergetics and neurotransmitter cycling in humans**

By a News Reporter-Staff News Editor at Ivy League Week – New research on Central Nervous System is the subject of a report. According to news reporting originating in New Haven, Connecticut, by NewsRx journalists, research stated, “In the last 25 years, (13)C MRS has been established as the only noninvasive method for the measurement of glutamate neurotransmission and cell-specific neuroenergetics. Although technically and experimentally challenging, (13)C MRS has already provided important new information on the relationship between neuroenergetics and neuronal function, the energy cost of brain function, the high neuronal activity in the resting brain state and how neuroenergetics and neurotransmitter cycling are altered in neurological and psychiatric disease.”

The news reporters obtained a quote from the research from the Yale University School of Medicine, “In this article, the current state of (13)C



MRS as it is applied to the study of neuroenergetics and neurotransmitter cycling in humans is reviewed. The focus is predominantly on recent findings in humans regarding metabolic pathways, applications to clinical research and the technical status of the method. Results from in vivo (13)C MRS studies in animals are discussed from the standpoint of the validation of MRS measurements of neuroenergetics and neurotransmitter cycling, and where they have helped to identify key questions to address in human research. Controversies concerning the relationship between neuroenergetics and neurotransmitter cycling and factors having an impact on the accurate determination of fluxes through mathematical modeling are addressed. We further touch upon different (13)C-labeled substrates used to study brain metabolism, before reviewing a number of human brain diseases investigated using (13)C MRS."

According to the news reporters, the research concluded: "Future technological developments are discussed that will help to overcome the limitations of (13)C MRS, with special attention given to recent developments in hyperpolarized (13)C MRS."

For more information on this research see: 13C MRS studies of neuroenergetics and neurotransmitter cycling in humans. *Nmr In Biomedicine*, 2011;24(8):943-57. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news correspondents report that additional information may be obtained by contacting D.L. Rothman, Dept. of Diagnostic Radiology, Magnetic Resonance Research Center, Yale University School of Medicine, New Haven, CT 06520-8043, United States. (2012 Oct 30)

### **Free University, Brussels: Fractional-order time series models for extracting the haemodynamic response from functional magnetic resonance imaging data**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Current study results on Central Nervous System have been published. According to news originating from Brussels, Belgium, by NewsRx correspondents, research stated, "The postprocessing of functional magnetic resonance imaging (fMRI) data to study the brain functions deals mainly with two objectives: signal detection and extraction of the haemodynamic response. Signal detection consists of exploring and detecting those areas of the brain that are triggered due to an external stimulus."

Our news journalists obtained a quote from the research from Free University, "Extraction of the haemodynamic response deals with describing and measuring the physiological process of activated regions in the brain due to stimulus. The haemodynamic response represents

the change in oxygen levels since the brain functions require more glucose and oxygen upon stimulus that implies a change in blood flow. In the literature, different approaches to estimate and model the haemodynamic response have been proposed. These approaches can be discriminated in model structures that either provide a proper representation of the obtained measurements but provide no or a limited amount of physiological information, or provide physiological insight but lacks a proper fit to the data. In this paper, a novel model structure is studied for describing the haemodynamics in fMRI measurements: fractional models.”

According to the news editors, the research concluded: “We show that these models are flexible enough to describe the gathered data with the additional merit of providing physiological information.”

For more information on this research see: Fractional-order time series models for extracting the haemodynamic response from functional magnetic resonance imaging data. *Ieee Transactions On Bio-medical Engineering*, 2012;59(8):2264-72.

The news correspondents report that additional information may be obtained from K. Barbee, Dept. of Fundamental Electricity and Instrumentation, Vrije Universiteit Brussel, Brussels, Belgium. (2012 Oct 29)

### **Oslo University Hospital: Simulation model of cardiac three dimensional accelerometer measurements**

By a News Reporter-Staff News Editor at Cardiovascular Week – Research findings on Cardiology are discussed in a new report. According to news reporting from Oslo, Norway, by NewsRx journalists, research stated, “A miniaturized accelerometer sensor attached to the heart may be applied for monitoring cardiac motion. Proper understanding of the sensor measurements is required for successful development of algorithms to process the signal and extract clinical information.”

The news correspondents obtained a quote from the research from Oslo University Hospital, “In vivo testing of such sensors is limited by the invasive nature of the procedure. In this study we have developed a mathematical simulation model of an accelerometer attached to the heart so that testing initially may be performed on realistic, simulated measurements. Previously recorded cardiac motion by sonomicrometric crystals was used as input to the model. The three dimensional motion of a crystal attached to the heart served as the simulated motion of the accelerometer, providing the translational acceleration components. A component of gravity is also measured by the accelerometer and fused with the translational acceleration. The component of gravity along an accelerometer axis varies when the axis direction slightly rotates as the accelerometer moves during the cardiac cycle. This time-varying

gravity component has substantial effects on the accelerometer measurements and was included in the simulation model by converting the motion to prolate spheroidal coordinates where the axis rotation could be found. The simulated accelerometer signal was filtered and integrated to velocity and displacement. The resulting simulated motion was consistent with previous accelerometer recordings during normal and ischemic conditions as well as for alterations of accelerometer orientation and patient positions.”

According to the news reporters, the research concluded: “This suggests that the model could potentially be useful in future testing of algorithms to filter and process accelerometer measurements.”

For more information on this research see: Simulation model of cardiac three dimensional accelerometer measurements. *Medical Engineering & Physics*, 2012;34(7):990-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting E.W. Remme, The Intervention Center, Oslo University Hospital, Rikshospitalet, Oslo, Norway. (2012 Oct 29)

### **Ghent University: Inspiration from nature: dynamic modelling of the musculoskeletal structure of the seahorse tail**

By a News Reporter-Staff News Editor at Science Letter – Current study results on Science have been published. According to news reporting originating in Ghent, Belgium, by NewsRx journalists, research stated, “Technological advances are often inspired by nature, considering that engineering is frequently faced by the same challenges as organisms in nature. One such interesting challenge is creating a structure that is at the same time stiff in a certain direction, yet flexible in another.”

The news reporters obtained a quote from the research from Ghent University, “The seahorse tail combines both radial stiffness and bending flexibility in a particularly elegant way: even though the tail is covered in a protective armour, it still shows sufficient flexibility to fully function as a prehensile organ. We therefore study the complex mechanics and dynamics of the musculoskeletal system of the seahorse tail from an engineering point of view. The seahorse tail derives its combination of flexibility and resilience from a chain of articulating skeletal segments. A versatile dynamic model of those segments was constructed, on the basis of automatic recognition of joint positions and muscle attachments. Both muscle structures that are thought to be responsible for ventral and ventral-lateral tail bending, namely the median ventral muscles and the hypaxial myomere muscles, were included in the model. Simulations on the model consist mainly of dynamic multi-body

simulations. The results show that the sequential structure of uniformly shaped bony segments can remain flexible because of gliding joints that connect the corners of the segments. Radial stiffness on the other hand is obtained through the support that the central vertebra provides to the tail plating.”

According to the news reporters, the research concluded: “Such insights could help in designing biomedical instruments that specifically require both high bending flexibility and radial stiffness (e.g. flexible stents and steerable catheters).”

For more information on this research see: Inspiration from nature: dynamic modelling of the musculoskeletal structure of the sea-horse tail. *International Journal for Numerical Methods In Biomedical Engineering*, 2012;28(10):1028-42. (Wiley-Blackwell - <http://www.wiley.com/>; International Journal for Numerical Methods In Biomedical Engineering - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2040-7947](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2040-7947))

Our news correspondents report that additional information may be obtained by contacting T. Praet, IBiTech-bioMMeda, Dept. of Civil Engineering, Ghent University, Ghent, Belgium. (2012 Oct 26)

### **Department of Drug Metabolism and Pharmacokinetics, South San Francisco: Validation and application of a liquid chromatography-tandem mass spectrometric method for the determination of GDC-0834 and its metabolite in human plasma using semi-automated 96-well protein precipitation**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Chromatography are presented in a new report. According to news reporting originating in South San Francisco, California, by NewsRx journalists, research stated, “A liquid chromatographic-tandem mass spectrometric (LC-MS/MS) method was developed and validated for the determination of GDC-0834 and its amide hydrolysis metabolite (M1) in human plasma to support clinical development. The method consisted of semi-automated 96-well protein precipitation extraction for sample preparation and LC-MS/MS analysis in positive ion mode using TurbolonSpray® for analysis.”

The news reporters obtained a quote from the research from the Department of Drug Metabolism and Pharmacokinetics, “D6-GDC-0834 and D6-M1 metabolite were used as internal standards. A linear regression (weighted 1/concentration<sup>2</sup>) was used to fit calibration curves over the concentration range of 1 -500 ng/mL for both GDC-0834 and M1 metabolite. The accuracy (percentage bias) at the lower limit of quantitation (LLOQ) was 5.20 and 0.100% for GDC-0834 and M1

metabolite, respectively. The precision (CV) for samples at the LLOQ was 3.13-8.84 and 5.20-8.93% for GDC-0834 and M1 metabolite, respectively. For quality control samples at 3, 200 and 400?ng/mL, the between-run CV was=7.38% for GDC-0834 and=8.20% for M1 metabolite. Between run percentage bias ranged from -2.76 to 6.98% for GDC-0834 and from -6.73 to 2.21% for M1 metabolite. GDC-0834 and M1 metabolite were stable in human plasma for 31?days at -20 and -70&#176;C.”

According to the news reporters, the research concluded: “This method was successfully applied to support a GDC-0834 human pharmacokinetic-based study.”

For more information on this research see: Validation and application of a liquid chromatography-tandem mass spectrometric method for the determination of GDC-0834 and its metabolite in human plasma using semi-automated 96-well protein precipitation. *Biomedical Chromatography*, 2012;26(11):1444-51. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news correspondents report that additional information may be obtained by contacting Y.G. Shin, Dept. of Drug Metabolism and Pharmacokinetics, Genentech, South San Francisco, CA, 94080, United States. (2012 Oct 24)

## **Duke University, Durham: Detection of intestinal dysplasia using angle-resolved low coherence interferometry**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting from Durham, North Carolina, by NewsRx journalists, research stated, “Angle-resolved low coherence interferometry (a/LCI) is an optical biopsy technique that allows for depth-resolved, label-free measurement of the average size and optical density of cell nuclei in epithelial tissue to assess the tissue health. a/LCI has previously been used clinically to identify the presence of dysplasia in Barrett’s Esophagus patients undergoing routine surveillance. We present the results of a pilot, ex vivo study of tissues from 27 patients undergoing partial colonic resection surgery, conducted to evaluate the ability of a/LCI to identify dysplasia.”

The news correspondents obtained a quote from the research from Duke University, “Performance was determined by comparing the nuclear morphology measurements with pathological assessment of co-located physical biopsies. A statistically significant correlation between increased average nuclear size, reduced nuclear density, and the presence of dysplasia was noted at the basal layer of the epithelium, at a

depth of 200 to 300 m beneath the tissue surface. Using a decision line determined from a receiver operating characteristic, a/LCI was able to separate dysplastic from healthy tissues with a sensitivity of 92.9% (13/14), a specificity of 83.6% (56/67), and an overall accuracy of 85.2% (69/81).”

According to the news reporters, the research concluded: “The study illustrates the extension of the a/LCI technique to the detection of intestinal dysplasia, and demonstrates the need for future in vivo studies.”

For more information on this research see: Detection of intestinal dysplasia using angle-resolved low coherence interferometry. *Journal of Biomedical Optics*, 2011;16(10):106002.

Our news journalists report that additional information may be obtained by contacting N. Terry, Duke University, Dept. of Biomedical Engineering, 136 Hudson Hall, Durham, North Carolina 27708, United States. (2012 Oct 24)

### **IIT, Chicago: A robust and efficient valve model based on resistive immersed surfaces**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Chicago, Illinois, by NewsRx correspondents, research stated, “A procedure for modeling the heart valves is presented. Instead of modeling complete leaflet motion, leaflets are modeled in open and closed configurations.”

Our news editors obtained a quote from the research from IIT, “The geometry of each configuration can be defined, for example, from in vivo image data. This method enables significant computational savings compared with complete fluidstructure interaction and contact modeling, while maintaining realistic three-dimensional velocity and pressure distributions near the valve, which is not possible from lumped parameter modeling. Leaflets are modeled as immersed, fixed surfaces over which a resistance to flow is assigned. On the basis of local flow conditions, the resistance values assigned for each configuration are changed to switch the valve between open and closed states. This formulation allows for the pressure to be discontinuous across the valve.”

According to the news editors, the research concluded: “To illustrate the versatility of the model, realistic and patient-specific simulations are presented, as well as comparison with complete fluidstructure interaction simulation.”

For more information on this research see: A robust and efficient valve model based on resistive immersed surfaces. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(9):937-959. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2040-7947](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2040-7947))

The news editors report that additional information may be obtained by contacting M. Astorino, IIT, Chicago, IL 60616, United States. (2012 Oct 24)

### **Musashino University, Tokyo: Robust calibration models to predict antipyrine content in various kinds of packaged hospital powder preparations by using near-infrared spectroscopy**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Tokyo, Japan, by NewsRx correspondents, research stated, “The purpose of this study was to evaluate drug content of hospital powder preparations using non-destructive, non-contact, short-term measurements with near-infrared spectroscopy (NIR). Antipyrine (0-50%) was mixed with additive powder, and packed with semi-transparent (SP) or transparent (TP) paper to obtain single packaged samples (SPP and TPP).”

Our news editors obtained a quote from the research from Musashino University, “Double packaged samples were obtained by packing TPP with TP. NIR spectra of the packaged samples were recorded using a NIR spectrometer with a fiber-optic probe. The best calibration model was determined to minimize the standard error of cross-validation (SEP) by the leave-out-one method in principal component regression (PCR). The calibration models for SPP and TPP were calculated to be the minimum SEP based on one-and four-PC models by the PCR method, respectively. Plots of predicted and actual drug contents for SPP and TPP showed a straight line with a slope of 0.946 and 0.948, and  $r^2$  of 0.965 and 0.980, respectively.”

According to the news editors, the research concluded: “On the other hand, the calibration model for the single and double TPP was obtained based on a three-PC model, and the plot of predicted and actual drug content showed a straight line with a slope of 0.942 and  $r^2$  of 0.”

For more information on this research see: Robust calibration models to predict antipyrine content in various kinds of packaged hospital

powder preparations by using near-infrared spectroscopy. *Bio-medical Materials and Engineering*, 2012;22(5):311-9.

The news editors report that additional information may be obtained by contacting M. Otsuka, Research Institute of Pharmaceutical Sciences, Musashino University, Tokyo, Japan. (2012 Oct 24)

### **Shenyang Pharmaceutical University: The comparative research on constituents of Radix Aconiti and its processing by HPLC quadrupole TOF-MS**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Chromatography. According to news reporting from Shenyang, People's Republic of China, by NewsRx journalists, research stated, "Based upon the regulations stipulated by the State Food and Drug Administration of China, only the processed, detoxified tubers and roots of Aconitum are allowed to be administered orally, used in clinical decoctions and adopted as raw materials for pharmaceutical manufacturing, so the processing principle of preparation of Radix Aconiti is important for ensuring the Radix Aconiti praeparata quality. A simple approach was described for HPLC-Q-TOF-MS screening and identification of many of the aconitine alkaloids present in unprocessed Radix Aconiti and Radix Aconiti praeparata."

The news correspondents obtained a quote from the research from Shenyang Pharmaceutical University, "To compare their fingerprints, the processing principle of preparation of Radix Aconiti was developed. Twenty-nine compounds and 26 compounds were assigned to aconitine alkaloids and tentatively identified by comparing accurate mass and fragments information with that of the authentic standards or by mass spectrometry analysis and retrieving the reference literature. The non-ester alkaloids were almost the same. The diester diterpene alkaloids were decreased, the monoester-diterpene alkaloids were increased and lipo-alkaloids decreased obviously in the processing of the preparation."

According to the news reporters, the research concluded: "These transformed components could be regarded as potential chemical markers that can be used to distinguish between raw and processed herbs."

For more information on this research see: The comparative research on constituents of Radix Aconiti and its processing by HPLC quadrupole TOF-MS. *Biomedical Chromatography*, 2012;26(11):1301-7. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-0801](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-0801))

Our news journalists report that additional information may be obtained by contacting J. Wu, Dept. of Pharmaceutical Analysis, School of Pharmacy, Shenyang Pharmaceutical University, Shenyang, 110016, People's Taiwan. (2012 Oct 24)



## **Submission of scientifically sound and ethical manuscripts to peer-reviewed journals - a reviewer's personal perspective on bioanalytical publications**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Chromatography. According to news originating from Raritan, New Jersey, by NewsRx editors, the research stated, “In the pharmaceutical industry, bioanalysis is very dynamic and is probably one of the few fields of research covering the entire drug discovery, development and post-marketing process. Important decisions on drug safety can partially rely on bioanalytical data, which therefore can be subject to regulatory scrutiny.”

Our news journalists obtained a quote from the research, “Bioanalytical scientists have historically contributed significant numbers of scientific manuscripts in many peer-reviewed analytical journals. All of these journals provide some high-level instructions, but they also leave sufficient flexibility for reviewers to perform independent critique and offer recommendations for each submitted manuscript. Reviewers play a pivotal role in the process of bioanalytical publication to ensure the publication of high-quality manuscripts in a timely fashion. Their efforts usually lead to improved manuscripts. However, it has to be a joint effort among authors, reviewers and editors to promote scientifically sound and ethically fair bioanalytical publications. Most of the submitted manuscripts were well written with only minor or moderate revisions required for further improvement.”

According to the news editors, the research concluded: “Nevertheless, there were small numbers of submitted manuscripts that did not meet the requirements for publications because of scientific or ethical deficiencies, which are discussed in this Letter to the Editor.”

For more information on this research see: Submission of scientifically sound and ethical manuscripts to peer-reviewed journals - a reviewer's personal perspective on bioanalytical publications. *Biomedical Chromatography*, 2012;26(11):1457-60. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

The news correspondents report that additional information may be obtained from N. Weng, Janssen Research and Development, Global Development Operations, 1000 US Highway 202, Raritan, NJ, 08869, United States. (2012 Oct 24)

## University College London: The importance of RF bandwidth for effective tagging in pulsed arterial spin labeling MRI at 9.4T

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from London, United Kingdom, by NewsRx correspondents, research stated, “The movement towards MRI at higher field strengths (>7T) has enhanced the appeal of arterial spin labeling (ASL) for many applications due to improved SNR of the measurements. Greater field strength also introduces increased magnetic susceptibility effects resulting in marked B0 field inhomogeneity.”

Our news editors obtained a quote from the research from University College London, “Although B0 field perturbations can be minimised by shimming over the imaging volume, marked field inhomogeneity is likely to remain within the labeling region for pulsed ASL (PASL). This study highlights a potential source of error in cerebral blood flow quantification using PASL at high field. We show that labeling efficiency in flow-sensitive alternating inversion recovery (FAIR) displayed marked sensitivity to the RF bandwidth of the inversion pulse in a rat model at 9.4T. The majority of preclinical PASL studies have not reported the bandwidth of the inversion pulse. We show that a high bandwidth pulse of  $\geq 15$  kHz was required to robustly overcome the field inhomogeneity in the labeling region at high field strength, which is significantly greater than the inversion bandwidth 23 kHz used in previous studies.”

According to the news editors, the research concluded: “Unless SAR levels are at their limit, we suggest the use of a high bandwidth labeling pulse for most PASL studies.”

For more information on this research see: The importance of RF bandwidth for effective tagging in pulsed arterial spin labeling MRI at 9.4T. *NMR in Biomedicine*, 2012;25(10):1139-1143. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

The news editors report that additional information may be obtained by contacting J.A. Wells, UCL Inst Neurol, Dept. of Brain Repair & Rehabil, London, United Kingdom. (2012 Oct 24)

## University of Arizona, Tucson: Retinal oximeter for the blue-green oximetry technique

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Optics. According to news reporting out of Tucson, Arizona, by NewsRx editors, research stated, “Retinal oximetry offers potential for noninvasive assessment of central venous oxyhemoglobin saturation (SO(2)) via the retinal vessels but requires a calibrated accuracy of  $\pm 3\%$  saturation in order to be clinically useful. Prior oximeter designs have been hampered by poor saturation calibration accuracy.”

Our news journalists obtained a quote from the research from the University of Arizona, “We demonstrate that the blue-green oximetry (BGO) technique can provide accuracy within  $\pm 3\%$  in swine when multiply scattered light from blood within a retinal vessel is isolated. A noninvasive on-axis scanning retinal oximeter (ROx-3) is constructed that generates a multiwavelength image in the range required for BGO. A field stop in the detection pathway is used in conjunction with an anti-confocal bisecting wire to remove specular vessel reflections and isolate multiply backscattered light from the blood column within a retinal vessel. This design is tested on an enucleated swine eye vessel and a retinal vein in a human volunteer with retinal SO(2) measurements of  $\sim 1$  and  $\sim 65\%$ , respectively. These saturations, calculated using the calibration line from earlier work, are internally consistent with a standard error of the mean of  $\pm 2\%$  SO(2). The absolute measures are well within the expected saturation range for the site ( $-1$  and  $63\%$ ).”

According to the news editors, the research concluded: “This is the first demonstration of noninvasive on-axis BGO retinal oximetry.”

For more information on this research see: Retinal oximeter for the blue-green oximetry technique. *Journal of Biomedical Optics*, 2011;16(10):107004.

Our news journalists report that additional information may be obtained by contacting K.R. Denninghoff, University of Arizona, Dept. of Emergency Medicine and College of Optical Sciences, 1609 North Warren Avenue, Room 116, Tucson, Arizona 85724-5057, United States. (2012 Oct 24)

**University of Bern: Application of the specular and diffuse reflection analysis for in vitro diagnostics of dental erosion: correlation with enamel softening, roughness, and calcium release**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Optics is now available. According to news originating from Bern, Switzerland, by NewsRx correspondents, research stated, “We present assembly and application of an optical reflectometer for the analysis of dental erosion. The erosive procedure involved acid-induced softening and initial substance loss phases, which are considered to be difficult for visual diagnosis in a clinic.”

Our news journalists obtained a quote from the research from the University of Bern, “Change of the specular reflection signal showed the highest sensitivity for the detection of the early softening phase of erosion among tested methods. The exponential decrease of the specular reflection intensity with erosive duration was compared to the increase of enamel roughness. Surface roughness was measured by optical analysis, and the observed tendency was correlated with scanning electron microscopy images of eroded enamel. A high correlation between specular reflection intensity and measurement of enamel softening ( $r(2)=-0.86$ ) as well as calcium release ( $r(2)=-0.86$ ) was found during erosion progression. Measurement of diffuse reflection revealed higher tooth-to-tooth deviation in contrast to the analysis of specular reflection intensity and lower correlation with other applied methods ( $r(2)=0.42-0.48$ ).”

According to the news editors, the research concluded: “The proposed optical method allows simple and fast surface analysis and could be used for further optimization and construction of the first noncontact and cost-effective diagnostic tool for early erosion assessment in vivo.”

For more information on this research see: Application of the specular and diffuse reflection analysis for in vitro diagnostics of dental erosion: correlation with enamel softening, roughness, and calcium release. *Journal of Biomedical Optics*, 2011;16(10):107002.

The news correspondents report that additional information may be obtained from E. Rakhmatullina, University of Bern, Dept. of Preventive, Restorative and Paediatric Dentistry, Freiburgstrasse 7, Bern, CH-3010, Switzerland. (2012 Oct 24)

## **University of Tübingen: Rat brain MRI at 16.4T using a capacitively tunable patch antenna in combination with a receive array**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Tübingen, Germany, by NewsRx correspondents, research stated, “For MRI at 16.4T, with a proton Larmor frequency of 698 MHz, one of the principal RF engineering challenges is to generate a spatially homogeneous transmit field over a larger volume of interest for spin excitation. Constructing volume coils large enough to house a receive array along with the subject and to maintain the quadrature symmetry for different loading conditions is difficult at this frequency.”

Our news editors obtained a quote from the research from the University of Tübingen, “This calls for new approaches to RF coil design for ultra-high field MR systems. A remotely placed capacitively tunable patch antenna, which can easily be adjusted to different loading conditions, was used to generate a relatively homogeneous excitation field covering a large imaging volume with a transversal profile similar to that of a birdcage coil. Since it was placed in front of the animal, this created valuable free space in the narrow magnet bore around the subject for additional hardware. To enhance the reception sensitivity, the patch antenna was combined with an actively detunable 3-channel receive coil array.”

According to the news editors, the research concluded: “In addition to increased SNR compared to a quadrature transceive surface coil, we were able to get high quality gradient echo and spin-echo images covering the whole rat brain.”

For more information on this research see: Rat brain MRI at 16.4T using a capacitively tunable patch antenna in combination with a receive array. *NMR in Biomedicine*, 2012;25(10):1170-1176. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

The news editors report that additional information may be obtained by contacting G. Shajan, University of Tübingen, Dept. of Neuroimaging, Tübingen, Germany. (2012 Oct 24)

## University of Zurich: Quantitative BOLD response of the renal medulla to hyperoxic challenge at 1.5T and 3.0T

By a News Reporter-Staff News Editor at Life Science Weekly – Researchers detail new data in Nephrology. According to news reporting from Zurich, Switzerland, by NewsRx journalists, research stated, “The aim of this study was to gage the magnitude of changes of the apparent renal medullary transverse relaxation time (T-2\*) induced by inhalation of pure oxygen (O-2) or carbogen (95% O-2, 5% CO2) versus baseline breathing of room air.”

The news correspondents obtained a quote from the research from the University of Zurich, “Eight healthy volunteers underwent 2D multi-gradient echo MR imaging at 1.5 T and 3.0 T. Parametrical T-2\* relaxation time maps were computed and average T-2\* was measured in regions of interest placed in the renal medulla and cortex. The largest T-2\* changes were measured in the renal medulla, with a relative T-2\* of 33.8 +/- 22.0% (right medulla) and 34.7 +/- 17.6% (left medulla) as compared to room air for oxygen breathing (p > 0.01), and 53.8 +/- 23.9% and 53.5 +/- 33.9% (p < 0.01) for carbogen breathing, respectively at 3 T. At 1.5 T, the corresponding values were 13.7 +/- 18.5% and 24.1 +/- 17.1% (p < 0.01) for oxygen breathing and 23.9 +/- 17.2% and 38.9 +/- 37.6% (p < 0.01) for carbogen breathing.”

According to the news reporters, the research concluded: “As a result, we showed that renal medullary T-2\* times responded strongly to inhalation of hyperoxic gases, which may be attributed to the hypoxic condition of the medulla and subsequent reduction in deoxyhemoglobin.”

For more information on this research see: Quantitative BOLD response of the renal medulla to hyperoxic challenge at 1.5T and 3.0T. *NMR in Biomedicine*, 2012;25(10):1133-1138. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news journalists report that additional information may be obtained by contacting O.F. Donati, University of Zurich, Dept. of Nephrol, CH-8091 Zurich, Switzerland. (2012 Oct 23)

**Ajou University, Suwon: Chiral separation of N-methyl-dl-aspartic acid in rat brain tissue as N-ethoxycarbonylated (S)-(+)-2-octyl ester derivatives by GC-MS**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Data detailed on Biomedical Chromatography have been presented. According to news reporting out of Suwon, South Korea, by NewsRx editors, research stated, “A selective and sensitive analytical method was developed for enantiomeric separation and determination of N-methyl-DL-aspartic acid (NMA). The method involved the conversion of each enantiomer into N-ethoxycarbonylated (S)-(+)-2-octyl ester derivative for the direct separation by gas chromatography-mass spectrometry (GC-MS).”

Our news journalists obtained a quote from the research from Ajou University, “The diastereomeric derivatives showed characteristic mass spectral properties for analysis by selected ion monitoring mode (SIM) and enabling enantioseparation on an achiral capillary column. Two enantiomers were baseline separated, and the detection limits for N-methyl-L-aspartic acid (NMLA) and N-methyl-D-aspartic acid (NMDA) were 0.07 and 0.03?ng/g, respectively.”

According to the news editors, the research concluded: “When applied to rat brain tissues for absolute configuration of NMA, only NMDA was determined, while NMLA was monitored as lower than the limit of detection.”

For more information on this research see: Chiral separation of N-methyl-dl-aspartic acid in rat brain tissue as N-ethoxycarbonylated (S)-(+)-2-octyl ester derivatives by GC-MS. *Biomedical Chromatography*, 2012;26(11):1353-6. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-0801](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-0801))

Our news journalists report that additional information may be obtained by contacting D.T. Nguyen, Dept. of Molecular Science and Technology, Ajou University, Suwon, 443-721, South Korea. (2012 Oct 22)

**National Defense Medical College, Saitama: Novel hydrocolloid-sheet as wound dressing to stimulate healing-impaired wound healing in diabetic db/db mice**

By a News Reporter-Staff News Editor at Diabetes Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Saitama, Japan, by NewsRx journalists, research stated, “To create a moist environment for wound healing, a hydrocolloid-sheet composed of alginate, chitin/chitosan and fucoidan (ACF-HS) has been developed as a functional wound dressing.

ACF-HS gradually adsorbed medium without any maceration and the medium adsorption in vitro reached constant after 18 h.”

The news reporters obtained a quote from the research from National Defense Medical College, “ACF-HS could effectively interact with and protect a healing-impaired wound in diabetic db/db mice, providing a good moist healing environment with exudate. Furthermore, the wound dressing could have other properties like ease of application and removal, and proper adherence. The aim of this study was to evaluate an accelerating effect of ACF-HS on wound healing for healing-impaired wounds in diabetic db/db mice. Round full-thickness skin defects (12 mm in diameter) were made on the back of db/db mice to prepare healing-impaired wounds. After applying ACF-HS to the wounds, the mice were later killed and histological sections of the wound were prepared. Histological examinations showed significantly advanced granulation tissue and capillary formations in the wounds treated with ACF-HS on days 4, 9 and 14 compared with those in commercially available hydrocolloid wound dressing and non-treatment (control).”

According to the news reporters, the research concluded: “Thus, ACF-HS may serve as a new wound dressing for diabetic healing-impaired wounds.”

For more information on this research see: Novel hydrocolloid-sheet as wound dressing to stimulate healing-impaired wound healing in diabetic db/db mice. *Bio-medical Materials and Engineering*, 2012;22(5):301-10.

Our news correspondents report that additional information may be obtained by contacting S. Yanagibayashi, Dept. of Plastic and Reconstructive Surgery, National Defense Medical College, Saitama, Japan. (2012 Oct 22)

### **Federal University, Sao Paulo: Morphological and chemical changes in dentin after using endodontic agents: Fourier transform Raman spectroscopy, energy-dispersive x-ray fluorescence spectrometry, and scanning electron microscopy study**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Endodontics. According to news reporting from Sao Paulo, Brazil, by NewsRx journalists, research stated, “We examine the morphological and chemical changes in the pulp chamber dentin after using endodontic agents by scanning electron microscopy (SEM), Fourier transform Raman spectroscopy (FT-Raman), and micro energy-dispersive x-ray fluorescence spectrometry (mu EDXRF). Thirty teeth were sectioned exposing the pulp chamber



and divided by six groups ( $n = 5$ ): NT-no treatment; CHX-2% chlorhexidine; CHXE-2% chlorhexidine + 17% EDTA; E-17% EDTA; SH5-5.25% NaOCl; SH5E-5.25% NaOCl + 17% EDTA.”

The news correspondents obtained a quote from the research from Federal University, “The inorganic and organic content was analyzed by FT-Raman.  $\mu$ EDXRF examined calcium (Ca) and phosphorus (P) content as well as Ca/P ratio. Impressions of specimens were evaluated by SEM. Data were submitted to Kruskal-Wallis and Dunn tests ( $p \leq 0.05$ ). Differences were observed among groups for the 960  $\text{cm}^{-1}$  peak. Ca and P content differences were significant (SH5  $>$  NT = SH5E  $>$  CHX  $>$  E  $>$  CHXE). CHXE and E presented the highest Ca/P ratio values compared to the other groups ( $p \leq 0.05$ ). The SEM images in the EDTA-treated groups had the highest number of open tubules. Erosion in the tubules was observed in CHX and SH5E groups. Endodontic agents change the inorganic and organic content of pulp chamber dentin.”

According to the news reporters, the researchers concluded: “NaOCl used alone, or in association with EDTA, was the most effective agent considering chemical and morphological approaches.”

For more information on this research see: Morphological and chemical changes in dentin after using endodontic agents: Fourier transform Raman spectroscopy, energy-dispersive x-ray fluorescence spectrometry, and scanning electron microscopy study. *Journal of Biomedical Optics*, 2012;17(7):153-158. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting F.M. Pascon, Fed Univ Sao Paulo UNIFESP, Math & Earth Sci Department, BR-09972270 Sao Paulo, Brazil. (2012 Oct 12)

## **Bengal Engineering and Science University, Howrah: Microtrap electrode devices for single cell trapping and impedance measurement**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Microdevices is the subject of a report. According to news reporting originating from Howrah, India, by NewsRx correspondents, research stated, “This paper reports the design and fabrication of electrode microtraps for single cell trapping and impedance measurement. In this work, the microtrap electrodes of parallel and elliptical geometry have been fabricated by electroplating of gold electrodes of optimum thickness.”

Our news editors obtained a quote from the research from Bengal Engineering and Science University, “This has enabled the formation of electrode traps without requiring any precision alignment between

separate insulating traps like PDMS and the bottom gold electrodes. Further the improved uniformity of the electric field between the trapping electrodes as observed from COVENTORWARE simulation significantly reduces the effect of cell position inside the microwell on the electrical measurement unlike previous reports. This makes it possible to directly extract the equivalent cell parameters from the electrical measurement without introducing any correction factor corresponding to cell position. We have performed impedance spectroscopy with both the microwell electrode structures with single HeLa cell at two different positions of trapping. It has been observed that there is almost no change in the extracted values of cell resistance and capacitance for different positions within parallel electrodes and there is only 0.7 % and 0.85 % change in cell resistance and capacitance for the two positions within elliptical electrodes.”

According to the news editors, the researchers concluded: “Thus these microwell electrode structures can be used as an improved and a more convenient platform for single cell electrical characterization.”

For more information on this research see: Microtrap electrode devices for single cell trapping and impedance measurement. *Biomedical Microdevices*, 2012;14(5):955-64. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news editors report that additional information may be obtained by contacting D. Mondal, School of Materials Science and Engineering, Bengal Engineering and Science University Shibpur, Howrah, 711103, India.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Oct 10)

### **Boston University: Microfluidic models of vascular functions**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating in Boston, Massachusetts, by NewsRx journalists, research stated, “In vitro studies of vascular physiology have traditionally relied on cultures of endothelial cells, smooth muscle cells, and pericytes grown on centimeter-scale plates, filters, and flow chambers. The introduction of microfluidic tools has revolutionized the study of vascular physiology by allowing researchers to create physiologically relevant culture models, at the same time greatly reducing the consumption of expensive reagents.”

The news reporters obtained a quote from the research from Boston University, “By taking advantage of the small dimensions and laminar flow inherent in microfluidic systems, recent studies have created in vitro models that reproduce many features of the in vivo vascular microenvironment with fine spatial and temporal resolution. In this review, we highlight the advantages of microfluidics in four areas: the investigation of hemodynamics on a capillary length scale, the modulation of fluid streams over vascular cells, angiogenesis induced by the exposure of vascular cells to well-defined gradients in growth factors or pressure, and the growth of microvascular networks in biomaterials.”

According to the news reporters, the researchers concluded: “Such unique capabilities at the microscale are rapidly advancing the understanding of microcirculatory dynamics, shear responses, and angiogenesis in health and disease as well as the ability to create in vivo-like blood vessels in vitro.”

For more information on this research see: Microfluidic models of vascular functions. *Annual Review of Biomedical Engineering*, 2012;14():205-30.

Our news correspondents report that additional information may be obtained by contacting K.H. Wong, Dept. of Biomedical Engineering, Boston University, Boston, Massachusetts 02215, United States. (2012 Oct 10)

### **Changchun Institute of Optics: A flexible layout design method for passive micromixers**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Microdevices have been presented. According to news originating from Changchun, People’s Republic of China, by NewsRx correspondents, research stated, “This paper discusses a flexible layout design method of passive micromixers based on the topology optimization of fluidic flows. Being different from the trial and error method, this method obtains the detailed layout of a passive micromixer according to the desired mixing performance by solving a topology optimization problem.”

Our news journalists obtained a quote from the research from the Changchun Institute of Optics, “Therefore, the dependence on the experience of the designer is weakened, when this method is used to design a passive micromixer with acceptable mixing performance. Several design disciplines for the passive micromixers are considered to demonstrate the flexibility of the layout design method for passive micromixers. These design disciplines include the approximation of the real 3D micromixer, the manufacturing feasibility, the spatial periodic design, and effects of the Peclet number and Reynolds number on the designs obtained by this layout design method.”

According to the news editors, the researchers concluded: “The capability of this design method is validated by several comparisons performed between the obtained layouts and the optimized designs in the recently published literatures, where the values of the mixing measurement is improved up to 40.4% for one cycle of the micromixer.”

For more information on this research see: A flexible layout design method for passive micromixers. *Biomedical Microdevices*, 2012;14(5):929-45. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news correspondents report that additional information may be obtained from Y. Deng, Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP), Chinese Academy of Sciences, 130033, Changchun, People's Taiwan.

The publisher's contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Oct 10)

### **Department of Electronics and Instrumentation Engineering, Greater Noida: Prediction of quantitative intrathoracic fluid volume to diagnose pulmonary oedema using LabVIEW**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Greater Noida, India, by NewsRx journalists, research stated, “Pulmonary oedema is a life-threatening disease that requires special attention in the area of research and clinical diagnosis. Computer-based techniques are rarely used to quantify the intrathoracic fluid volume (IFV) for diagnostic purposes.”

The news reporters obtained a quote from the research from the Department of Electronics and Instrumentation Engineering, “This paper discusses a software program developed to detect and diagnose pulmonary oedema using LabVIEW. The software runs on anthropometric dimensions and physiological parameters, mainly transthoracic electrical impedance (TEI). This technique is accurate and faster than existing manual techniques. The LabVIEW software was used to compute the parameters required to quantify IFV. An equation relating per cent control and IFV was obtained. The results of predicted TEI and measured TEI were compared with previously reported data to validate the developed program. It was found that the predicted values of TEI obtained from the computer-based technique were much closer to the measured

values of TEI. Six new subjects were enrolled to measure and predict transthoracic impedance and hence to quantify IFV.”

According to the news reporters, the researchers concluded: “A similar difference was also observed in the measured and predicted values of TEI for the new subjects.”

For more information on this research see: Prediction of quantitative intrathoracic fluid volume to diagnose pulmonary oedema using LabVIEW. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):859-64.

Our news correspondents report that additional information may be obtained by contacting S. Urooj, Dept. of Electronics and Instrumentation Engineering, Galgotias College of Engineering and Technology, Greater Noida, 201306, India. (2012 Oct 10)

### **Department of Industrial and Systems Engineering, Blacksburg: Estimation of trunk mechanical properties using system identification: effects of experimental setup and modelling assumptions**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Blacksburg, Virginia, by NewsRx journalists, research stated, “The use of system identification to quantify trunk mechanical properties is growing in biomechanics research. The effects of several experimental and modelling factors involved in the system identification of trunk mechanical properties were investigated.”

The news reporters obtained a quote from the research from the Department of Industrial and Systems Engineering, “Trunk kinematics and kinetics were measured in six individuals when exposed to sudden trunk perturbations. Effects of motion sensor positioning and properties of elements between the perturbing device and the trunk were investigated by adopting different models for system identification. Results showed that by measuring trunk kinematics at a location other than the trunk surface, the deformation of soft tissues is erroneously included into trunk kinematics and results in the trunk being predicted as a more damped structure. Results also showed that including elements between the trunk and the perturbing device in the system identification model did not substantially alter model predictions.”

According to the news reporters, the researchers concluded: “Other important parameters that were found to substantially affect predictions were the cut-off frequency used when low-pass filtering raw data and the data window length used to estimate trunk properties.”

For more information on this research see: Estimation of trunk mechanical properties using system identification: effects of experimental

setup and modelling assumptions. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(9):1001-9.

Our news correspondents report that additional information may be obtained by contacting B. Bazrgari, Dept. of Industrial and Systems Engineering, Virginia Technical, 250 Durham Hall (0118), Blacksburg, VA 24061, United States. (2012 Oct 10)

### **Department of Mechanical and Aerospace Engineering, Turin: Numerical and experimental characterization of a novel modular passive micromixer**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Microdevices. According to news reporting from Turin, Italy, by NewsRx journalists, research stated, “This paper reports a new low-cost passive microfluidic mixer design, based on a replication of identical mixing units composed of microchannels with variable curvature (clothoid) geometry. The micromixer presents a compact and modular architecture that can be easily fabricated using a simple and reliable fabrication process.”

The news correspondents obtained a quote from the research from the Department of Mechanical and Aerospace Engineering, “The particular clothoid-based geometry enhances the mixing by inducing transversal secondary flows and recirculation effects. The role of the relevant fluid mechanics mechanisms promoting the mixing in this geometry were analysed using computational fluid dynamics (CFD) for Reynolds numbers ranging from 1 to 110. A measure of mixing potency was quantitatively evaluated by calculating mixing efficiency, while a measure of particle dispersion was assessed through the lacunarity index. The results show that the secondary flow arrangement and recirculation effects are able to provide a mixing efficiency equal to 80 % at Reynolds number above 70. In addition, the analysis of particles distribution promotes the lacunarity as powerful tool to quantify the dispersion of fluid particles and, in turn, the overall mixing. On fabricated micromixer prototypes the microscopic-Laser-Induced-Fluorescence (LIF) technique was applied to characterize mixing.”

According to the news reporters, the researchers concluded: “The experimental results confirmed the mixing potency of the microdevice.”

For more information on this research see: Numerical and experimental characterization of a novel modular passive micromixer. *Biomedical Microdevices*, 2012;14(5):849-62. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting F. Pennella, Dept. of Mechanical and Aerospace

Engineering, Politecnico di Torino, Corso Duca degli Abruzzi 24, 10129, Turin, Italy.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Oct 10)

**Duke University, Durham: Experimental validation of an inverse fluorescence Monte Carlo model to extract concentrations of metabolically relevant fluorophores from turbid phantoms and a murine tumor model**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Durham, North Carolina, by NewsRx correspondents, research stated, “An inverse Monte Carlo based model has been developed to extract intrinsic fluorescence from turbid media. The goal of this work was to experimentally validate the model to extract intrinsic fluorescence of three biologically meaningful fluorophores related to metabolism from turbid media containing absorbers and scatterers.”

Our news editors obtained a quote from the research from Duke University, “Experimental studies were first carried out on tissue-mimicking phantoms that contained individual fluorophores and their combinations, across multiple absorption, scattering, and fluorophore concentrations. The model was then tested in a murine tumor model to determine both the kinetics of fluorophore uptake as well as overall tissue fluorophore concentration through extraction of the intrinsic fluorescence of an exogenous contrast agent that reports on glucose uptake. Results show the model can be used to recover the true intrinsic fluorescence spectrum with high accuracy ( $R^2 = 0.988$ ) as well as accurately compute fluorophore concentration in both single and multiple fluorophores phantoms when appropriate calibration standards are available. In the murine tumor, the model-corrected intrinsic fluorescence could be used to differentiate drug dose injections between different groups.”

According to the news editors, the researchers concluded: “A strong linear correlation was observed between the extracted intrinsic fluorescence intensity and injected drug dose, compared with the distorted turbid tissue fluorescence.”

For more information on this research see: Experimental validation of an inverse fluorescence Monte Carlo model to extract concentrations of metabolically relevant fluorophores from turbid phantoms and

a murine tumor model. *Journal of Biomedical Optics*, 2012;17(7):501-515. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting C.B. Liu, Duke University, Medical Center, Dept. of Radiat Oncol, Durham, NC 27710, United States. (2012 Oct 10)

### **Harvard University and MIT, Cambridge: Evaluation of optical reflectance techniques for imaging of alveolar structure**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Cambridge, Massachusetts, by NewsRx correspondents, research stated, “Three-dimensional (3-D) visualization of the fine structures within the lung parenchyma could advance our understanding of alveolar physiology and pathophysiology. Current knowledge has been primarily based on histology, but it is a destructive two-dimensional (2-D) technique that is limited by tissue processing artifacts.”

Our news journalists obtained a quote from the research from Harvard University and MIT, “Micro-CT provides high-resolution three-dimensional (3-D) imaging within a limited sample size, but is not applicable to intact lungs from larger animals or humans. Optical reflectance techniques offer the promise to visualize alveolar regions of the large animal or human lung with sub-cellular resolution in three dimensions. Here, we present the capabilities of three optical reflectance techniques, namely optical frequency domain imaging, spectrally encoded confocal microscopy, and full field optical coherence microscopy, to visualize both gross architecture as well as cellular detail in fixed, phosphate buffered saline-immersed rat lung tissue. Images from all techniques were correlated to each other and then to corresponding histology.”

According to the news editors, the researchers concluded: “Spatial and temporal resolution, imaging depth, and suitability for in vivo probe development were compared to highlight the merits and limitations of each technology for studying respiratory physiology at the alveolar level.”

For more information on this research see: Evaluation of optical reflectance techniques for imaging of alveolar structure. *Journal of Biomedical Optics*, 2012;17(7):25-31. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.



The news correspondents report that additional information may be obtained from C.I. Unglert, Harvard Mit Div Hlth Sci & Technol, Cambridge, MA 02139, United States. (2012 Oct 10)

### **Katholieke Universiteit Leuven, Heverlee: A numerically validated probabilistic model of a simplified total hip replacement construct**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Heverlee, Belgium, by NewsRx journalists, research stated, “Hip replacement constructs are paradigms of uncertain systems, and as such are suited to the application of probabilistic methods to assess their structural integrity. In order to gain confidence in a probabilistic model, it would be useful to verify the findings with experimental data; however, this is difficult to achieve in practice because of the exhaustive number of parameter combinations that need to be tested.”

The news reporters obtained a quote from the research from Katholieke Universiteit Leuven, “As an alternative to experimental testing, benchmarking can be carried out provided a known analytical solution is available. To this end, a simplified 2D two-beam model of the femoral part of a total hip replacement construct was utilised to analyse uncertainties and variability in the construct as it is subjected to load. The use of a simplified model enabled geometric parameters to be investigated; these are commonly not considered in probabilistic models due to the increased complexity involved. Analytical and finite element representations of the model were developed and compared. The probabilistic study used the Monte Carlo simulation technique and the first-order reliability method to look at the inducible displacement of a hip implant, a phenomenon that has been linked to the most common cause of hip implant failure, aseptic loosening.”

According to the news reporters, the researchers concluded: “Excellent correlation was observed between the analytical and probabilistic solutions, and it was shown that probabilistic approaches could efficiently predict the response of the simplified beam model while readily identifying the parameters most likely to compromise the structural integrity of the construct.”

For more information on this research see: A numerically validated probabilistic model of a simplified total hip replacement construct. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):845-58.

Our news correspondents report that additional information may be obtained by contacting L. Mehrez, PMA Division, Dept. of Mechanical

Engineering, Katholieke Universiteit Leuven, 3001, Heverlee, Belgium.  
(2012 Oct 10)

**Kyung Hee University, Yongin: Reduction of knee range of motion during continuous passive motion due to misaligned hip joint centre**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Yongin, South Korea, by NewsRx journalists, research stated, “When using continuous passive motion (CPM) devices, appropriate setting of the device and positioning of the patient are necessary to obtain maximum range of motion (ROM). In this study, the ROMs in both the knee joint and CPM device during CPM treatment were measured using a motion analysis system for three different CPM devices.”

The news correspondents obtained a quote from the research from Kyung Hee University, “Additionally, the trajectories of the angles at the knee for hip joint misalignments were evaluated using kinematic models of the three CPM devices. The results showed that discrepancies in ROM between the knee joints and the CPM device settings during CPM treatment were revealed regardless of the CPM device and that the effect of misalignment is dependent on the design of the CPM device.”

According to the news reporters, the researchers concluded: “The present technology could be applied for the development of a better design configuration for the CPM device to reduce the discrepancy in ROM at the knee joint.”

For more information on this research see: Reduction of knee range of motion during continuous passive motion due to misaligned hip joint centre. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):801-6.

Our news journalists report that additional information may be obtained by contacting Y.H. Kim, Dept. of Mechanical Engineering & e-Spine Center, Kyung Hee University, Yongin, 446-701, South Korea.  
(2012 Oct 10)

## **Masaryk University, Brno: Hyperspectral imaging based method for fast characterization of kidney stone types**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Brno, Czech Republic, by NewsRx correspondents, research stated, “The formation of kidney stones is a common and highly studied disease, which causes intense pain and presents a high recidivism. In order to find the causes of this problem, the characterization of the main compounds is of great importance.”

Our news editors obtained a quote from the research from Masaryk University, “In this sense, the analysis of the composition and structure of the stone can give key information about the urine parameters during the crystal growth. But the usual methods employed are slow, analyst dependent and the information obtained is poor. In the present work, the near infrared (NIR)-hyperspectral imaging technique was used for the analysis of 215 samples of kidney stones, including the main types usually found and their mixtures. The NIR reflectance spectra of the analyzed stones showed significant differences that were used for their classification. To do so, a method was created by the use of artificial neural networks, which showed a probability higher than 90% for right classification of the stones.”

According to the news editors, the researchers concluded: “The promising results, robust methodology, and the fast analytical process, without the need of an expert assistance, lead to an easy implementation at the clinical laboratories, offering the urologist a rapid diagnosis that shall contribute to minimize urolithiasis recidivism.”

For more information on this research see: Hyperspectral imaging based method for fast characterization of kidney stone types. *Journal of Biomedical Optics*, 2012;17(7):389-400. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting F. Blanco, Masaryk University, R&D Center Low Cost Plasma & Nanotechnol Surface Mod, CS-61137 Brno, Czech Republic. (2012 Oct 10)

## National Center for Scientific Research (CNRS), Marseille: Preparation and antiprotozoal evaluation of promising &#223;-carboline alkaloids

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedicine and Pharmacotherapy have been published. According to news reporting out of Marseille, France, by NewsRx editors, research stated, “The synthesis of &#223;-carbolines and their in vitro antiplasmodial and antileishmanial activities were described herein. These molecules have also been studied concerning their in vitro cytotoxicity toward the human cell line THP1, in order to calculate their respective selectivity indexes (SI).”

Our news journalists obtained a quote from the research from National Center for Scientific Research (CNRS), “Among the 20 tested molecules, four exhibited significant antiplasmodial activity on the W2 multi-resistant *Plasmodium falciparum* strain ( $0.7 \leq IC_{50} \leq 1.7$  M), in comparison with two reference drugs (chloroquine and doxycycline), and a low cytotoxicity. These &#223;-carbolines were also evaluated concerning their in vitro antileishmanial activity on *Leishmania donovani* promastigotes, permitting to identify an antileishmanial hit compound, displaying quite promising activity ( $IC_{50} = 6.1$  M) in comparison with amphotericin B and pentamidine chosen as reference drugs.”

According to the news editors, the researchers concluded: “Finally, structure-activity relationships were discussed, pointing out that molecules presenting a para-substituted phenyl moiety at position 1 of the &#223;-carboline ring displayed the best biological profile.”

For more information on this research see: Preparation and antiprotozoal evaluation of promising &#223;-carboline alkaloids. *Biomedicine & Pharmacotherapy*, 2012;66(5):339-47. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedicine & Pharmacotherapy* - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

Our news journalists report that additional information may be obtained by contacting A. Gellis, UMR CNRS 6264, Laboratoire Chimie Provence, Aix-Marseille Université-Laboratoire de Pharmacochimie Radicalaire, Faculté de Pharmacie, 27 Boulevard Jean-Moulin, 13385 Marseille Cedex 05, France. (2012 Oct 10)

**National Center for Scientific Research (CNRS),  
Vandoeuvre les Nancy: Applying a new computational  
method for biological tissue optics based on the  
time-dependent two-dimensional radiative transfer  
equation**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Vandoeuvre les Nancy, France, by NewsRx journalists, research stated, “Optical tomography is a medical imaging technique based on light propagation in the near infrared (NIR) part of the spectrum. We present a new way of predicting the short-pulsed NIR light propagation using a time-dependent two-dimensional-global radiative transfer equation in an absorbing and strongly anisotropically scattering medium.”

The news reporters obtained a quote from the research from National Center for Scientific Research (CNRS), “A cell-vertex finite-volume method is proposed for the discretization of the spatial domain. The closure relation based on the exponential scheme and linear interpolations was applied for the first time in the context of time-dependent radiative heat transfer problems. Details are given about the application of the original method on unstructured triangular meshes. The angular space ( $4\pi$  Sr) is uniformly subdivided into discrete directions and a finite-differences discretization of the time domain is used. Numerical simulations for media with physical properties analogous to healthy and metastatic human liver subjected to a collimated short-pulsed NIR light are presented and discussed. As expected, discrepancies between the two kinds of tissues were found.”

According to the news reporters, the researchers concluded: “In particular, the level of light flux was found to be weaker (inside the medium and at boundaries) in the healthy medium than in the metastatic one.”

For more information on this research see: Applying a new computational method for biological tissue optics based on the time-dependent two-dimensional radiative transfer equation. *Journal of Biomedical Optics*, 2012;17(7):142-152. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting F. Asllanaj, CNRS, UMR 7563, LEMTA, F-54500 Vandoeuvre Les Nancy, France. (2012 Oct 10)

### **Northeastern University, Boston: Failure locus of the anterior cruciate ligament: 3D finite element analysis**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news originating from Boston, Massachusetts, by NewsRx correspondents, research stated, “Anterior cruciate ligament (ACL) disruption is a common injury that is detrimental to an athlete’s quality of life. Determining the mechanisms that cause ACL injury is important in order to develop proper interventions.”

Our news journalists obtained a quote from the research from Northeastern University, “A failure locus defined as various combinations of loadings and movements, internal/external rotation of femur and valgus and varus moments at a 25(o) knee flexion angle leading to ACL failure was obtained. The results indicated that varus and valgus movements were more dominant to the ACL injury than femoral rotation. Also, Von Mises stress in the lateral tibial cartilage during the valgus ACL injury mechanism was 83% greater than that of the medial cartilage during the varus mechanism of ACL injury.”

According to the news editors, the researchers concluded: “The results of this study could be used to develop training programmes focused on the avoidance of the described combination of movements which may lead to ACL injury.”

For more information on this research see: Failure locus of the anterior cruciate ligament: 3D finite element analysis. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):865-74.

The news correspondents report that additional information may be obtained from A. Homyk, Dept. of Mechanical and Industrial Engineering, Northeastern University, Boston, MA, United States. (2012 Oct 10)

### **Ohio State University, Columbus: Development and validation of a rapid LC-MS/MS method for the determination of JCC76, a novel antitumor agent for breast cancer, in rat plasma and its application to a pharmacokinetics study**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Breast Cancer. According to news reporting originating from Columbus, Ohio, by NewsRx correspondents, research stated, “JCC76 is a novel nimesulide analog that selectively inhibits the human epidermal growth factor receptor 2 (HER2) overexpressing breast cancer cell proliferation and tumor progression. To support further pharmacological and toxicological studies of JCC76, a novel and rapid method using liquid chromatography and electrospray ionization

tandem mass spectrometry (LC-ESI-MS/MS) has been developed and validated for the quantification of the compound in rat plasma.”

Our news editors obtained a quote from the research from Ohio State University, “A C18 column was used for chromatographic separation, and the mobile phase was aqueous ammonium formate (pH 3.7; 5?mm)methanol (1:9, v/v) with an isocratic elution. With a simple liquidliquid extraction procedure using the mixture of methyl tert-butyl etherhexane (1:2, v/v), the mean extraction efficiency of JCC76 in rat plasma was determined as 89.597.3% and no obvious matrix effect was observed. This method demonstrated a linear calibration range from 0.3 to 100?ng/mL for JCC76 in rat plasma and a small volume of sample consumption. The intra- and inter-assay accuracy and precision were within +/- 10%. The pharmacokinetics of JCC76 was also profiled using this validated method in rats.”

According to the news editors, the researchers concluded: “This rapid and sensitive method has been proven to effectively quantify JCC76 for pharmacokinetics study.”

For more information on this research see: Development and validation of a rapid LC-MS/MS method for the determination of JCC76, a novel antitumor agent for breast cancer, in rat plasma and its application to a pharmacokinetics study. *Biomedical Chromatography*, 2012;26(9):1118-1124. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

The news editors report that additional information may be obtained by contacting X.H. Cai, Ohio State University, Dept. of Pharmaceut, Columbus, OH 43210, United States. (2012 Oct 10)

### **Rheinische Friedrich-Wilhelms University, Bonn: Computational simulation of internal bone remodelling around dental implants: a sensitivity analysis**

By a News Reporter-StaffNews Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news originating from Bonn, Germany, by NewsRx correspondents, research stated, “This study aimed to predict the distribution of bone trabeculae, as a density change per unit time, around a dental implant based on applying a selected mathematical remodelling model. The apparent bone density change as a function of the mechanical stimulus was the base of the applied remodelling model that describes disuse and overload bone resorption.”

Our news journalists obtained a quote from the research from Rheinische Friedrich-Wilhelms University, “The simulation was tested

in a finite element model of a screw-shaped dental implant in an idealised bone segment. The sensitivity of the simulation to different mechanical parameters was investigated; these included element edge length, boundary conditions, as well as direction and magnitude of the implant loads. The alteration in the mechanical parameters had a significant influence on density distribution and model stability, in particular at the cortical bone region. The remodelling model could succeed to achieve trabeculae-like structure around osseointegrated dental implants.”

According to the news editors, the researchers concluded: “The validation of this model to a real clinical case is required.”

For more information on this research see: Computational simulation of internal bone remodelling around dental implants: a sensitivity analysis. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):807-14.

The news correspondents report that additional information may be obtained from I. Hasan, Endowed Chair of Oral Technology, Rheinische Friedrich-Wilhelms University, Welschnonnenstr 17, 53111, Bonn, Germany. (2012 Oct 10)

### **Roswell Park Cancer Institute, Buffalo: Imaging a photodynamic therapy photosensitizer in vivo with a time-gated fluorescence tomography system**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from Buffalo, New York, by NewsRx journalists, research stated, “We report the tomographic imaging of a photodynamic therapy (PDT) photosensitizer, 2-(1-hexyloxyethyl)-2-devinyl pyropheophorbide-a (HPPH) in vivo with time-domain fluorescence diffuse optical tomography (TD-FDOT). Simultaneous reconstruction of fluorescence yield and lifetime of HPPH was performed before and after PDT.”

The news correspondents obtained a quote from the research from Roswell Park Cancer Institute, “The methodology was validated in phantom experiments, and depth-resolved in vivo imaging was achieved through simultaneous three-dimensional (3-D) mappings of fluorescence yield and lifetime contrasts. The tomographic images of a human head-and-neck xenograft in a mouse confirmed the preferential uptake and retention of HPPH by the tumor 24-h post-injection. HPPH-mediated PDT induced significant changes in fluorescence yield and lifetime.”

According to the news reporters, the researchers concluded: “This pilot study demonstrates that TD-FDOT may be a good imaging modality for assessing photosensitizer distributions in deep tissue during PDT monitoring.”



For more information on this research see: Imaging a photodynamic therapy photosensitizer in vivo with a time-gated fluorescence tomography system. *Journal of Biomedical Optics*, 2012;17(7):45-52. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting W.R. Mo, Roswell Pk Canc Inst, PDT Center, Buffalo, NY 14263, United States. (2012 Oct 10)

### **School of Chemical Science and Engineering, Stockholm: Development of a novel microfluidic device for long-term in situ monitoring of live cells in 3-dimensional matrices**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Microdevices. According to news reporting originating from Stockholm, Sweden, by NewsRx correspondents, research stated, “Using the latest innovations in microfabrication technology, 3-dimensional microfluidic cell culture systems have been developed as an attractive alternative to traditional 2-dimensional culturing systems as a model for long-term microscale cell-based research. Most microfluidic systems are based on the embedding of cells in hydrogels.”

Our news editors obtained a quote from the research from the School of Chemical Science and Engineering, “However, physiologically realistic conditions based on hydrogels are difficult to obtain and the systems are often too complicated. We have developed a microfluidic cell culture device that incorporates a biodegradable rigid 3D polymer scaffold using standard soft lithography methods. The device permits repeated high-resolution fluorescent imaging of live cell populations within the matrix over a 4 week period. It was also possible to track cell development at the same spatial location throughout this time. In addition, human primary periodontal ligament cells were induced to produce quantifiable calcium deposits within the system.”

According to the news editors, the researchers concluded: “This simple and versatile device should be readily applicable for cell-based studies that require long-term culture and high-resolution bioimaging.”

For more information on this research see: Development of a novel microfluidic device for long-term in situ monitoring of live cells in 3-dimensional matrices. *Biomedical Microdevices*, 2012;14(5):885-93. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news editors report that additional information may be obtained by contacting S. Danmark, Dept. of Fibre and Polymer Technology, School of Chemical Science and Engineering, KTH Royal Institute of Technology, Teknikringen 56-58, 100 44, Stockholm, Sweden.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Oct 10)

### **School of Dentistry, Sao Paulo: Finite element analysis of stress distribution in intact and porcelain veneer restored teeth**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Sao Paulo, Brazil, by NewsRx journalists, research stated, “The aim of this study was to investigate the stress distribution generated in a veneer restoration of an upper central incisor compared to intact teeth using the finite element analysis after applying a lingual buccal loading at the incisal edge. Two models were developed: one model contained enamel, dentine, cementum, periodontal ligament, cortical and trabecular bones, and the other model was a veneer restoration; both models were developed using MSC/Nastran software (MacNeal-Schwendler Corporation, Los Angeles, CA, USA) as the pre-and post-processor.”

The news reporters obtained a quote from the research from the School of Dentistry, “A 10-N load was applied at the incisal edge from the lingual to the buccal side to simulate oral conditions in this area (protrusion). Von Mises stresses were then analysed for three different regions: A-B (enamel elements under the veneer or second enamel layer), A'-B' (buccal enamel and/or veneer element layer) and C-D (lingual enamel elements layer). A higher stress mode was observed for both models at the lingual cervical region. The presence of a veneer restoration on the incisors is a good alternative to mimic the behaviour of enamel under protrusion loading conditions.”

According to the news reporters, the researchers concluded: “The use of veneers to replace enamel during rehabilitations is recommended.”

For more information on this research see: Finite element analysis of stress distribution in intact and porcelain veneer restored teeth. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):795-800.

Our news correspondents report that additional information may be obtained by contacting M.R. Matson, School of Dentistry, Bandeirante University of Sao Paulo (UNIBAN), Rua Maria Candida, 1813, Bloco G, 6&#176; and, 02071-013, Sao Paulo, SP, Brazil. (2012 Oct 10)

### **Sharif University of Technology, Tehran: Prediction of shape and internal structure of the proximal femur using a modified level set method for structural topology optimisation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Tehran, Iran, by NewsRx correspondents, research stated, “A computational framework was developed to simulate the bone remodelling process as a structural topology optimisation problem. The mathematical formulation of the Level Set technique was extended and then implemented into a coronal plane model of the proximal femur to simulate the remodelling of internal structure and external geometry of bone into the optimal state.”

Our news journalists obtained a quote from the research from the Sharif University of Technology, “Results indicated that the proposed approach could reasonably mimic the major geometrical and material features of the natural bone. Simulation of the internal bone remodelling on the typical gross shape of the proximal femur, resulted in a density distribution pattern with good consistency with that of the natural bone.”

According to the news editors, the researchers concluded: “When both external and internal bone remodelling were simulated simultaneously, the initial rectangular design domain with a regularly distributed mass reduced gradually to an optimal state with external shape and internal structure similar to those of the natural proximal femur.”

For more information on this research see: Prediction of shape and internal structure of the proximal femur using a modified level set method for structural topology optimisation. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):835-44.

The news correspondents report that additional information may be obtained from M.K. Bahari, School of Mechanical Engineering, Sharif University of Technology, Tehran, Iran. (2012 Oct 10)

### **Singapore General Hospital: In vivo, real-time, transnasal, image-guided Raman endoscopy: defining spectral properties in the nasopharynx and larynx**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Singapore, Singapore, by NewsRx journalists, research stated, “We report for the first time the implementation of transnasal, image-guided Raman endoscopy to directly assess Raman

spectral properties of nasopharyngeal and laryngeal tissue in vivo during clinical endoscopic examinations. A rapid 785-nm excitation Raman endoscopy system, coupled with a miniaturized fiber-optic Raman probe, was utilized for real-time, in vivo Raman measurements of different anatomical locations in the head and neck.”

The news correspondents obtained a quote from the research from Singapore General Hospital, “A total of 874 high-quality in vivo Raman spectra were successfully acquired from different anatomic locations of the nasopharynx and larynx [i.e., posterior nasopharynx (PN) (n = 521), the fossa of Rosenmuller (FOR) (n = 157), and true laryngeal vocal chords (LVC) (n = 196)] in 23 normal subjects at transnasal endoscopy. Difference spectra and principal component analysis (PCA) were employed for tissue characterization, uncovering the tissue variability at the biomolecular level. The PCA-linear discriminant analysis (LDA) provides sensitivity of 77.0% and specificity of 89.2% for differentiation between PN and FOR, and sensitivity of 68.8% and specificity of 76.0% for distinguishing LVC and PN using the leave-one-subject-out, cross-validation method. This work demonstrates that transnasal, image-guided Raman endoscopy can be used to acquire in vivo Raman spectra from the nasopharynx and larynx in real time.”

According to the news reporters, the researchers concluded: “Significant Raman spectral differences ( $p < 0.05$ ) identified as reflecting the distinct composition and morphology in the nasopharynx and larynx should be considered to be important parameters in the interpretation and rendering of diagnostic decision algorithms for in vivo tissue diagnosis and characterization in the head and neck.”

For more information on this research see: In vivo, real-time, transnasal, image-guided Raman endoscopy: defining spectral properties in the nasopharynx and larynx. *Journal of Biomedical Optics*, 2012;17(7):433-439. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting M.S. Bergholt, Singapore General Hospital, Dept. of Otolaryngol, Singapore 0316, Singapore. (2012 Oct 10)

### **Swiss Federal Institute of Technology, Lausanne: Polyimide/SU-8 catheter-tip MEMS gauge pressure sensor**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Microdevices is now available. According to news reporting out of Lausanne, Switzerland, by NewsRx editors, research stated, “This paper describes the development of a polyimide/SU-8 catheter-tip MEMS gauge pressure sensor. Finite element analysis was used

to investigate critical parameters, impacting on the device design and sensing characteristics.”

Our news journalists obtained a quote from the research from the Swiss Federal Institute of Technology, “The sensing element of the device was fabricated by polyimide-based micromachining on a flexible membrane, using embedded thin-film metallic wires as piezoresistive elements. A chamber containing this flexible membrane was sealed using an adapted SU-8 bonding technique. The device was evaluated experimentally and its overall performance compared with a commercial silicon-based pressure sensor.”

According to the news editors, the researchers concluded: “Furthermore, the device use was demonstrated by measuring blood pressure and heart rate in vivo.”

For more information on this research see: Polyimide/SU-8 catheter-tip MEMS gauge pressure sensor. *Biomedical Microdevices*, 2012;14(5):819-28. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting W. Hasenkamp, Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Oct 10)

### **University Hospital, Dijon: Reproducibility of near-infrared spectroscopy parameters measured during brachial artery occlusion and reactive hyperemia in healthy men**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Dijon, France, by NewsRx editors, research stated, “Near-infrared spectroscopy (NIRS) is a noninvasive technique evaluating microvascular function. The aim of this study was to assess the reproducibility of NIRS parameters during reactive hyperemia induced by a 5 min brachial artery occlusion.”

Our news journalists obtained a quote from the research from University Hospital, “Twenty-four healthy young males (mean 34 +/- 8 years old) had two microvascular function evaluations by NIRS over a 7 to 30-day period (mean 16 +/- 10 days). Intra-subject and inter-observer reproducibility were evaluated with intraclass correlation coefficient (ICC), coefficient of variation (CV), and standard error of measurement (SEM%) for every parameter. Mean NIRS parameters did not differ between both evaluations. Reproducibility was greatest for

muscle oxygen consumption (ICC: 0.84; CV: 6.51%; SEM: 7.11%), time to basal O(2)Hb (ICC: 0.63, CV: 20.04%, SEM 27.22%), time to maximal O(2)Hb (ICC: 0.71; CV: 15.61%; SEM: 19.27%), peak of O(2)Hb (ICC: 0.63, CV: 6.68%, SEM 8.53%), time to maximal tHb (ICC: 0.73, CV: 19.61%, SEM 24.56%) and area under the O(2)Hb and tHb curves (ICC: 0.68, CV: 16.15%, SEM 22.93% and ICC: 0.62, CV: 18.59%, SEM 26.64%, respectively). Moreover, inter-observer reproducibility ranged from excellent to perfect (ICC from 0.85 to 1.00) for every parameter.”

According to the news editors, the researchers concluded: “NIRS parameters during reactive hyperemia are highly reproducible which enables their repeated measurement to study microvascular function in healthy subjects.”

For more information on this research see: Reproducibility of near-infrared spectroscopy parameters measured during brachial artery occlusion and reactive hyperemia in healthy men. *Journal of Biomedical Optics*, 2012;17(7):492-496. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting S. Lacroix, CHU Dijon, Inserm CIC P 803, Dijon, France. (2012 Oct 10)

### **University Hospital, Gottingen: High-sensitivity detection of breast tumors in vivo by use of a pH-sensitive near-infrared fluorescence probe**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from Gottingen, Germany, by NewsRx journalists, research stated, “We investigated the potential of the pH-sensitive dye, CypHer5E, conjugated to Herceptin (pH-Her) for the sensitive detection of breast tumors in mice using noninvasive time-domain near-infrared fluorescence imaging and different methods of data analysis. First, the fluorescence properties of pH-Her were analyzed as function of pH and/or dye-to-protein ratio, and binding specificity was confirmed in cell-based assays.”

The news correspondents obtained a quote from the research from University Hospital, “Subsequently, the performance of pH-Her in nude mice bearing orthotopic HER2-positive (KPL-4) and HER2-negative (MDA-MB-231) breast carcinoma xenografts was compared to that of an always-on fluorescent conjugate Alexa Fluor 647-Herceptin (Alexa-Her). Subtraction of autofluorescence and lifetime (LT)-gated image analyses were performed for background fluorescence suppression. In mice bearing HER2-positive tumors, autofluorescence subtraction together with the selective fluorescence enhancement of pH-Her solely in

the tumor's acidic environment provided high contrast-to-noise ratios (CNRs). This led to an improved sensitivity of tumor detection compared to Alexa-Her. In contrast, LT-gated imaging using LTs determined in model systems did not improve tumor-detection sensitivity in vivo for either probe."

According to the news reporters, the researchers concluded: "PH-Her is suitable for sensitive in vivo monitoring of HER2-expressing breast tumors with imaging in the intensity domain and represents a promising tool for detection of weak fluorescent signals deriving from small tumors or metastases."

For more information on this research see: High-sensitivity detection of breast tumors in vivo by use of a pH-sensitive near-infrared fluorescence probe. *Journal of Biomedical Optics*, 2012;17(7):401-409. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting J.E. Mathejczyk, Univ Med Gottingen, Dept. of Hematol & Oncol, D-37075 Gottingen, Germany. (2012 Oct 10)

### **University of Calabria, Arcavacata di Rende: Histological validation of near-infrared reflectance multispectral imaging technique for caries detection and quantification**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Arcavacata di Rende, Italy, by NewsRx correspondents, research stated, "Near infrared (NIR) multispectral imaging is a novel noninvasive technique that maps and quantifies dental caries. The technique has the ability to reduce the confounding effect of stain present on teeth."

Our news journalists obtained a quote from the research from the University of Calabria, "The aim of this study was to develop and validate a quantitative NIR multispectral imaging system for caries detection and assessment against a histological reference standard. The proposed technique is based on spectral imaging at specific wavelengths in the range from 1000 to 1 700 nm. A total of 112 extracted teeth (molars and premolars) were used and images of occlusal surfaces at different wavelengths were acquired. Three spectral reflectance images were combined to generate a quantitative lesion map of the tooth. The maximum value of the map at the corresponding histological section was used as the NIR caries score. The NIR caries score significantly correlated with the histological reference standard (Spearman's Coefficient = 0.774,  $p < 0.01$ ). Caries detection sensitivities and specificities of

72% and 91% for sound areas, 36% and 79% for lesions on the enamel, and 82% and 69% for lesions in dentin were found.”

According to the news editors, the researchers concluded: “These results suggest that NIR spectral imaging is a novel and promising method for the detection, quantification, and mapping of dental caries.”

For more information on this research see: Histological validation of near-infrared reflectance multispectral imaging technique for caries detection and quantification. *Journal of Biomedical Optics*, 2012;17(7):246-253. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from S. Salsone, University of Calabria, CNR, IPCF Unit Support Cosenza, LiCryL Lab, I-87036 Arcavacata Di Rende, Italy. (2012 Oct 10)

### **University of Ljubljana: Optodynamic energy-conversion efficiency during an Er:YAG-laser-pulse delivery into a liquid through different fiber-tip geometries**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Ljubljana, Slovenia, by NewsRx editors, research stated, “When an erbium-laser pulse is directed into water through a small-diameter fiber tip (FT), the absorption of the laser energy superheats the water and its boiling induces a vapor bubble. We present the influence of different FT geometries and pulse parameters on the vapor-bubble dynamics.”

Our news journalists obtained a quote from the research from the University of Ljubljana, “In our investigation, we use a free-running erbium: yttrium aluminum garnet (Er:YAG) ( $\lambda = 2.94 \mu\text{m}$ ) laser that was designed for laser dentistry. Its pulse is directed into the water through FTs with a flat and conical geometry. Our results show that in the case of the conical FT, a spherical bubble is induced, while a channel-like bubble develops for the flat FT. The ratio between the mechanical energy of the liquid medium and the pulse energy, which we call the optodynamic energy-conversion efficiency, is examined using shadow photography. The results indicate that this efficiency is significantly larger when a conical FT is used and it increases with increasing pulse energy and decreasing pulse duration.”

According to the news editors, the researchers concluded: “The spherical bubbles are compared with the Rayleigh model in order to present the influence of the pulse duration on the dynamics of the bubble’s expansion.”



For more information on this research see: Optodynamic energy-conversion efficiency during an Er:YAG-laser-pulse delivery into a liquid through different fiber-tip geometries. *Journal of Biomedical Optics*, 2012;17(7):133-141. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting P. Gregorcic, Univ Ljubljana, Fac Mech Engn, SI-1000 Ljubljana, Slovenia. (2012 Oct 10)

### **University of Minho, Guimaraes: Development of new spacer device geometry: a CFD study (part I)**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting out of Guimaraes, Portugal, by NewsRx editors, research stated, “Asthma is a widespread disease, affecting more than 300 million individuals. The treatment in children is based upon an administration of a pressurised metered-dose inhaler added with a spacer.”

Our news journalists obtained a quote from the research from the University of Minho, “The efficiency of drug delivery to the patient is strongly affected by the transient airflow pattern inside the spacer device. This paper presents a computational fluid dynamics (CFD) analysis of airflow inside a commercially available spacer device with wide application. This study, carried out in Fluent, was the basis of an optimisation procedure developed to improve the geometry of the spacer and develop a more efficient product. The results show that an appropriate control of the boundary layer development, by changing the spacer shape, reduces the length of the recirculation zones and improves the flow.”

According to the news editors, the researchers concluded: “It can be concluded that CFD is a powerful technique that can be successfully applied to optimise the geometry of such medical devices.”

For more information on this research see: Development of new spacer device geometry: a CFD study (part I). *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):825-33.

Our news journalists report that additional information may be obtained by contacting R.F. Oliveira, Mechanical Engineering Department, School of Engineering, University of Minho, 4800-058, Guimaraes, Portugal. (2012 Oct 10)

### **University of Rostock: Advanced material modelling in numerical simulation of primary acetabular press-fit cup stability**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news originating from Rostock, Germany, by NewsRx correspondents, research stated, “Primary stability of artificial acetabular cups, used for total hip arthroplasty, is required for the subsequent osteointegration and good long-term clinical results of the implant. Although closed-cell polymer foams represent an adequate bone substitute in experimental studies investigating primary stability, correct numerical modelling of this material depends on the parameter selection.”

Our news journalists obtained a quote from the research from the University of Rostock, “Material parameters necessary for crushable foam plasticity behaviour were originated from numerical simulations matched with experimental tests of the polymethacrylimide raw material. Experimental primary stability tests of acetabular press-fit cups consisting of static shell assembly with consecutively pull-out and lever-out testing were subsequently simulated using finite element analysis. Identified and optimised parameters allowed the accurate numerical reproduction of the raw material tests. Correlation between experimental tests and the numerical simulation of primary implant stability depended on the value of interference fit.”

According to the news editors, the researchers concluded: “However, the validated material model provides the opportunity for subsequent parametric numerical studies.”

For more information on this research see: Advanced material modelling in numerical simulation of primary acetabular press-fit cup stability. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):787-93.

The news correspondents report that additional information may be obtained from R. Souffrant, Biomechanics and Implant Technology Research Laboratory, Dept. of Orthopaedics, University of Rostock, Rostock, Germany. (2012 Oct 10)

### **University of Southampton: Implant-bone interface healing and adaptation in resurfacing hip replacement**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating from Southampton, United Kingdom, by NewsRx correspondents, research stated, “Hip resurfacing demonstrates good survivorship as a treatment for young patients with osteoarthritis, but occasional implant loosening failures occur. On the femoral side there

is radiographic evidence suggesting that the implant stem bears load, which is thought to lead to proximal stress shielding and adaptive bone remodelling.”

Our news editors obtained a quote from the research from the University of Southampton, “Previous attempts aimed at reproducing clinically observed bone adaptations in response to the implant have not recreated the full set of common radiographic changes, so a modified bone adaptation algorithm was developed in an attempt to replicate more closely the effects of the prosthesis on the host bone. The algorithm features combined implant-bone interface healing and continuum bone remodelling. It was observed that remodelling simulations that accounted for progressive gap filling at the implant-bone interface predicted the closest periprosthetic bone density changes to clinical X-rays and DEXA data.”

According to the news editors, the researchers concluded: “This model may contribute to improved understanding of clinical failure mechanisms with traditional hip resurfacing designs and enable more detailed pre-clinical analysis of new designs.”

For more information on this research see: Implant-bone interface healing and adaptation in resurfacing hip replacement. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(9):935-47.

The news editors report that additional information may be obtained by contacting A. Dickinson, Bioengineering Research Group, University of Southampton, Southampton, Hampshire, UK. (2012 Oct 10)

### **University of Stuttgart: The muscle line of action in current models of the human cervical spine: a comparison with in vivo MRI data**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news originating from Stuttgart, Germany, by NewsRx correspondents, research stated, “Cervical muscles are commonly represented by line-of-action models. This investigation evaluates the performance of three types of model implementations, based on their ability to mimic geometric in-vivo aspects of muscles.”

Our news journalists obtained a quote from the research from the University of Stuttgart, “Five prominent pairs of neck muscles were reconstructed in three head positions using magnetic resonance imaging. Based on the reconstructions, muscle approximations were created that represent the muscles with piecewise straight lines. Measured and modelled muscle approximations were compared with respect to their pulling directions at the attachment sites and the overall distance between the muscle paths. Muscle lengths were evaluated in two

ways. First, length discrepancies were determined between measured and modelled muscles depending on the head position. Second, the difference of muscle lengths in neutral and deflected head positions for measurement and models were calculated. The results indicate considerable differences between models and measurements.”

According to the news editors, the researchers concluded: “Pulling directions, for instance, differed by up to 40°; depending on the chosen muscle and the type of muscle implementation.”

For more information on this research see: The muscle line of action in current models of the human cervical spine: a comparison with in vivo MRI data. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(9):953-61.

The news correspondents report that additional information may be obtained from R. Jaeger, Institute of Applied Mechanics (CE), Chair of Continuum Mechanics, University of Stuttgart, Pfaffenwaldring 7, D-70569 Stuttgart, Germany. (2012 Oct 10)

### **University of Thessaly, Volos: Muscle-driven finite element simulation of human foot movements**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of Volos, Greece, by NewsRx editors, research stated, “This paper describes a finite element scheme for realistic muscle-driven simulation of human foot movements. The scheme is used to simulate human ankle plantar flexion.”

Our news journalists obtained a quote from the research from the University of Thessaly, “A three-dimensional anatomically detailed finite element model of human foot and lower leg is developed and the idea of generating natural foot movement based entirely on the contraction of the plantar flexor muscles is used. The bones, ligaments, articular cartilage, muscles, tendons, as well as the rest soft tissues of human foot and lower leg are included in the model. A realistic three-dimensional continuum constitutive model that describes the biomechanical behaviour of muscles and tendons is used. Both the active and passive properties of muscle tissue are accounted for. The materials for bones and ligaments are considered as homogeneous, isotropic and linearly elastic, whereas the articular cartilage and the rest soft tissues (mainly fat) are defined as hyperelastic materials. The model is used to estimate muscle tissue deformations as well as stresses and strains that develop in the lower leg muscles during plantar flexion of the ankle.”

According to the news editors, the researchers concluded: “Stresses and strains that develop in Achilles tendon during such a movement are also investigated.”

For more information on this research see: Muscle-driven finite element simulation of human foot movements. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(9):925-34.

Our news journalists report that additional information may be obtained by contacting L.A. Spyrou, Dept. of Mechanical Engineering, University of Thessaly, Volos 38334, Greece. (2012 Oct 10)

### **University of Western Ontario, London: Visualization of the solubilization process of the plasma membrane of a living cell by waveguide evanescent field fluorescence microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in London, Canada, by NewsRx journalists, research stated, “Waveguide evanescent field fluorescence microscopy (WEFF) is a novel microscopy technology that allows imaging of a cell’s plasma membrane in the vicinity of a glass substrate with high axial resolution, low background and little photobleaching. Time-lapse imaging can be performed to investigate changes in cell morphology in the presence or absence of chemical agents.”

The news reporters obtained a quote from the research from the University of Western Ontario, “WEFF microscopy provides a method to investigate plasma membranes of living cells and allows a comparison to simplified model membranes immobilized on planar substrates. The interaction of the nonionic detergent Triton X-100 with plasma membranes of osteoblasts in an aqueous environment was investigated. Solubilization of the membranes very close to the waveguide surface was visualized and related to the three-stage solubilisation model proposed for liposomes and supported lipid bilayers.”

According to the news reporters, the researchers concluded: “Findings for the plasma membranes of cells are in excellent agreement with results reported for these artificial model systems.”

For more information on this research see: Visualization of the solubilization process of the plasma membrane of a living cell by waveguide evanescent field fluorescence microscopy. *Journal of Biomedical Optics*, 2012;17(7):372-378. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting A. Hassanzadeh, University of Western Ontario, Dept. of Physiol & Pharmacol, Schulich Sch Med & Dental, London, ON, Canada. (2012 Oct 10)

## **Vanderbilt University, Nashville: Advanced technologies for gastrointestinal endoscopy**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news originating from Nashville, Tennessee, by NewsRx correspondents, research stated, “The gastrointestinal tract is home to some of the most deadly human diseases. Exacerbating the problem is the difficulty of accessing it for diagnosis or intervention and the concomitant patient discomfort.”

Our news journalists obtained a quote from the research from Vanderbilt University, “Flexible endoscopy has established itself as the method of choice and its diagnostic accuracy is high, but there remain technical limitations in modern scopes, and the procedure is poorly tolerated by patients, leading to low rates of compliance with screening guidelines. Although advancement in clinical endoscope design has been slow in recent years, a critical mass of enabling technologies is now paving the way for the next generation of gastrointestinal endoscopes. This review describes current endoscopes and provides an overview of innovative flexible scopes and wireless capsules that can enable painless endoscopy and/or enhanced diagnostic and therapeutic capabilities.”

According to the news editors, the researchers concluded: “We provide a perspective on the potential of these new technologies to address the limitations of current endoscopes in mass cancer screening and other contexts and thus to save many lives.”

For more information on this research see: Advanced technologies for gastrointestinal endoscopy. *Annual Review of Biomedical Engineering*, 2012;14():397-429.

The news correspondents report that additional information may be obtained from P. Valdastri, Science and Technology of Robotics in Medicine Laboratory, Vanderbilt University, Nashville, Tennessee 37235, United States. (2012 Oct 10)

## **Washington University, St. Louis: Photoacoustic microscopy of blood pulse wave**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating in St. Louis, Missouri, by NewsRx journalists, research stated, “Blood pulse wave velocity (PWV) is an important physiological parameter that characterizes vascular stiffness. In this letter, we present electrocardiogram-synchronized, photoacoustic microscopy for noninvasive quantification of the PWV in the peripheral vessels of living mice.”

The news reporters obtained a quote from the research from Washington University, “Interestingly, blood pulse wave-induced fluctuations in blood flow speed were clearly observed in arteries and arterioles, but not in veins or venules. Simultaneously recorded electrocardiograms served as references to measure the travel time of the pulse wave between two cross sections of a chosen vessel and vessel segmentation analysis enabled accurate quantification of the travel distance. PWVs were quantified in ten vessel segments from two mice.”

According to the news reporters, the researchers concluded: “Statistical analysis shows a linear correlation between the PWV and the vessel diameter which agrees with known physiology.”

For more information on this research see: Photoacoustic microscopy of blood pulse wave. *Journal of Biomedical Optics*, 2012;17(7):12-14. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting C.H. Yeh, Washington University, Dept. of Biomed Engrn, Opt Imaging Lab, St Louis, MO 63130, United States. (2012 Oct 10)

### **West Virginia University, Morgantown: Microfabrication of cylindrical microfluidic channel networks for microvascular research**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Microdevices have been published. According to news reporting out of Morgantown, West Virginia, by NewsRx editors, research stated, “Current methods for formation of microvascular channel scaffolds are limited with non-circular channel cross-sections, complicated fabrication, and less flexibility in microchannel network design. To address current limitations in the creation of engineered microvascular channels with complex three-dimensional (3-D) geometries in the shape of microvessels, we have developed a reproducible, cost-effective, and flexible micromanufacturing process combined with photolithographic reflowable photoresist and soft lithography techniques to fabricate cylindrical microchannel and networks.”

Our news journalists obtained a quote from the research from West Virginia University, “A positive reflowable photoresist AZ P4620 was used to fabricate a master microchannel mold with semi-circular cross-sections. By the alignment and bonding of two polydimethylsiloxane (PDMS) microchannels replicated from the master mold together, a

cylindrical microchannel or microchannel network was created. Further examination of the channel dimensions and surface profiles at different branching levels showed that the shape of the microfluidic channel was well approximated by a semi-circular surface, and a multi-level, multi-depth channel network was created. In addition, a computational fluidic dynamics (CFD) model was used to simulate shear flows and corresponding pressure distributions inside of the microchannel and channel network based on the dimensions of the fabricated channels.”

According to the news editors, the researchers concluded: “The fabricated multi-depth cylindrical microchannel network can provide platforms for the investigation of microvascular cells growing inside of cylindrical channels under shear flows and lumen pressures, and work as scaffolds for the investigation of morphogenesis and tubulogenesis.”

For more information on this research see: Microfabrication of cylindrical microfluidic channel networks for microvascular research. *Biomedical Microdevices*, 2012;14(5):873-83. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting Z. Huang, Lane Dept. of Computer Science and Electrical Engineering, West Virginia University, Morgantown, WV, 26506, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Oct 10)

### **Western Carolina University, Cullowhee: Using topological equivalence to discover stable control parameters in biodynamic systems**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Cullowhee, North Carolina, by NewsRx correspondents, research stated, “In order to better understand the mechanisms that contribute to low back pain, researchers have developed mathematical models and simulations. A mathematical model including neuromuscular feedback control is developed for a person balancing on an unstable sitting apparatus, the wobble chair.”

Our news editors obtained a quote from the research from Western Carolina University, “When the application of a direct method fails to discover appropriate controller gain parameters for the wobble chair, we show how topological equivalence can be used to indirectly identify appropriate parameter values. The solution is found by first transforming the wobble chair into the Acrobot, another member of the same family of



topologically equivalent dynamical systems. After finding appropriate gain parameters for the Acrobot, a continuous transformation is performed to convert the Acrobot back to the wobble chair, during which the gain parameters are adjusted to maintain stability.”

According to the news editors, the researchers concluded: “Thus, we demonstrate how topological equivalence can be used to indirectly solve a problem that was difficult to solve directly.”

For more information on this research see: Using topological equivalence to discover stable control parameters in biodynamic systems. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):875-84.

The news editors report that additional information may be obtained by contacting M.L. Tanaka, Dept. of Engineering and Technology, Western Carolina University, 333 Belk, Cullowhee, NC 28723, United States. (2012 Oct 10)

### **Yale University School of Medicine, New Haven: Optical nanoscopy: from acquisition to analysis**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in New Haven, Connecticut, by NewsRx journalists, research stated, “Recent advances in far-field microscopy have demonstrated that fluorescence imaging is possible at resolutions well below the long-standing diffraction limit. By exploiting photophysical properties of fluorescent probe molecules, this new class of methods yields a resolving power that is fundamentally diffraction unlimited.”

The news reporters obtained a quote from the research from the Yale University School of Medicine, “Although these methods are becoming more widely used in biological imaging, they must be complemented by suitable data analysis approaches if their potential is to be fully realized. Here we review the basic principles of diffraction-unlimited microscopy and how these principles influence the selection of available algorithms for data analysis.”

According to the news reporters, the researchers concluded: “Furthermore, we provide an overview of existing analysis strategies and discuss their application.”

For more information on this research see: Optical nanoscopy: from acquisition to analysis. *Annual Review of Biomedical Engineering*, 2012;14():231-54.

Our news correspondents report that additional information may be obtained by contacting T.J. Gould, Dept. of Cell Biology, Yale University School of Medicine, New Haven, Connecticut 06510, United States. (2012 Oct 10)

## **Cornell University College of Medicine, New York City: Nonlinear dynamics in cardiology**

By a News Reporter-Staff News Editor at Ivy League Week – A new study on Biomedical Engineering is now available. According to news reporting originating from New York City, New York, by NewsRx correspondents, research stated, “The dynamics of many cardiac arrhythmias, as well as the nature of transitions between different heart rhythms, have long been considered evidence of nonlinear phenomena playing a direct role in cardiac arrhythmogenesis. In most types of cardiac disease, the pathology develops slowly and gradually, often over many years.”

Our news editors obtained a quote from the research from the Cornell University College of Medicine, “In contrast, arrhythmias often occur suddenly. In nonlinear systems, sudden changes in qualitative dynamics can, counterintuitively, result from a gradual change in a system parameter-this is known as a bifurcation. Here, we review how nonlinearities in cardiac electrophysiology influence normal and abnormal rhythms and how bifurcations change the dynamics. In particular, we focus on the many recent developments in computational modeling at the cellular level that are focused on intracellular calcium dynamics.”

According to the news editors, the researchers concluded: “We discuss two areas where recent experimental and modeling work has suggested the importance of nonlinearities in calcium dynamics: repolarization alternans and pacemaker cell automaticity.”

For more information on this research see: Nonlinear dynamics in cardiology. *Annual Review of Biomedical Engineering*, 2012;14():179-203.

The news editors report that additional information may be obtained by contacting T. Krogh-Madsen, Greenberg Division of Cardiology, Dept. of Medicine, Weill Cornell Medical College, New York, New York 10065, United States. (2012 Oct 09)

## **Ghent University: Nonthermal plasma sterilization of living and nonliving surfaces**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Biomedical Engineering. According to news originating from Ghent, Belgium, by NewsRx correspondents, research stated, “The recent tremendous progress in understanding physical plasma phenomena, together with the development of new plasma sources, has put a growing focus on the application of nonthermal plasmas in the biomedical domain. Among several novel applications, the inactivation of bacteria by nonthermal plasmas (so-called plasma sterilization) is particularly interesting.”

Our news journalists obtained a quote from the research from Ghent University, “This introductory review provides a summary of the current status of this emerging research field. In addition to the inactivation of bacteria on nonliving surfaces, this review also focuses on the sterilization of living surfaces, such as animal and human tissues.”

According to the news editors, the researchers concluded: “Clearly, nonthermal plasmas have undoubtedly great potential as a novel method for low-temperature sterilization.”

For more information on this research see: Nonthermal plasma sterilization of living and nonliving surfaces. *Annual Review of Biomedical Engineering*, 2012;14(0):255-74.

The news correspondents report that additional information may be obtained from N. De Geyter, Research Unit Plasma Technology, Dept. of Applied Physics, Faculty of Engineering and Architecture, Ghent University, 9000 Gent, Belgium. (2012 Oct 09)

### **IFSTTAR, Marseille: Inverse analysis and robustness evaluation for biological structure behaviour in FE simulation: application to the liver**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Marseille, France, by NewsRx journalists, research stated, “To prevent traumas to abdominal organs, the selection of efficient safety devices should be based on a detailed knowledge of injury mechanisms and related injury criteria. In this sense, finite element (FE) simulation coupled with experiment could be a valuable tool to provide a better understanding of the behaviour of internal organs under crash conditions.”

The news correspondents obtained a quote from the research from IFSTTAR, “This work proposes a methodology based on inverse analysis which combines exploration process optimisation and robustness study to obtain mechanical behaviour of the complex structure of the liver through FE simulation. The liver characterisation was based on Mooney-Rivlin hyperelastic behaviour law considering whole liver structure under uniform quasi-static compression. With the global method used, the model fits experimental data.”

According to the news reporters, the researchers concluded: “The variability induced by modelling parameters is quantified within a reasonable time.”

For more information on this research see: Inverse analysis and robustness evaluation for biological structure behaviour in FE simulation: application to the liver. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(9):993-9.

Our news journalists report that additional information may be obtained by contacting C. Conte, Laboratoire de Biomecanique Appliquee, IFSTTAR, Universite de Mediterranee, Bd P Dramard, 13 016 Marseille, France. (2012 Oct 09)

### **Queen Mary University, London: Mechanical regulation of nuclear structure and function**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from London, United Kingdom, by NewsRx correspondents, research stated, “Mechanical loading induces both nuclear distortion and alterations in gene expression in a variety of cell types. Mechanotransduction is the process by which extracellular mechanical forces can activate a number of well-studied cytoplasmic signaling cascades.”

Our news editors obtained a quote from the research from Queen Mary University, “Inevitably, such signals are transduced to the nucleus and induce transcription factor-mediated changes in gene expression. However, gene expression also can be regulated through alterations in nuclear architecture, providing direct control of genome function. One putative transduction mechanism for this phenomenon involves alterations in nuclear architecture that result from the mechanical perturbation of the cell. This perturbation is associated with direct mechanical strain or osmotic stress, which is transferred to the nucleus. This review describes the current state of knowledge relating the nuclear architecture and the transfer of mechanical forces to the nucleus mediated by the cytoskeleton, the nucleoskeleton, and the LINC (linker of the nucleoskeleton and cytoskeleton) complex. Moreover, remodeling of the nucleus induces alterations in nuclear stiffness, which may be associated with cell differentiation.”

According to the news editors, the researchers concluded: “These phenomena are discussed in relation to the potential influence of nuclear architecture-mediated mechanoregulation of transcription and cell fate.”

For more information on this research see: Mechanical regulation of nuclear structure and function. *Annual Review of Biomedical Engineering*, 2012;14():431-55.

The news editors report that additional information may be obtained by contacting R.P. Martins, Institute of Bioengineering, School of Engineering and Materials Science, Queen Mary University of London, London E1 4NS, UK. (2012 Oct 09)

**Spanish National Research Council (CSIC), Madrid:  
Anisotropy-based robust focus measure for non-mydriatric  
retinal imaging**

By a News Reporter-Staff News Editor at Medical Imaging Law Weekly – Current study results on Biomedical Engineering have been published. According to news originating from Madrid, Spain, by NewsRx correspondents, research stated, “Non-mydriatric retinal imaging is an important tool for diagnosis and progression assessment of ophthalmic diseases. Because it does not require pharmacological dilation of the patient’s pupil, it is essential for screening programs performed by non-medical personnel.”

Our news journalists obtained a quote from the research from Spanish National Research Council (CSIC), “A typical camera is equipped with a manual focusing mechanism to compensate for the refractive errors in the eye. However, manual focusing is error prone, especially when performed by inexperienced photographers. In this work, we propose a new and robust focus measure based on a calculation of image anisotropy which, in turn, is evaluated from the directional variance of the normalized discrete cosine transform.”

According to the news editors, the researchers concluded: “Simulation and experimental results demonstrate the effectiveness of the proposed focus measure.”

For more information on this research see: Anisotropy-based robust focus measure for non-mydriatric retinal imaging. *Journal of Biomedical Optics*, 2012;17(7):345-353. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from A.G. Marrugo, CSIC, Inst Opt, Madrid 28006, Spain. (2012 Oct 09)

**University of Cincinnati: Formation of lipid bilayers inside  
microfluidic channel array for monitoring  
membrane-embedded nanopores of phi29 DNA packaging  
nanomotor**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Microdevices are presented in a new report. According to news reporting out of Cincinnati, Ohio, by NewsRx editors, research stated, “An efficient method to form lipid bilayers inside an array of microfluidic channels has been developed and applied to monitor

the membrane-embedded phi29 DNA packaging motor with an electrochemical characterization on a lab-on-a-chip (LOC) platform. A push-pull junction capturing approach was applied to confine a small amount of the lipid solution inside a microchannel.”

Our news journalists obtained a quote from the research from the University of Cincinnati, “The selective permeability between solvents and water in PDMS was utilized to extract the solvent from the lipid solution, resulting in a self-formation of the lipid bilayer in the microchannel array. Each microchannel was independently connected to a silver/silver chloride (Ag/AgCl) electrode array, leading to a high-throughput monitoring of the nanopore insertion in the formed lipid bilayers.”

According to the news editors, the researchers concluded: “The formation of multiple lipid bilayers inside an array of microchannels and the simultaneous electrical and optical monitoring of multiple bilayer provides an efficient LOC platform for the further development of single phi29 motor pore sensing and high throughput single pore dsDNA sequencing.”

For more information on this research see: Formation of lipid bilayers inside microfluidic channel array for monitoring membrane-embedded nanopores of phi29 DNA packaging nanomotor. *Biomedical Microdevices*, 2012;14(5):921-8. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting J.S. Shim, College of Engineering and Applied Science, University of Cincinnati, Cincinnati, OH, 45221, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Oct 09)

### **University of Connecticut, Farmington: Analysis of second-harmonic-generation microscopy in a mouse model of ovarian carcinoma**

By a News Reporter-Staff News Editor at Cancer Weekly – Investigators discuss new findings in Carcinomas. According to news reporting out of Farmington, Connecticut, by NewsRx editors, research stated, “Second-harmonic-generation (SHG) imaging of mouse ovaries ex vivo was used to detect collagen structure changes accompanying ovarian cancer development. Dosing with 4-vinylcyclohexene diepoxide and 7,12-dimethylbenz[a]anthracene resulted in histologically confirmed cases of normal, benign abnormality, dysplasia, and carcinoma.”

Our news journalists obtained a quote from the research from the University of Connecticut, “Parameters for each SHG image were calculated using the Fourier transform matrix and gray-level co-occurrence matrix (GLCM). Cancer versus normal and cancer versus all other diagnoses showed the greatest separation using the parameters derived from power in the highest-frequency region and GLCM energy. Mixed effects models showed that these parameters were significantly different between cancer and normal ( $P < 0.008$ ). Images were classified with a support vector machine, using 25% of the data for training and 75% for testing. Utilizing all images with signal greater than the noise level, cancer versus not-cancer specimens were classified with 81.2% sensitivity and 80.0% specificity, and cancer versus normal specimens were classified with 77.8% sensitivity and 79.3% specificity. Utilizing only images with greater than of 75% of the field of view containing signal improved sensitivity and specificity for cancer versus normal to 81.5% and 81.1%.”

According to the news editors, the researchers concluded: “These results suggest that using SHG to visualize collagen structure in ovaries could help with early cancer detection.”

For more information on this research see: Analysis of second-harmonic-generation microscopy in a mouse model of ovarian carcinoma. *Journal of Biomedical Optics*, 2012;17(7):190-198. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting J.M. Watson, University of Connecticut, Center Hlth, Carole & Ray Neag Comprehensive Canc Center, Div Gynecol Oncol, Farmington, CT 06030, United States. (2012 Oct 09)

### **Yale University, New Haven: Robots for use in autism research**

By a News Reporter-Staff News Editor at Ivy League Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in New Haven, Connecticut, by NewsRx journalists, research stated, “Autism spectrum disorders are a group of life-long disabilities that affect people’s ability to communicate and to understand social cues. Research into applying robots as therapy tools has shown that robots seem to improve engagement and elicit novel social behaviors from people (particularly children and teenagers) with autism.”

The news reporters obtained a quote from the research from Yale University, “Robot therapy for autism has been explored as one of the first application domains in the field of socially assistive robotics (SAR),

which aims to develop robots that assist people with special needs through social interactions. In this review, we discuss the past decade's work in SAR systems designed for autism therapy by analyzing robot design decisions, human-robot interactions, and system evaluations."

According to the news reporters, the researchers concluded: "We conclude by discussing challenges and future trends for this young but rapidly developing research area."

For more information on this research see: Robots for use in autism research. *Annual Review of Biomedical Engineering*, 2012;14():275-94.

Our news correspondents report that additional information may be obtained by contacting B. Scassellati, Dept. of Computer Science, Yale University, New Haven, Connecticut 06520, United States. (2012 Oct 09)

### **Australian National University, Canberra: A theoretical study of bone remodelling under PEMF at cellular level**

By a News Reporter-Staff News Editor at Clinical Trials Week – Research findings on Bone Research are discussed in a new report. According to news reporting out of Canberra, Australia, by NewsRx editors, research stated, "Pulsed electromagnetic field (PEMF) devices have been used clinically to slow down osteoporosis and accelerate the healing of bone fractures for many years. However, the underlying mechanism by which bone remodelling under PEMF is regulated remains poorly understood."

Our news journalists obtained a quote from the research from Australian National University, "In this paper, a mathematical model of bone cell population of bone remodelling under PEMF at cellular level is developed to address this issue for the first time. On the basis of this model and control theory, parametric study of control mechanisms is carried out and a number of possible control mechanisms are identified."

According to the news editors, the researchers concluded: "These findings will help further the understanding of bone remodelling under PEMF and advance therapies and pharmacological developments in clinical trials."

For more information on this research see: A theoretical study of bone remodelling under PEMF at cellular level. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(8):885-97.

Our news journalists report that additional information may be obtained by contacting Y. Wang, Research School of Engineering, Australian National University, Canberra, ACT, 0200, Australia. (2012 Oct 08)



## Taipei Medical University: Regulation of PUMA induced by mechanical stress in rat cardiomyocytes

By a News Reporter-Staff News Editor at Cardiovascular Week – Fresh data on Apoptosis are presented in a new report. According to news reporting originating in Taipei, Taiwan, by NewsRx journalists, research stated, “PUMA (p53-up-regulated modulator of apoptosis), an apoptosis regulated gene, increased during endoplasmic reticulum stress. However, the expression of PUMA in cardiomyocytes under mechanical stress is little known.”

The news reporters obtained a quote from the research from Taipei Medical University, “We aimed to investigate the regulation mechanism of PUMA expression and apoptosis induced by mechanical stress in cardiomyocytes. Aorta-caval (AV) shunt was performed in adult Wistar rats to induce volume overload. Rat neonatal cardiomyocytes were stretched by vacuum to 20% of maximum elongation at 60 cycles/min. PUMA protein and mRNA were up-regulated in the shunt group as compared with sham group. The increased PUMA protein expression and apoptosis induced by shunt was reversed by treatment with atorvastatin at 30 mg/kg/day orally for 7 days. TUNEL assay showed that treatment with atorvastatin inhibited the apoptosis induced by volume overload. Cyclic stretch significantly enhanced PUMA protein and gene expression. Addition of c-jun N-terminal kinase (JNK) inhibitor SP600125, JNK small interfering RNA (siRNA) and interferon-gamma (INF-gamma) antibody 30 min before stretch reduced the induction of PUMA protein. Gel shift assay demonstrated that stretch increased the DNA binding activity of interferon regulatory factor-1. Stretch increased, while PUMA-Mut plasmid, SP600125 and INF-gamma antibody abolished the PUMA promoter activity induced by stretch. PUMA mediated apoptosis induced by stretch was reversed by PUMA siRNA and atorvastatin. Mechanical stress enhanced apoptosis and PUMA expression in cardiomyocytes.”

According to the news reporters, the researchers concluded: “Treatment with atorvastatin reversed both PUMA expression and apoptosis induced by mechanical stress in cardiomyocytes.”

For more information on this research see: Regulation of PUMA induced by mechanical stress in rat cardiomyocytes. *Journal of Biomedical Science*, 2012;19(0):1-13. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; Journal of Biomedical Science - [www.jbiomedsci.com](http://www.jbiomedsci.com))

Our news correspondents report that additional information may be obtained by contacting W.P. Cheng, Taipei Medical University, Sch Med, Coll Med, Taipei, Taiwan. (2012 Oct 08)

### **Washington University, St. Louis: Quantitative imaging methods for the development and validation of brain biomechanics models**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in St. Louis, Missouri, by NewsRx journalists, research stated, “Rapid deformation of brain tissue in response to head impact or acceleration can lead to numerous pathological changes, both immediate and delayed. Modeling and simulation hold promise for illuminating the mechanisms of traumatic brain injury (TBI) and for developing preventive devices and strategies.”

The news reporters obtained a quote from the research from Washington University, “However, mathematical models have predictive value only if they satisfy two conditions. First, they must capture the biomechanics of the brain as both a material and a structure, including the mechanics of brain tissue and its interactions with the skull. Second, they must be validated by direct comparison with experimental data. Emerging imaging technologies and recent imaging studies provide important data for these purposes. This review describes these techniques and data, with an emphasis on magnetic resonance imaging approaches.”

According to the news reporters, the researchers concluded: “In combination, these imaging tools promise to extend our understanding of brain biomechanics and improve our ability to study TBI in silico.”

For more information on this research see: Quantitative imaging methods for the development and validation of brain biomechanics models. *Annual Review of Biomedical Engineering*, 2012;14():369-96.

Our news correspondents report that additional information may be obtained by contacting P.V. Bayly, Dept. of Mechanical Engineering and Materials Science, Washington University in St Louis, St Louis, Missouri 63130, United States. (2012 Oct 08)

### **Aix-Marseille University: Preparation and antiprotozoal evaluation of promising beta-carboline alkaloids**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Marseille, France, by NewsRx correspondents, research stated, “The synthesis of beta-carbolines and their in vitro antiplasmodial and antileishmanial activities were described herein. These molecules have also been studied concerning their in vitro cytotoxicity toward the human cell line THP1, in order to calculate their respective selectivity indexes (SI).”

Our news journalists obtained a quote from the research from Aix-Marseille University, “Among the 20 tested molecules, four exhibited significant antiplasmodial activity on the W2 multi-resistant *Plasmodium falciparum* strain ( $0.7 \leq IC_{50} \leq 1.7 \mu M$ ), in comparison with two reference drugs (chloroquine and doxycycline), and a low cytotoxicity. These beta-carbolines were also evaluated concerning their in vitro antileishmanial activity on *Leishmania donovani* promastigotes, permitting to identify an antileishmanial hit compound, displaying quite promising activity ( $IC_{50} = 6.1 \mu M$ ) in comparison with amphotericin B and pentamidine chosen as reference drugs.”

According to the news editors, the researchers concluded: “Finally, structure-activity relationships were discussed, pointing out that molecules presenting a para-substituted phenyl moiety at position 1 of the beta-carboline ring displayed the best biological profile.”

For more information on this research see: Preparation and antiprotozoal evaluation of promising beta-carboline alkaloids. *Biomedicine & Pharmacotherapy*, 2012;66(5):339-347. *Biomedicine & Pharmacotherapy* can be contacted at: Elsevier France-Editions Scientifiques Medicales Elsevier, 23 Rue Linois, 75724 Paris, France. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedicine & Pharmacotherapy* - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

The news correspondents report that additional information may be obtained from A. Gellis, Aix Marseille Univ, UMR MD3, Fac Pharm, F-13385 Marseille 05, France. (2012 Oct 03)

### **Chalmers University of Technology, Goteborg: On the viability of implantable electrodes for the natural control of artificial limbs: Review and discussion**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Goteborg, Sweden, by NewsRx correspondents, research stated, “: The control of robotic prostheses based on pattern recognition algorithms is a widely studied subject that has shown promising results in acute experiments. The long-term implementation of this technology, however, has not yet been achieved due to practical issues that can be mainly attributed to the use of surface electrodes and their highly environmental dependency.”

Our news editors obtained a quote from the research from the Chalmers University of Technology, “This paper describes several implantable electrodes and discusses them as a solution for the natural control of artificial limbs. In this context ‘natural’ is defined as producing control over limb movement analogous to that of an intact physiological system. This includes coordinated and simultaneous movements of different degrees of freedom. It also implies that the input signals must

come from nerves or muscles that were originally meant to produce the intended movement and that feedback is perceived as originating in the missing limb without requiring burdensome levels of concentration.”

According to the news editors, the researchers concluded: “After scrutinizing different electrode designs and their clinical implementation, we concluded that the epimysial and cuff electrodes are currently promising candidates to achieving a long-term stable and natural control of robotic prosthetics, provided that communication from the electrodes to the outside of the body is guaranteed.”

For more information on this research see: On the viability of implantable electrodes for the natural control of artificial limbs: Review and discussion. *Biomedical Engineering Online*, 2012;11():33. (BioMed Central - <http://www.biomedcentral.com/>; Biomedical Engineering Online - [www.biomedical-engineering-online.com](http://www.biomedical-engineering-online.com))

The news editors report that additional information may be obtained by contacting M. Ortiz-Catalan, Dept. of Signals and Systems, Biomedical Engineering Division, Chalmers University of Technology, Goteborg, Sweden. (2012 Oct 03)

### **Cornell University, Ithaca: Computational fluid dynamics of developing avian outflow tract heart valves**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Ithaca, New York, by NewsRx journalists, research stated, “Hemodynamic forces play an important role in sculpting the embryonic heart and its valves. Alteration of blood flow patterns through the hearts of embryonic animal models lead to malformations that resemble some clinical congenital heart defects, but the precise mechanisms are poorly understood.”

The news reporters obtained a quote from the research from Cornell University, “Quantitative understanding of the local fluid forces acting in the heart has been elusive because of the extremely small and rapidly changing anatomy. In this study, we combine multiple imaging modalities with computational simulation to rigorously quantify the hemodynamic environment within the developing outflow tract (OFT) and its eventual aortic and pulmonary valves. In vivo Doppler ultrasound generated velocity profiles were applied to Micro-Computed Tomography generated 3D OFT lumen geometries from Hamburger-Hamilton (HH) stage 16-30 chick embryos. Computational fluid dynamics simulation initial conditions were iterated until local flow profiles converged with in vivo Doppler flow measurements. Results suggested that flow in the early tubular OFT (HH16 and HH23) was best approximated by Poiseuille flow, while later embryonic OFT septation (HH27, HH30) was

mimicked by plug flow conditions. Peak wall shear stress (WSS) values increased from 18.16 dynes/cm(2) at HH16 to 671.24 dynes/cm(2) at HH30. Spatiotemporally averaged WSS values also showed a monotonic increase from 3.03 dynes/cm(2) at HH16 to 136.50 dynes/cm(2) at HH30. Simulated velocity streamlines in the early heart suggest a lack of mixing, which differed from classical ink injections. Changes in local flow patterns preceded and correlated with key morphogenetic events such as OFT septation and valve formation.”

According to the news reporters, the researchers concluded: “This novel method to quantify local dynamic hemodynamics parameters affords insight into sculpting role of blood flow in the embryonic heart and provides a quantitative baseline dataset for future research.”

For more information on this research see: Computational fluid dynamics of developing avian outflow tract heart valves. *Annals of Biomedical Engineering*, 2012;40(10):2212-27. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting K.N. Bharadwaj, Dept. of Biomedical Engineering, Cornell University, 304 Weill Hall, Ithaca, NY, 14853-7501, United States. (2012 Oct 03)

### **Institute of Robotics and Intelligent Systems, Zurich: Quantification of clinical scores through physiological recordings in low-responsive patients: a feasibility study**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Zurich, Switzerland, by NewsRx journalists, research stated, “Clinical scores represent the gold standard in characterizing the clinical condition of patients in vegetative or minimally conscious state. However, they suffer from problems of sensitivity, specificity, subjectivity and inter-rater reliability. In this feasibility study, objective measures including physiological and neurophysiological signals are used to quantify the clinical state of 13 low-responsive patients.”

The news reporters obtained a quote from the research from the Institute of Robotics and Intelligent Systems, “A linear regression method was applied in nine patients to obtain fixed regression coefficients for the description of the clinical state. The statistical model was extended and evaluated with four patients of another hospital. A linear mixed models approach was introduced to handle the challenges of data sets obtained from different locations. Using linear backward regression 12 variables were sufficient to explain 74.4% of the variability in the change of the clinical scores. Variables based on event-related potentials and electrocardiogram account for most of the variability. These

preliminary results are promising considering that this is the first attempt to describe the clinical state of low-responsive patients in such a global and quantitative way. This new model could complement the clinical scores based on objective measurements in order to increase diagnostic reliability.”

According to the news reporters, the researchers concluded: “Nevertheless, more patients are necessary to prove the conclusions of a statistical model with 12 variables.”

For more information on this research see: Quantification of clinical scores through physiological recordings in low-responsive patients: a feasibility study. *Journal of Neuroengineering and Rehabilitation*, 2012;9(0):30. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Neuroengineering and Rehabilitation* - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

Our news correspondents report that additional information may be obtained by contacting M. Wieser, Sensory-Motor Systems Lab, Institute of Robotics and Intelligent Systems, Dept. of Health Science and Technologies, ETH Zurich, Tannenstrasse 1, Zurich, 8092, Switzerland. (2012 Oct 03)

### **Massachusetts Institute of Technology, Cambridge: Spectrally resolved multidepth fluorescence imaging**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Optics are presented in a new report. According to news reporting from Cambridge, Massachusetts, by NewsRx journalists, research stated, “We present a multicolor fluorescence imaging modality to visualize in real-time tissue structures emitting multispectral fluorescent light from different focal depths. Each designated spectrum of fluorescent emission from a specific depth within a volumetric tissue is probed by a depth-spectrum selective holographic grating.”

The news correspondents obtained a quote from the research from the Massachusetts Institute of Technology, “The grating for each fluorescent color are multiplexed within a volume hologram, which enables simultaneously obtaining multicolored fluorescent information at different depths within a biological tissue sample. We demonstrate the imaging modality’s ability to obtain laser-induced multicolored fluorescence images of a biological sample from different depths without scanning.”

According to the news reporters, the researchers concluded: “We also experimentally demonstrate that the imaging modality can be simultaneously operated at both fluorescent and bright field modes to provide complementary information of volumetric tissue structures at different depths in real-time.”

For more information on this research see: Spectrally resolved multidepth fluorescence imaging. *Journal of Biomedical Optics*, 2011;16(9):096015.

Our news journalists report that additional information may be obtained by contacting Y. Luo, Massachusetts Institute of Technology, Dept. of Mechanical Engineering, Cambridge, Massachusetts 02139, United States. (2012 Oct 03)

### **Mississippi State University: Stress state and strain rate dependence of the human placenta**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Mississippi State, Mississippi, by NewsRx correspondents, research stated, “Maternal trauma (MT) in automotive collisions is a source of injury, morbidity, and mortality for both mothers and fetuses. The primary associated pathology is placental abruption in which the placenta detaches from the uterus leading to hemorrhaging and termination of pregnancy.”

Our news editors obtained a quote from the research from Mississippi State University, “In this study, we focused on the differences in placental tissue response to different stress states (tension, compression, and shear) and different strain rates. Human placentas were obtained (n = 11) for mechanical testing and microstructure analysis. Specimens (n = 4+) were tested in compression, tension, and shear, each at three strain rates (nine testing protocols). Microstructure analysis included scanning electron microscopy, histology, and interrupted mechanical tests to observe tissue response to various loading states. Our data showed the greatest stiffness in tension, followed by compression, and then by shear. The study concludes that mechanical behavior of human placenta tissue (i) has a strong stress state dependence and (ii) behaves in a rate dependent manner in all three stress states, which had previously only been shown in tension. Interrupted mechanical tests revealed differences in the morphological microstructure evolution that was driven by the kinematic constraints from the different loading states.”

According to the news editors, the researchers concluded: “Furthermore, these structure-property data can be used to develop high fidelity constitutive models for MT simulations.”

For more information on this research see: Stress state and strain rate dependence of the human placenta. *Annals of Biomedical Engineering*, 2012;40(10):2255-65. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting B.C. Weed, Tissue Bioengineering Laboratory, Dept. of Agricultural and Biological Engineering, Mississippi State University, Mississippi State, MS, 39762, United States. (2012 Oct 03)

### **Rutgers State University, Piscataway: Polyelectrolyte Complex Membranes for Prevention of Post-Surgical Adhesions in Neurosurgery**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Piscataway, New Jersey, by NewsRx journalists, research stated, “Adhesions are bands of tissue that can form after the surgery and bind together the surrounding tissue in the vicinity of the surgical site. In this work, polyelectrolyte complex (PEC)-based membranes were developed and investigated for their potential application as anti-adhesion barriers after neurosurgery.”

The news reporters obtained a quote from the research from Rutgers State University, “The adhesion and migration behavior of fibroblast and mixed neuronal cells were also investigated. Fibroblasts cells neither adhered nor migrated onto the PEC material after 5 days in vitro. Similar behaviors were observed for neurons and astrocytes cells. Swelling experiments of these membranes showed that the membranes are extremely hygroscopic and absorb significant amount of water. Membranes containing 70% alginate absorbed the highest amount of water (442 +/- A 24% of dry wet). PEC content was highest in 50% alginate containing membranes (87.1 +/- A 6.7%). The membrane’s mechanical properties were attributed to combined contribution of water absorption and PEC content. Drug release profiles were investigated using albumin as a model drug. Membranes containing 70% alginate showed highest initial drug release rate followed by membranes containing 60 and 50% alginate.”

According to the news reporters, the researchers concluded: “Membranes were stable and did not dissolve for 1 month in phosphate buffer and lysozyme solutions.”

For more information on this research see: Polyelectrolyte Complex Membranes for Prevention of Post-Surgical Adhesions in Neurosurgery. *Annals of Biomedical Engineering*, 2012;40(9):1949-1960. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting D. Verma, Rutgers State University, Dept. of



Mech & Aerosp Engn, Piscataway, NJ 08855, United States. (2012 Oct 03)

### **Sabanci University, Istanbul: Kidney Stone Erosion by Micro Scale Hydrodynamic Cavitation and Consequent Kidney Stone Treatment**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Istanbul, Turkey, by NewsRx correspondents, research stated, “The objective of this study is to reveal the potential of micro scale hydrodynamic bubbly cavitation for the use of kidney stone treatment. Hydrodynamically generated cavitating bubbles were targeted to the surfaces of 18 kidney stone samples made of calcium oxalate, and their destructive effects were exploited in order to remove kidney stones in in vitro experiments.”

Our news editors obtained a quote from the research from Sabanci University, “Phosphate buffered saline (PBS) solution was used as the working fluid under bubbly cavitating conditions in a 0.75 cm long micro probe of 147  $\mu$  m inner diameter at 9790 kPa pressure. The surface of calcium oxalate type kidney stones were exposed to bubbly cavitation at room temperature for 5 to 30 min. The eroded kidney stones were visually analyzed with a high speed CCD camera and using SEM (scanning electron microscopy) techniques. The experiments showed that at a cavitation number of 0.017, hydrodynamic bubbly cavitation device could successfully erode stones with an erosion rate of 0.31 mg/min. It was also observed that the targeted application of the erosion with micro scale hydrodynamic cavitation may even cause the fracture of the kidney stones within a short time of 30 min.”

According to the news editors, the researchers concluded: “The proposed treatment method has proven to be an efficient instrument for destroying kidney stones.”

For more information on this research see: Kidney Stone Erosion by Micro Scale Hydrodynamic Cavitation and Consequent Kidney Stone Treatment. *Annals of Biomedical Engineering*, 2012;40(9):1895-1902. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting O.Y. Perk, Sabanci Univ, Fac Engn & Nat Sci, Biol Sci & Bioengn Program, Istanbul, Turkey. (2012 Oct 03)

### **University of Kansas, Lawrence: Functional photoacoustic imaging to observe regional brain activation induced by cocaine hydrochloride**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Optics is the subject of a report. According to news originating from Lawrence, Kansas, by NewsRx correspondents, research stated, “Photoacoustic microscopy (PAM) was used to detect small animal brain activation in response to drug abuse. Cocaine hydrochloride in saline solution was injected into the blood stream of Sprague Dawley rats through tail veins.”

Our news journalists obtained a quote from the research from the University of Kansas, “The rat brain functional change in response to the injection of drug was then monitored by the PAM technique. Images in the coronal view of the rat brain at the locations of 1.2 and 3.4 mm posterior to bregma were obtained. The resulted photoacoustic (PA) images showed the regional changes in the blood volume. Additionally, the regional changes in blood oxygenation were also presented.”

According to the news editors, the researchers concluded: “The results demonstrated that PA imaging is capable of monitoring regional hemodynamic changes induced by drug abuse.”

For more information on this research see: Functional photoacoustic imaging to observe regional brain activation induced by cocaine hydrochloride. *Journal of Biomedical Optics*, 2011;16(9):090506.

The news correspondents report that additional information may be obtained from J. Jo, The University of Kansas, KU Bioengineering Research Center, Dept. of Mechanical Engineering, Lawrence, Kansas 66045, United States. (2012 Oct 03)

### **Brown University, Providence: Isolation, characterization, and differentiation of stem cells for cartilage regeneration**

By a News Reporter-Staff News Editor at Ivy League Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Providence, Rhode Island, by NewsRx journalists, research stated, “The goal of tissue engineering is to create a functional replacement for tissues damaged by injury or disease. In many cases, impaired tissues cannot provide viable cells, leading to the investigation of stem cells as a possible alternative.”

The news reporters obtained a quote from the research from Brown University, “Cartilage, in particular, may benefit from the use of stem cells since the tissue has low cellularity and cannot effectively repair itself. To address this need, researchers are investigating the chondrogenic capabilities of several multipotent stem cell sources, including adult and extra-embryonic mesenchymal stem cells (MSCs), embryonic

stem cells (ESCs), and induced pluripotent stem cells (iPSCs). Comparative studies indicate that each cell type has advantages and disadvantages, and while direct comparisons are difficult to make, published data suggest some sources may be more promising for cartilage regeneration than others. In this review, we identify current approaches for isolating and chondrogenically differentiating MSCs from bone marrow, fat, synovium, muscle, and peripheral blood, as well as cells from extra-embryonic tissues, ESCs, and iPSCs. Additionally, we assess chondrogenic induction with growth factors, identifying standard cocktails used for each stem cell type.”

According to the news reporters, the researchers concluded: “Cell-only (pellet) and scaffold-based studies are also included, as is a discussion of in vivo results.”

For more information on this research see: Isolation, characterization, and differentiation of stem cells for cartilage regeneration. *Annals of Biomedical Engineering*, 2012;40(10):2079-97. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting O.S. Beane, Center for Biomedical Engineering, Brown University, Providence, RI, United States. (2012 Oct 02)

### **Columbia University, New York City: Sonic hedgehog signaling regulates Bcr-Abl expression in human chronic myeloid leukemia cells**

By a News Reporter-Staff News Editor at Ivy League Week – Current study results on Leukemia have been published. According to news reporting from New York City, New York, by NewsRx journalists, research stated, “Bcr-Abl fusion protein activates tyrosine kinase, resulting in the proliferation of leukemia cells, especially chronic myeloid leukemia (CML) cells. Imatinib (IM) effectively targets Bcr-Abl tyrosine kinase, but development of resistance to IM occurs with varying frequency.”

The news correspondents obtained a quote from the research from Columbia University, “Elucidation of the common regulatory pathway upstream of Bcr-Abl in IM-sensitive and IM-resistant CML cells is important for developing novel therapeutics against CML. This study demonstrated that IM preferentially inhibited the viability and Bcr-Abl expression in IM-sensitive K562 (K562) cells, but not in Bcr-Abl overexpressing IM-resistant K562 (K562R) cells. Both K562 and K562R cells expressed Shh preproprotein, cleaved Shh C-terminal and N-terminal peptides, as well as mRNA level of major Shh signaling molecules, including sonic hedgehog (Shh), patched (PTCH), smoothened (Smo) and Gli-1. Moreover, Gli-1 translocation into nucleus was evident in these

two cell lines, suggesting that both K562 and K562R cells possess activated and major components of the Shh signaling pathway. Silencing of Gli-1 by interference RNA was accompanied by inhibition of Bcr-Abl protein expression. Pharmacological suppression of Bcr-Abl expression was restored by the Smo agonist purmorphamine. Treatment of Shh peptide in both K562 and K562R cells not only increased Shh and Gli-1 expression, but also up-regulated Bcr-Abl expression. Resveratrol, a known Bcr-Abl inhibitor, reduced Gli-1 activation and inhibited the viability of CML cells. Shh signaling may regulate Bcr-Abl expression in human chronic myeloid leukemia cells.”

According to the news reporters, the researchers concluded: “Novel compounds inhibiting both Shh signaling and Bcr-Abl expression, such as resveratrol, may have potential to be effective agents against CML independent of IM resistance.”

For more information on this research see: Sonic hedgehog signaling regulates Bcr-Abl expression in human chronic myeloid leukemia cells. *Biomedicine & Pharmacotherapy*, 2012;66(5):378-383. *Biomedicine & Pharmacotherapy* can be contacted at: Elsevier France-Editions Scientifiques Medicales Elsevier, 23 Rue Linois, 75724 Paris, France. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedicine & Pharmacotherapy* - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

Our news journalists report that additional information may be obtained by contacting H.F. Liao, Columbia University, Dept. of Radiat Oncol, New York, NY, United States. (2012 Oct 02)

### **Nanjing University: Review of MiR-200b and cancer chemosensitivity**

By a News Reporter-Staff News Editor at Cancer Weekly – Investigators discuss new findings in *Biomedicine and Pharmacotherapy*. According to news reporting originating from Nanjing, People’s Republic of China, by NewsRx correspondents, research stated, “Chemoresistance remains a major obstacle to successful cancer treatment and leads to poor prognosis of the patients, yet the underlying mechanisms have not been fully understood. MicroRNAs (miRNAs) are non-coding small RNAs of 19-22 nucleotides which could negatively regulate gene expressions mainly through 3'-untranslated region (3'UTR) binding of target mRNAs.”

Our news editors obtained a quote from the research from Nanjing University, “MiR-200 family (miR-200a, miR-200b, miR-200c, miR-141, and miR-429) is a cluster of miRNAs highly correlated with epithelial-mesenchymal transition (EMT), wherein miR-200b is identified as a critical regulator of tumor invasion, metastasis, and chemosensitivity. Recent advances of miR-200b dysregulation in tumor chemoresistance were summarized.”

According to the news editors, the researchers concluded: “Possible mechanisms and reversion strategies were also addressed.”

For more information on this research see: Review of MiR-200b and cancer chemosensitivity. *Biomedicine & Pharmacotherapy*, 2012;66(6):397-402. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedicine & Pharmacotherapy - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

The news editors report that additional information may be obtained by contacting B. Feng, Dept. of Medical Oncology, Jinling Hospital, School of Medicine, Nanjing University, Nanjing 210002, People's Taiwan. (2012 Oct 02)

### **Panjab University, Chandigarh: Angiostatic role of the selective cyclooxygenase-2 inhibitor etoricoxib (MK0663) in experimental lung cancer**

By a News Reporter-Staff News Editor at Cancer Weekly – Researchers detail new data in Lung Cancer. According to news reporting originating in Chandigarh, India, by NewsRx journalists, research stated, “Lung cancer was induced in Sprague-Dawley rats by a single intra-tracheal instillation of 9,10-dimethylbenz(a)anthracene (DMBA) and evaluated the anti-angiogenic action of etoricoxib, which is a selective cyclooxygenase-2 (COX-2) inhibitor. The animals were divided into four groups.”

The news reporters obtained a quote from the research from Panjab University, “Group 1 (Control) received 0.9% (w/v) normal saline intra-tracheal and 0.5% (w/v) carboxymethyl cellulose per oral daily as the vehicle of the drug, Group 2 received DMBA (20mg/kg) intra-tracheal once, Group 3 received a daily oral dose of etoricoxib (0.6mg/kg bw) in addition to the DMBA while Group 4 received etoricoxib alone. Morphological and histological analysis confirmed the presence of lung tumors 20weeks after the administration of DMBA. Expressions of COX-2, MMP-2, MMP-9, MCP-1, MIP-1&#223; and VEGF were studied by immunofluorescence, Western immunoblot and mRNA studies, which showed a higher expression of these proteins in the DMBA-treated animals but much lower in DMBA+etoricoxib. Gelatin zymography as applied for the detection of the extracellular protein degrading enzymes, matrix metalloproteinases showed more intense activity in DMBA-treated rats as compared to the other groups. Also, the isolated alveolar macrophages were stained with Merocyanine540 (MC540) to study the membrane fluidity and lipid packing effect. DMBA treatment resulted in a significant increase in the number of lung cells exhibiting a high intensity of MC540 staining, which was reduced by the co-administration of etoricoxib.”

According to the news reporters, the researchers concluded: “Thus the effects of etoricoxib on the expression of the angiogenic proteins have been observed, which clearly shows an anti-angiogenic mechanism of action of etoricoxib in lung cancer chemoprevention.”

For more information on this research see: Angiostatic role of the selective cyclooxygenase-2 inhibitor etoricoxib (MK0663) in experimental lung cancer. *Biomedicine & Pharmacotherapy*, 2012;66(6):474-83. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedicine & Pharmacotherapy - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

Our news correspondents report that additional information may be obtained by contacting N. Nadda, Dept. of Biophysics, Panjab University, Chandigarh 160014, India. (2012 Oct 02)

### **SASTRA University, Tamil Nadu: Fabrication, Characterization and In Vitro Evaluation of Aligned PLGA-PCL Nanofibers for Neural Regeneration**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biotechnology. According to news reporting originating in Tamil Nadu, India, by NewsRx journalists, research stated, “Electrospun nanofibrous scaffolds have received a great deal of attention in tissue engineering in recent years. Bridging larger nerve gaps between proximal and distal ends requires exogenous tubular constructs with uniaxially aligned topographical cues to promote the axonal re-growth due to the lack of fibrin cable formation.”

The news reporters obtained a quote from the research from SASTRA University, “In this study, we have designed and developed a collector to obtain aligned nanofibers of PLGA-PCL. The average diameter of the fibers obtained is 230 ± 63 nm and the alignment of fibers is quantified by calculating relative angle of each fiber. The tensile strength, porosity, contact angle, and biodegradation of the uniaxial PLGA-PCL nanofibers are measured and compared with the corresponding random fibers. Pore size, Young’s modulus, and degradation of the aligned scaffold are significantly lesser than random fibers ( $p < 0.05$ ). The in vitro cell adhesion and proliferation of Schwann cells on the aligned nanofibers are evaluated and compared with random nanofibers. Our results demonstrate that the alignment of nanofibers has a significant influence on the adhesion and proliferation of Schwann cells.”

According to the news reporters, the researchers concluded: “Thus, the axially aligned nanofibers may mimic the fibrin cable architecture; thereby it may represent an ideal scaffold for extending the growth of axonal processes.”

For more information on this research see: Fabrication, Characterization and In Vitro Evaluation of Aligned PLGA-PCL Nanofibers

for Neural Regeneration. *Annals of Biomedical Engineering*, 2012;40(10):2098-110. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting A. Subramanian, Center for Nanotechnology & Advanced Biomaterials, School of Chemical & Biotechnology, SASTRA University, Thanjavur, Tamil Nadu, 613 401, India. (2012 Oct 02)

### **University of Pennsylvania, Philadelphia: Blood oxygen level dependent angiography (BOLDangio) and its potential applications in cancer research**

By a News Reporter-Staff News Editor at Cancer Weekly – Researchers detail new data in Chalcogens. According to news originating from Philadelphia, Pennsylvania, by NewsRx correspondents, research stated, “Clinically, development of anti-angiogenic drugs for cancer therapy is pivotal. Longitudinal monitoring of tumor angiogenesis can help clinicians determine the effectiveness of anti-angiogenic therapy.”

Our news journalists obtained a quote from the research from the University of Pennsylvania, “Blood oxygen level dependent (BOLD) effect has been widely used for functional imaging and tumor oxygenation assessment. In this study, the BOLD effect is investigated under different levels of oxygen inhalation for the development of a novel angiographic MRI technique, blood oxygen level dependent angiography (BOLDangio). Under short-term (<10 min) generalized hypoxia induced by inhalation of 8% oxygen, we measure BOLD contrast as high as 25% from vessels at 9.4T using a simple gradient echo (GRE) pulse sequence. This produces high-resolution 2D and 3D maps of normal and tumor brain vasculature in less than 10 minutes. Additionally, this technique reliably detects metastatic tumours and tumour-induced intracranial hemorrhage. BOLDangio provides a sensitive research tool for MRI of vasculature under normal and pathological conditions.”

According to the news editors, the researchers concluded: “Thus, it may be applied as a simple monitoring technique for measuring the effectiveness of anti-angiogenic drugs in a preclinical environment.”

For more information on this research see: Blood oxygen level dependent angiography (BOLDangio) and its potential applications in cancer research. *Nmr In Biomedicine*, 2012;25(10):1125-32. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-1492)

The news correspondents report that additional information may be obtained from K. Cai, Center for Magnetic Resonance and Optical Imaging, Dept. of Radiology, University of Pennsylvania, Philadelphia, PA, United States. (2012 Oct 02)

### **Mean cerebral blood flow measurements using phase contrast MRI in the first year of life**

By a News Reporter-Staff News Editor at Cardiovascular Week – Research findings on Cerebral Blood Flow are discussed in a new report. According to news originating from London, United Kingdom, by NewsRx correspondents, research stated, “Alterations in cerebral blood flow (CBF) are believed to be linked to many of the neurological pathologies that affect neonates and small infants. CBF measurements are nonetheless often difficult to perform in this population, as many techniques rely on radioactive tracers or other invasive methods.”

Our news journalists obtained a quote from the research, “In this study, mean global CBF was measured in 21 infants under the age of one, using non-invasive MRI techniques adapted to the neonatal population. Mean CBF was computed as the ratio of blood flow delivered to the brain (measured using phase contrast MRI) and brain volume (computed by segmenting anatomical MR images). Tests in adult volunteers and repeated measurements showed the flow measurements using the proposed method to be both accurate and reproducible. It was also found that cardiac gating need not be employed in infants with no known cardiac pathology. The developed technique can easily be appended to a neonatal MRI examination to provide rapid, robust, and non-invasive estimates of mean CBF, thus providing a means to monitor developmental or pathology-related alterations in cerebral perfusion and the impact of different treatment courses. In the imaged cohort, mean CBF and flow to the brain were found to rapidly increase during the first year of life (from approx. 25 to 60?ml blood/100?ml tissue/min), in good agreement with literature from other modalities where available.”

According to the news editors, the researchers concluded: “Mean CBF also showed a significant correlation with arterial oxygen saturation level and heart rate, but no significant correlation was found between CBF and the hematocrit or body temperature.”

For more information on this research see: Mean cerebral blood flow measurements using phase contrast MRI in the first year of life. *NMR in Biomedicine*, 2012;25(9):1063-1072. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)



The news correspondents report that additional information may be obtained from M. Varela, MRC Clin Sci Center, London, United Kingdom. (2012 Oct 01)

### **University of California, Davis: Fluorescence lifetime imaging for the characterization of the biochemical composition of atherosclerotic plaques**

By a News Reporter-Staff News Editor at Cardiovascular Week – Fresh data on Cardiovascular Diseases and Conditions are presented in a new report. According to news reporting from Davis, California, by NewsRx journalists, research stated, “This study investigates the ability of a flexible fiberoptic-based fluorescence lifetime imaging microscopy (FLIM) technique to resolve biochemical features in plaque fibrotic cap associated with plaque instability and based solely on fluorescence decay characteristics. Autofluorescence of atherosclerotic human aorta (11 autopsy samples) was measured at 48 locations through two filters, F377: 377/50 and F460: 460/60 nm (center wavelength/bandwidth).”

The news correspondents obtained a quote from the research from the University of California, “The fluorescence decay dynamic was described by average lifetime ( $t$ ) and four Laguerre coefficients (LECs) retrieved through a Laguerre deconvolution technique. FLIM-derived parameters discriminated between four groups [elastin-rich (ER), elastin and macrophage-rich (E+M), collagen-rich (CR), and lipid-rich (LR)]. For example,  $t(F377)$  discriminated ER from CR ( $R=0.84$ );  $t(F460)$  discriminated E+M from CR and ER ( $R=0.60$  and  $0.54$ , respectively); LEC-1( $F377$ ) discriminated CR from LR and E+M ( $R=0.69$  and  $0.77$ , respectively);  $p<0.05$  for all correlations. Linear discriminant analysis was used to classify this data set with specificity  $>87\%$  (all cases) and sensitivity as high as  $86\%$ .”

According to the news reporters, the researchers concluded: “Current results demonstrate for the first time that clinically relevant features (e.g., ratios of lipid versus collagen versus elastin) can be evaluated with a flexible-fiber based FLIM technique without the need for fluorescence intensity information or contrast agents.”

For more information on this research see: Fluorescence lifetime imaging for the characterization of the biochemical composition of atherosclerotic plaques. *Journal of Biomedical Optics*, 2011;16(9):096018.

Our news journalists report that additional information may be obtained by contacting J. Phipps, University of California, Davis, Dept. of Biomedical Engineering, Davis, California 95616, United States. (2012 Oct 01)

## **University of Leeds: Trabecular level analysis of bone cement augmentation: a comparative experimental and finite element study**

By a News Reporter-Staff News Editor at Biotech Business Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from Leeds, United Kingdom, by NewsRx journalists, research stated, “The representation of cement-augmented bone in finite element (FE) models of vertebrae following vertebroplasty remains a challenge, and the methods of the model validation are limited. The aim of this study was to create specimen-specific FE models of cement-augmented synthetic bone at the microscopic level, and to develop a new methodology to validate these models.”

The news correspondents obtained a quote from the research from the University of Leeds, “An open cell polyurethane foam was used reduce drying effects and because of its similar structure to osteoporotic trabecular bone. Cylindrical specimens of the foam were augmented with PMMA cement. Each specimen was loaded to three levels of compression inside a micro-computed tomography (CT) scanner and imaged both before compression and in each of the loaded states. Micro-FE models were generated from the unloaded CT images and displacements applied to match measurements taken from the images. A morphological comparison between the FE-predicted trabecular deformations and the corresponding experimental measurements was developed to validate the accuracy of the FE model. The predicted deformation was found to be accurate (less than 12% error) in the elastic region.”

According to the news reporters, the researchers concluded: “This method can now be used to evaluate real bone and different types of bone cements for different clinical situations.”

For more information on this research see: Trabecular level analysis of bone cement augmentation: a comparative experimental and finite element study. *Annals of Biomedical Engineering*, 2012;40(10):2168-76. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting Y. Zhao, Institute of Medical and Biological Engineering, School of Mechanical Engineering, University of Leeds, Leeds, LS2 9JT, UK. (2012 Oct 01)

## University of Sydney: Non-invasive Estimation of Cerebrospinal Fluid Pressure Waveforms by Means of Retinal Venous Pulsatility and Central Aortic Blood Pressure

By a News Reporter-Staff News Editor at Hematology Week – New research on Blood Pressure is the subject of a report. According to news reporting from Sydney, Australia, by NewsRx journalists, research stated, “Current techniques used for cerebrospinal fluid pressure (CSFp) measurements are invasive. They require a surgical procedure for placement of a pressure catheter in the brain ventricles or in the brain tissue.”

The news correspondents obtained a quote from the research from the University of Sydney, “The human eye provides direct visualisation of its physiological structures and due to its anatomical connection with CSF via the retrolaminar optic nerve it may provide accessible information about CSFp. A total of 25 subjects were included in this study. 15 subjects were used to characterise the relationship between intraocular pressure (IOP), spontaneous retinal venous pulsatility (SRVP), and CSFp. IOP was manipulated and SRVP amplitudes recorded dynamically using the dynamic vessel analyzer (DVA). The relationship between IOP and SRVP amplitude was established to estimate CSFp. Additionally Doppler blood flow velocity of the middle cerebral artery and arterial blood pressure (ABP) were acquired for all subjects. This was to compare and validate our findings with an alternative approach (ICM+) which uses these values to estimate CSFp. A CSFp waveform was extracted from central blood pressure (CBP) waveform by removing its cardiac component frequency. Furthermore to calibrate the CSFp to CBP waveform ratio, invasive CSFp, and ABP was measured from 10 subjects with brain tumours who had a range of normal to elevated CSFp (i.e., 0-30 mmHg). Results show good agreement between the two methods (correlation  $r(2) = 0.55$ ) Mean estimated CSFp for the two techniques did not show any significant difference ( $p > 0.05$ ). A significant correlation between CBP pulse (CBPp) and invasive CSFp pulse (CSFpp) was observed (i.e.,  $CSFpp = 0.0654CBBp + 3.91$ ,  $p < 0.01$ ). Estimated CSFpp was calibrated to CBPp according to this relation.”

According to the news reporters, the researchers concluded: “The study demonstrated a good correlation between two different methods of estimating CSFp non-invasively and may provide a novel method to estimate CSF waveforms non-invasively.”

For more information on this research see: Non-invasive Estimation of Cerebrospinal Fluid Pressure Waveforms by Means of Retinal Venous Pulsatility and Central Aortic Blood Pressure. *Annals of Biomedical Engineering*, 2012;40(9):1940-1948. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013,

USA. (Springer - [www.springer.com](http://www.springer.com); Annals of Biomedical Engineering - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting S.M. Golzan, University of Sydney, Sydney, NSW 2006, Australia. (2012 Oct 01)

### **Computer-assisted anatomically placed double-bundle ACL reconstruction: An in vitro experiment with different tension angles for the AM and the PL graft**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Medical Engineering and Physics. According to news originating from Nijmegen, Netherlands, by NewsRx correspondents, research stated, “Anterior cruciate ligament reconstruction techniques are evolving with innovations like double-bundle (DB) grafts and computer assistance. The current DB techniques do not appear to make the clinical difference yet.”

Our news journalists obtained a quote from the research, “Insight in various techniques may lead to better results. In this study, the anterior laxity of a DB reconstruction with an anteromedial (AM) graft fixated in 90°; of flexion and a posterolateral (PL) graft fixated in 20°; and computer-assisted anatomically placed femoral attachments was compared to normal values and single-bundle grafts. In 8 fresh-frozen human cadaveric knees, the anterior laxity was tested from 0°; to 90°; flexion, with a 100Newton (N) anterior tibial load in joints with (1) intact ACL, (2) torn ACL, (3) single-bundle (SB) graft tensed with 15N in 20°;,, (4) anatomic AM graft tensed with 15N in 90°;,, (5) anatomic PL graft tensed with 15N in 20°;,, and (6) anatomic DB graft (4+5). All reconstructions caused a posterior position of the tibia. Relative to the normal anterior laxity, the single-bundle techniques showed significantly increased laxities: The SB technique in 0°; (+1.1mm) and 15°; (+1.7mm); The AM reconstructions in 45°; (+1.6mm) and 90°; (+1.5mm); The PL reconstructions in all angles (from +1.4 to +2.3mm), except in 0°;.”

According to the news editors, the researchers concluded: “The anatomic DB technique showed no significantly increased laxities and restored normal laxity in all angles.”

For more information on this research see: Computer-assisted anatomically placed double-bundle ACL reconstruction: An in vitro experiment with different tension angles for the AM and the PL graft. *Medical Engineering & Physics*, 2012;34(8):1031-6. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wnps/product/cws\\_home/30456](http://www.elsevier.com/wnps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from J.W. Luites, Sint Maartenskliniek Research, Development & Education, PO Box 9011, 6500 GM, Nijmegen, Netherlands. (2012 Sep 28)

### **Delft University of Technology: Grasping soft tissue by means of vacuum technique**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators discuss new findings in Medical Engineering and Physics. According to news reporting originating from Delft, Netherlands, by NewsRx correspondents, research stated, “A notable characteristic of bariatric surgery is the frequent manipulation of the bowel. The bowel is large, delicate, flexible, and has a natural lubricant on the tissue surface.”

Our news editors obtained a quote from the research from the Delft University of Technology, “Therefore the bowel is difficult to grasp and manipulate. Vacuum technique is commonly used in industry for all types of grasping and manipulation.”

According to the news editors, the researchers concluded: “Two types of nozzles that differed slightly in geometry (NT1 and NT2), were reviewed in an experimental set up for pull tests on pig bowels.”

For more information on this research see: Grasping soft tissue by means of vacuum technique. *Medical Engineering & Physics*, 2012;34(8):1088-94. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting D. Vonck, Faculty of Industrial Design Engineering, Dept. of Applied Ergonomics and Design, Delft University of Technology, Delft, Netherlands. (2012 Sep 28)

### **General Hospital, Tripolis: A simple constitutive model for the Scapholunate ligament**

By a News Reporter-Staff News Editor at Health & Medicine Week – Fresh data on Medical Engineering and Physics are presented in a new report. According to news reporting originating in Tripolis, Greece, by NewsRx journalists, research stated, “A simple constitutive equation is presented to describe the non-linear load-displacement behavior of the Scapholunate ligament. The model is based on an elastic large strain probabilistic constitutive equation and has been formulated offering three characteristic constants.”

The news reporters obtained a quote from the research from General Hospital, “Experimental data from five human cadaveric Scapholunate

ligaments were used to corroborate the accuracy of the model. Good correlation ( $r(2)=0.90-0.98$ ) was found with the experimental data.”

According to the news reporters, the researchers concluded: “Representative characteristic constants for the human Scapholunate ligament based on the model were determined.”

For more information on this research see: A simple constitutive model for the Scapholunate ligament. *Medical Engineering & Physics*, 2012;34(8):1196-9. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting F.V. Nikolopoulos, Dept. of Orthopaedics, Panarkadikon General Hospital, Tripolis, Erythrou Staurou Terma, Tripolis 22100, Greece. (2012 Sep 28)

### **Linkoping University: Quantifying turbulent wall shear stress in a subject specific human aorta using large eddy simulation**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Medical Engineering and Physics have been published. According to news reporting originating in Linkoping, Sweden, by NewsRx journalists, research stated, “In this study, large-eddy simulation (LES) is employed to calculate the disturbed flow field and the wall shear stress (WSS) in a subject specific human aorta. Velocity and geometry measurements using magnetic resonance imaging (MRI) are taken as input to the model to provide accurate boundary conditions and to assure the physiological relevance.”

The news reporters obtained a quote from the research from Linkoping University, “In total, 50 consecutive cardiac cycles were simulated from which a phase average was computed to get a statistically reliable result. A decomposition similar to Reynolds decomposition is introduced, where the WSS signal is divided into a pulsating part (due to the mass flow rate) and a fluctuating part (originating from the disturbed flow). Oscillatory shear index (OSI) is plotted against time-averaged WSS in a novel way, and locations on the aortic wall where elevated values existed could easily be found. In general, high and oscillating WSS values were found in the vicinity of the branches in the aortic arch, while low and oscillating WSS were present in the inner curvature of the descending aorta.”

According to the news reporters, the researchers concluded: “The decomposition of WSS into a pulsating and a fluctuating part increases the understanding of how WSS affects the aortic wall, which enables both qualitative and quantitative comparisons.”

For more information on this research see: Quantifying turbulent wall shear stress in a subject specific human aorta using large eddy simulation. *Medical Engineering & Physics*, 2012;34(8):1139-48. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting J. Lantz, Dept. of Management and Engineering, Linköping University, SE-581 83 Linköping, Sweden. (2012 Sep 28)

### **National Central University, Taoyuan: Correlation of the experimental and numerical results for the holding power of dental, traumatic, and spinal screws**

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Medical Engineering and Physics is the subject of a report. According to news originating from Taoyuan, Taiwan, by NewsRx correspondents, research stated, “The holding power of the bone-screw interfaces is one of the key factors in the clinical performance of screw design. The value of the holding power can be experimentally measured by pullout tests.”

Our news journalists obtained a quote from the research from National Central University, “Historically, some researchers have used the finite-element method to simulate the holding power of the different screws. Among them, however, the assumed displacement of the screw withdrawal is unreasonably small (about 0.005-1.0mm). In addition, the chosen numerical indices are quite different, including maximum stress, strain energy, and reaction force. This study systematically uses dental, traumatic, and spinal screws to experimentally measure and numerically simulate their bone-purchasing ability within the synthetic bone. The testing results (pullout displacement and holding power) and numerical indices (maximum stress, total strain energy, and reaction forces) are chosen to calculate their correlation coefficients. The pullout displacement is divided into five regions from initial to final withdrawal. The experimental results demonstrate that the pullout displacement consistently occurs at the final region (0.6-1.6mm) and is significantly higher than the assumed value of the literature studies. For all screw groups, the measured holding power within the initial region is not highly or even negatively correlated with the experimental and numerical results within the final region. The observation from the simulative results shows the maximum stress only reflects the loads concentrated at some local site(s) and is the least correlated to the measured holding power. Comparatively, both energy and force are more global indices to correlate with the gross failure at the bone-screw interfaces. However,

the energy index is not suitable for the screw groups with rather tiny threads compared with the other specifications.”

According to the news editors, the researchers concluded: “The underestimated displacement leads to erroneous results in the screw-pullout simulation. Among three numerical indices the reaction-force is the optimal index for the screw-pullout problem.”

For more information on this research see: Correlation of the experimental and numerical results for the holding power of dental, traumatic, and spinal screws. *Medical Engineering & Physics*, 2012;34(8):1123-31. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from C.C. Lee, Dept. of Mechanical Engineering, National Central University, Taoyuan, Taiwan. (2012 Sep 28)

### **National Taiwan University, Taipei: Spontaneous inflammatory pain model from a mouse line with N-ethyl-N-nitrosourea mutagenesis**

By a News Reporter-Staff News Editor at Health & Medicine Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Taipei, Taiwan, by NewsRx journalists, research stated, “N-ethyl-N-nitrosourea mutagenesis was used to induce a point mutation in C57BL/6 J mice. Pain-related phenotype screening was performed in 915 G3 mice.”

The news reporters obtained a quote from the research from National Taiwan University, “We report the detection of a heritable recessive mutant in meiotic recombinant N1F1 mice that caused an abnormal pain sensitivity phenotype with spontaneous skin inflammation in the paws and ears. We investigated abnormal sensory processing, neuronal peptides, and behavioral responses after the induction of autoimmune inflammatory disease. Single-nucleotide polymorphism (SNP) markers and polymerase chain reaction product sequencing were used to identify the mutation site. All affected mice developed paw inflammation at 4-8 weeks. Histological examinations revealed hyperplasia of the epidermis in the inflamed paws and increased macrophage expression in the spleen and paw tissues. Mechanical and thermal nociceptive response thresholds were reduced in the affected mice. Locomotor activity was decreased in affected mice with inflamed hindpaws, and this reduction was attributable to the avoidance of contact of the affected paw with the floor. Motor strength and daily activity in the home cage in the affected mice did not show any significant changes. Although Fos immunoreactivity was normal in the dorsal horn of affected mice, calcitonin gene-related peptide immunoreactivity significantly increased in the deep



layer of the dorsal horn. The number of microglia increased in the spinal cord, hippocampus, and cerebral cortex in affected mice, and the proliferation of microglia was maintained for a couple of months. Two hundred eighty-five SNP markers were used to reveal the affected gene locus, which was found on the distal part of chromosome 18. A point mutation was detected at A to G in exon 8 of the *pstpip2* gene, resulting in a conserved tyrosine residue at amino acid 180 replaced by cysteine (Y180 C). The data provide definitive evidence that a mutation in *pstpip2* causes autoinflammatory disease in an N-ethyl-N-nitrosourea mutagenesis mouse model.”

According to the news reporters, the researchers concluded: “Thus, our *pstpip2* mutant mice provide a new model for investigating the potential mechanisms of inflammatory pain.”

For more information on this research see: Spontaneous inflammatory pain model from a mouse line with N-ethyl-N-nitrosourea mutagenesis. *Journal of Biomedical Science*, 2012;19(0):1-15. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

Our news correspondents report that additional information may be obtained by contacting T.C. Chen, National Taiwan University, Dept. of Anat & Cell Biol, Taipei, Taiwan. (2012 Sep 28)

### **School of Engineering, Subang Jaya: Computational analysis of the flow of bile in human cystic duct**

By a News Reporter-Staff News Editor at Health & Medicine Week – Data detailed on Medical Engineering and Physics have been presented. According to news reporting out of Subang Jaya, Malaysia, by NewsRx editors, research stated, “Computational fluid dynamic (CFD) simulations of the three-dimensional flow structures in realistic cystic ducts have been performed to obtain quantitative readings of the flow parameters to compare with clinical measurements. Resin casts of real patients’ cystic ducts lumen that possess representative anatomical features were scanned to obtain three-dimensional flow domains that were used in the numerical analysis.”

Our news journalists obtained a quote from the research from the School of Engineering, “The convoluting nature of the studied cystic ducts resulted in strong secondary flow that contributed towards a dimensionless pressure drop that is four times higher than those of a straight circular tube of an equivalent length and average diameter. The numerical pressure drop results across the cystic duct compared very well with those obtained from clinical observations which indicate that CFD is an appropriate tool to investigate the flow and functions

of the biliary system. From the hydrodynamic point of view, the cystic duct lumen seems to serve as a passive resistor that strives to provide a constant amount of resistance to control the flow of bile out of the gallbladder.”

According to the news editors, the researchers concluded: “This is mainly achieved by the coupling of the secondary flow effects and bile rheology to provide flow resistance.”

For more information on this research see: Computational analysis of the flow of bile in human cystic duct. *Medical Engineering & Physics*, 2012;34(8):1177-83. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting M. Al-Atabi, School of Engineering, Taylor’s University, No 1 Jalan Taylor’s, 47500 Subang Jaya, Selangor, Malaysia. (2012 Sep 28)

### **Technical University, Lisbon: Bone remodelling analysis of the humerus after a shoulder arthroplasty**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Medical Engineering and Physics. According to news reporting from Lisbon, Portugal, by NewsRx journalists, research stated, “The shoulder arthroplasty has become an efficient treatment for some pathologies. However there are complications that can compromise its success.”

The news correspondents obtained a quote from the research from Technical University, “Among them, the stress shielding effect on the humerus has been reported as a possible cause of failure. The objective of this work was to investigate the bone remodelling in the humerus after a shoulder arthroplasty. For this purpose, computational models were developed to analyse the stress shielding contribution to the humeral component failure of shoulder arthroplasties, with a cemented and an uncemented prosthesis. A computational remodelling model was used to characterize the bone apparent density at each site of the humerus. The density distribution was obtained by the solution of a problem that takes into account both structural stiffness and the metabolic cost of bone maintenance. Bone was subjected to 6 load cases that include the glenohumeral reaction force and the action of 10 muscles. In the implanted models, different interface conditions were tested for the bone-implant and the cement-implant interfaces. Moreover, a pathological case defined by a poorer quality of bone was considered. In the healthy situation, the models that better model in vivo conditions showed no significant changes in bone mass. However, the results for the pathological case showed some bone resorption which supports the

importance given to the quality of bone in the success of the joint replacement.”

According to the news reporters, the researchers concluded: “Bearing in mind the conditions addressed, the results lead to conclude that the stress shielding is not a key factor for the humeral component failure of shoulder arthroplasties in a healthy situation though several issues, including muscle function and bone quality, may heighten its effect.”

For more information on this research see: Bone remodelling analysis of the humerus after a shoulder arthroplasty. *Medical Engineering & Physics*, 2012;34(8):1132-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting C. Quental, IDMEC, Instituto Superior Tecnico, Technical University of Lisbon, Av Rovisco Pais, 1049-001 Lisbon, Portugal. (2012 Sep 28)

### **University Medical Center, Groningen: Principles of obstacle avoidance with a transfemoral prosthetic limb**

By a News Reporter-Staff News Editor at Health & Medicine Week – Researchers detail new data in Medical Engineering and Physics. According to news reporting from Groningen, Netherlands, by NewsRx journalists, research stated, “In this study, conditions that enable a prosthetic knee flexion strategy in transfemoral amputee subjects during obstacle avoidance were investigated. This study explored the hip torque principle and the static ground principle as object avoidance strategies.”

The news correspondents obtained a quote from the research from University Medical Center, “A prosthetic limb simulator device was used to study the influence of applied hip torques and static ground friction on the prosthetic foot trajectory. Inverse dynamics were used to calculate the energy produced by the hip joint. A two-dimensional forward dynamics model was used to investigate the relation between obstacle-foot distance and the necessary hip torques utilized during obstacle avoidance. The study showed that a prosthetic knee flexion strategy was facilitated by the use of ground friction and by larger active hip torques. This strategy required more energy produced by the hip compared to a knee extension strategy.”

According to the news reporters, the researchers concluded: “We conclude that when an amputee maintains enough distance between the distal tip of the foot and the obstacle during stance, he or she produces sufficiently high, yet feasible, hip torques and uses static ground friction, the amputee satisfies the conditions for enable stepping over an obstacle using a knee flexion strategy.”

For more information on this research see: Principles of obstacle avoidance with a transfemoral prosthetic limb. *Medical Engineering & Physics*, 2012;34(8):1109-16. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting H.G. van Keeken, Center for Human Movement Sciences, University Medical Center Groningen, University of Groningen, Groningen, Netherlands. (2012 Sep 28)

### **University of Glasgow: LES of non-Newtonian physiological blood flow in a model of arterial stenosis**

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Medical Engineering and Physics is the subject of a report. According to news reporting originating from Glasgow, United Kingdom, by NewsRx correspondents, research stated, “Large Eddy Simulation (LES) is performed to study the physiological pulsatile transition-to-turbulent non-Newtonian blood flow through a 3D model of arterial stenosis by using five different blood viscosity models: (i) Power-law, (ii) Carreau, (iii) Quemada, (iv) Cross and (v) modified-Casson. The computational domain has been chosen is a simple channel with a biological type stenosis formed eccentrically on the top wall.”

Our news editors obtained a quote from the research from the University of Glasgow, “The physiological pulsation is generated at the inlet of the model using the first four harmonic series of the physiological pressure pulse (Loudon and Tordesillas [1]). The effects of the various viscosity models are investigated in terms of the global maximum shear rate, post-stenotic re-circulation zone, mean shear stress, mean pressure, and turbulent kinetic energy. We find that the non-Newtonian viscosity models enlarge the length of the post-stenotic re-circulation region by moving the reattachment point of the shear layer separating from the upper wall further downstream. But the turbulent kinetic energy at the immediate post-lip of the stenosis drops due to the effects of the non-Newtonian viscosity.”

According to the news editors, the researchers concluded: “The importance of using LES in modelling the non-Newtonian physiological pulsatile blood flow is also assessed for the different viscosity models in terms of the results of the dynamic subgrid-scale (SGS) stress Smagorinsky model constant,  $C(s)$ , and the corresponding SGS normalised viscosity.”

For more information on this research see: LES of non-Newtonian physiological blood flow in a model of arterial stenosis. *Medical Engineering & Physics*, 2012;34(8):1079-87. (Elsevier - [www.elsevier.com](http://www.elsevier.com);

Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting M.M. Molla, School of Engineering, University of Glasgow, Glasgow G12 8QQ, UK. (2012 Sep 28)

### **University of Illinois, Chicago: Analysis of micro fracture in human Haversian cortical bone under?compression**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators discuss new findings in Science. According to news reporting originating in Chicago, Illinois, by NewsRx journalists, research stated, “A procedure to investigate local stress intensity factors in human Haversian cortical bone under compression is presented. The method combines a customised experimental setting for micro-compression tests of millimetric bone specimens and a finite element contact model conforming to the bone morphology that tracks advancing microcracks.”

The news reporters obtained a quote from the research from the University of Illinois, “The non-interpenetration conditions along the crack edges are ensured by penalty constraints of which the parameters are optimised for minimum contact pressure error with respect to the crack orientations. A cohesive crack opening law is implemented in the wake of the crack tips to remain consistent with the progressive tearing of collagen fibrils. The displacement solution is searched by a Newton-Raphson scheme containing a double loop first on the displacements and second on the frictional contact and cohesive condition updates at the crack interfaces. The experimental Dirichlet boundary conditions are acquired by digital image cross-correlation of bone light microscopy observations and then imported into the model. The local mechanical elastic moduli are measured by nanoindentation and microextensometry.”

According to the news reporters, the researchers concluded: “The comparison of the macroscopic stress-strain numerical response with the experiment reveals the existence of narrow diffuse damaged zones near the major cracks where the local stress intensity factors can be calculated.”

For more information on this research see: Analysis of micro fracture in human Haversian cortical bone under?compression. *International Journal for Numerical Methods In Biomedical Engineering*, 2012;28(9):974-98. (Wiley-Blackwell - <http://www.wiley.com/>; International Journal for Numerical Methods In Biomedical Engineering - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news correspondents report that additional information may be obtained by contacting J. Jonvaux, Dept. of Mechanical Engineering, University of Illinois at Chicago, 842 West Taylor Street, Chicago, IL 60607, United States. (2012 Sep 28)

### **University of Leeds: Rigid versus flexible plate fixation for periprosthetic femoral fracture-Computer modelling of a clinical case**

By a News Reporter-Staff News Editor at Health & Medicine Week – Fresh data on Medical Engineering and Physics are presented in a new report. According to news originating from Leeds, United Kingdom, by NewsRx correspondents, research stated, “A variety of plate designs have been implemented for treatment of periprosthetic femoral fracture (PFF) fixation. Controversy, however, exists with regard to optimum fixation methods using these plates.”

Our news journalists obtained a quote from the research from the University of Leeds, “A clinical case of a PFF fixation (Vancouver type C) was studied where a rigid locking plate fixation was compared with a more flexible non-locking approach. A parametric computational model was developed in order to understand the underlying biomechanics between these two fixations. The model was used to estimate the overall stiffness and fracture movement of the two implemented methods. Further, the differing aspects of plate design and application were incrementally changed in four different models. The clinical case showed that a rigid fixation using a 4.5mm titanium locking plate with a short bridging length did not promote healing and ultimately failed. In contrast, a flexible fixation using 5.6mm stainless steel non-locking plate with a larger bridging length promoted healing. The computational results highlighted that changing the bridging length made a more substantial difference to the stiffness and fracture movement than varying other parameters. Further the computational model predicted the failure zone on the locking plate. In summary, rigid fracture fixation in the case of PFF can suppress the fracture movement to a degree that prevents healing and may ultimately fail.”

According to the news editors, the researchers concluded: “The computational approach demonstrated the potential of this technique to compare the stiffness and fracture movement of different fixation constructs in order to determine the optimum fixation method for PFF.”

For more information on this research see: Rigid versus flexible plate fixation for periprosthetic femoral fracture-Computer modelling of a clinical case. *Medical Engineering & Physics*, 2012;34(8):1041-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wnps/product/cws\\_home/30456](http://www.elsevier.com/wnps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from M. Moazen, Institute of Medical and Biological Engineering, School of Mechanical Engineering, University of Leeds, Woodhouse Lane, Leeds LS2 9JT, UK. (2012 Sep 28)

### **University of Waterloo: The influence of headform orientation and flooring systems on impact dynamics during simulated fall-related head impacts**

By a News Reporter-Staff News Editor at Health & Medicine Week – Research findings on Medical Engineering and Physics are discussed in a new report. According to news originating from Waterloo, Canada, by NewsRx correspondents, research stated, “Novel compliant flooring systems are a promising approach for reducing fall-related injuries in seniors, as they may provide up to 50% attenuation in peak force during simulated hip impacts while eliciting only minimal influences on balance. This study aimed to determine the protective capacity of novel compliant floors during simulated ‘high severity’ head impacts compared to common flooring systems.”

Our news journalists obtained a quote from the research from the University of Waterloo, “A headform was impacted onto a common Commercial-Carpet at 1.5, 2.5, and 3.5m/s in front, back, and side orientations using a mechanical drop tower. Peak impact force applied to the headform ( $F(\max)$ ), peak linear acceleration of the headform ( $g(\max)$ ) and Head Injury Criterion (HIC) were determined. For the 3.5m/s trials, backwards-oriented impacts were associated with the highest  $F(\max)$  and HIC values ( $p \leq 0.001$ ); accordingly, this head orientation was used to complete additional trials on three common floors (Resilient Rubber, Residential-Loop Carpet, Berber Carpet) and six novel compliant floors at each impact velocity. ANOVAs indicated that flooring type was associated with all parameters at each impact velocity ( $p \leq 0.001$ ). Compared to impacts on the Commercial Carpet, Dunnett’s post hoc indicated all variables were smaller (25-80%) for the novel compliant floors ( $p \leq 0.001$ ), but larger for Resilient Rubber (31-159%,  $p \leq 0.01$ ). This study demonstrates that during ‘high severity’ simulated impacts, novel compliant floors can substantially reduce the forces and accelerations applied to a headform compared to common floors including carpet and resilient rubber.”

According to the news editors, the researchers concluded: “In combination with reports of minimal balance impairments, these findings support the promise of novel compliant floors as a biomechanically effective strategy for reducing fall-related injuries including traumatic brain injuries and skull fractures.”

For more information on this research see: The influence of head-form orientation and flooring systems on impact dynamics during simulated fall-related head impacts. *Medical Engineering & Physics*, 2012;34(8):1071-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from A.D. Wright, Injury Biomechanics and Aging Laboratory, Dept. of Kinesiology, University of Waterloo, Waterloo, Ontario, Canada. (2012 Sep 28)

### **Department of Electrical Engineering, Montreal: A High-Efficiency Low-Voltage CMOS Rectifier for Harvesting Energy in Implantable Devices**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating from Montreal, Canada, by NewsRx correspondents, research stated, “We present, in this paper, a new full-wave CMOS rectifier dedicated for wirelessly-powered low-voltage biomedical implants. It uses bootstrapped capacitors to reduce the effective threshold voltage of selected MOS switches.”

Our news editors obtained a quote from the research from the Department of Electrical Engineering, “It achieves a significant increase in its overall power efficiency and low voltage-drop. Therefore, the rectifier is good for applications with low-voltage power supplies and large load current. The rectifier topology does not require complex circuit design. The highest voltages available in the circuit are used to drive the gates of selected transistors in order to reduce leakage current and to lower their channel on-resistance, while having high transconductance. The proposed rectifier was fabricated using the standard TSMC 0.18  $\mu\text{m}$  CMOS process.”

According to the news editors, the researchers concluded: “When connected to a sinusoidal source of 3.3 V peak amplitude, it allows improving the overall power efficiency by 11% compared to the best recently published results given by a gate cross-coupled-based structure.”

For more information on this research see: A High-Efficiency Low-Voltage CMOS Rectifier for Harvesting Energy in Implantable Devices. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(4):326-335. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Circuits and Systems - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)



The news editors report that additional information may be obtained by contacting S.S. Hashemi, Ecole Polytechnic, Dept. of Elect Engn, Polystim Neurotechnol Lab, Montreal, PQ H3C 3A7, Canada. (2012 Sep 26)

### **Department of Internal Medicine, Seoul: A Knowledge-Based Approach to Arterial Stiffness Estimation Using the Digital Volume Pulse**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting out of Seoul, South Korea, by NewsRx editors, research stated, “We have developed a knowledge based approach for arterial stiffness estimation. The proposed new approach reliably estimates arterial stiffness based on the analysis of age and heart rate normalized reflected wave arrival time.”

Our news journalists obtained a quote from the research from the Department of Internal Medicine, “The proposed new approach reduces cost, space, technical expertise, specialized equipment, complexity, and increases the usability compared to recently researched non-invasive arterial stiffness estimators. The proposed method consists of two main stages: pulse feature extraction and linear regression analysis. The new approach extracts the pulse features and establishes a linear prediction equation. On evaluating proposed methodology with pulse wave velocity (PWV) based arterial stiffness estimators, the proposed methodology offered the error rate of 8.36% for men and 9.52% for women, respectively.”

According to the news editors, the researchers concluded: “With such low error rates and increased benefits, the proposed approach could be usefully applied as low cost and effective solution for ubiquitous and home healthcare environments.”

For more information on this research see: A Knowledge-Based Approach to Arterial Stiffness Estimation Using the Digital Volume Pulse. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(4):366-374. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Circuits and Systems* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

Our news journalists report that additional information may be obtained by contacting D.G. Jang, Sanggye Paik Hosp, Dept. of Internal Med, Seoul 139707, South Korea. (2012 Sep 26)

## **Hamdard University, New Delhi: Development and validation of HPLC method for simultaneous estimation of piperine and guggulsterones in compound Unani formulation (tablets) and a nanoreservoir system**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Chromatography. According to news reporting out of New Delhi, India, by NewsRx editors, research stated, “An attempt has been made to develop and validate a simultaneous HPLC method for novel approach of drug release via oil-in-water (o/w) nanoemulsion formulation and Habb-e-Khardal Unani tablet containing piperine and guggul sterones E and Z as main ingredients. Nanoemulsion was prepared by titration method using sefsol-218 as an oily phase, cremophor-EL as a surfactant, transcitol as a co-surfactant and distilled water as an aqueous phase.”

Our news journalists obtained a quote from the research from Hamdard University, “The formulation was optimized on the basis of thermodynamic stability and dispersibility test. The nanoformulation was evaluated for particle size, surface morphology, electrical conductivity and viscosity determination. The in vitro dissolution was carried out by dialysis bag method. Drugs were quantified using an HPLC method developed in-house with a C(18) column as stationary phase and acetonitrile and water as mobile phase at  $\lambda_{\text{max}}$  of 240 nm. The optimized formulation showed higher drug release, lower droplet size and less viscosity as compared with the conventional Habb-e-Khardal Unani tablet. The present study illustrated the potential of nanoemulsion dosage form in improving biopharmaceutic performance of piperine and guggul sterone.”

According to the news editors, the researchers concluded: “The HPLC method was also found to be quite sufficient for the routine quality control of formulations containing piperine and guggul sterone E and Z as ingredients and also for in vitro drug release studies.”

For more information on this research see: Development and validation of HPLC method for simultaneous estimation of piperine and guggulsterones in compound Unani formulation (tablets) and a nanoreservoir system. *Biomedical Chromatography*, 2012;26(10):1183-90. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-0801](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-0801))

Our news journalists report that additional information may be obtained by contacting Y.T. Kamal, Bioactive Natural Product Laboratory, Dept. of Pharmacognosy and Phytochemistry, Faculty of Pharmacy, Hamdard University, Hamdard Nagar, New Delhi, India. (2012 Sep 26)

**Heilongjiang University, Harbin: Characterization of eleutheroside B metabolites derived from an extract of *Acanthopanax senticosus* Harms by high-resolution liquid chromatography/quadrupole time-of-flight mass spectrometry and automated data analysis**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Chromatography have been presented. According to news originating from Harbin, People's Republic of China, by NewsRx correspondents, research stated, "We elucidated the structure and metabolite profile of eleutheroside B, a component derived from the extract of *Acanthopanax senticosus* Harms, after oral administration of the extract in rats. Samples of rat plasma were collected and analyzed by selective high-resolution liquid chromatography/quadrupole time-of-flight mass spectrometry (UPLC/Q-TOF MS) automated data analysis method."

Our news journalists obtained a quote from the research from Heilongjiang University, "A total of 11 metabolites were detected: four were identified, and three of those four are reported for the first time here. The three new plasma metabolites were identified on the basis of mass fragmentation patterns and literature reports. The major in vivo metabolic processes associated with eleutheroside B in *A. senticosus* include demethylation, acetylation, oxidation and glucuronidation after deglycosylation. A fairly comprehensive metabolic pathway was proposed for eleutheroside B."

According to the news editors, the researchers concluded: "Our results provide a meaningful basis for drug discovery, design and clinical applications related to *A. senticosus* in traditional Chinese medicine."

For more information on this research see: Characterization of eleutheroside B metabolites derived from an extract of *Acanthopanax senticosus* Harms by high-resolution liquid chromatography/quadrupole time-of-flight mass spectrometry and automated data analysis. *Biomedical Chromatography*, 2012;26(10):1269-75. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

The news correspondents report that additional information may be obtained from F. Lu, Institute of Traditional Chinese Medicine, Heilongjiang University of Chinese Medicine, He Ping Road 24, Harbin, 150040, People's Taiwan. (2012 Sep 26)

**National Institute of Pharmaceutical Education and Research, Ahmedabad: Simultaneous quantification of berberine and lysergol by HPLC-UV: evidence that lysergol enhances the oral bioavailability of berberine in rats**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Chromatography is the subject of a report. According to news reporting originating from Ahmedabad, India, by NewsRx correspondents, research stated, “A sensitive and simple HPLC method was developed for the simultaneous quantification of berberine and lysergol in rat plasma. The chromatographic separation was achieved on a C(18) column using isocratic elution with methanol-acetonitrile-0.1% ortho-phosphoric acid (25:20:55, v/v/v), pH adjusted to 6.5 with triethylamine and detected at a UV wavelength of 230nm.”

Our news editors obtained a quote from the research from the National Institute of Pharmaceutical Education and Research, “The extraction of the berberine and lysergol from the rat plasma with methylene chloride resulted in their high recoveries (82.62 and 90.17%). HPLC calibration curves for both berberine and lysergol based on the extracts from the rat plasma were linear over a broad concentration range of 50-1000ng/mL. The limit of quantification was 50ng/mL. Intra-and inter-day precisions were <15% and accuracy was 87.12-92.55% for berberine and 87.01-92.26% for lysergol. Stability studies showed that berberine and lysergol were stable in rat plasma for short-and long-term period for sample preparation and analysis. The described method was successfully applied to study the pharmacokinetics of berberine as well as lysergol following oral administration in Sprague-Dawley rats.”

According to the news editors, the researchers concluded: “The results of the study inferred that lysergol improved the oral bioavailability of berberine.”

For more information on this research see: Simultaneous quantification of berberine and lysergol by HPLC-UV: evidence that lysergol enhances the oral bioavailability of berberine in rats. *Biomedical Chromatography*, 2012;26(10):1170-5. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

The news editors report that additional information may be obtained by contacting S. Patil, Dept. of Natural Products, National Institute of Pharmaceutical Education and Research-Ahmedabad, S G Highway, Thaltej, Ahmedabad, 380054, Gujarat, India. (2012 Sep 26)

## Northwestern University, Evanston: Multiple scattering model for the penetration depth of low-coherence enhanced backscattering

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Optics. According to news reporting out of Evanston, Illinois, by NewsRx editors, research stated, “Low-coherence enhanced backscattering (LEBS) is a depth-selective self-interference phenomenon that originates from light traveling time-reversed paths in a scattering medium. The depth selectivity of LEBS and its sensitivity to optical properties of the scattering medium has made it a promising technique for probing the structure of biological tissue with applications to disease diagnosis and, in particular, precancerous conditions.”

Our news journalists obtained a quote from the research from Northwestern University, “The ability to accurately predict the penetration depth of the LEBS signal is important in targeting an optimal tissue depth for detecting precancerous cells. This prediction is further complicated by the variation in optical properties of different tissue types. In this paper, the effects of the reduced scattering coefficient ( $\mu_s$ ), the phase function and the instrument spatial coherence length ( $L_{sc}$ ) on the LEBS penetration depth are quantified. It is determined that the LEBS penetration depth is primarily dependent on  $L_{sc}$ ,  $\mu_s$ , and the anisotropy factor ( $g$ ), but has minimal dependence on higher moments of the phase function. An empirical expression, having a similar form as the double scattering approximation for LEBS, is found to accurately predict the average penetration depth in the multiple scattering regime.”

According to the news editors, the researchers concluded: “The expression is shown to be accurate for a broad range of experimentally relevant optical properties and spatial coherence lengths.”

For more information on this research see: Multiple scattering model for the penetration depth of low-coherence enhanced backscattering. *Journal of Biomedical Optics*, 2011;16(9):097006.

Our news journalists report that additional information may be obtained by contacting V. Turzhitsky, Northwestern University, Dept. of Biomedical Engineering, Evanston, Illinois 60208, United States. (2012 Sep 26)

## **Osaka University: Image Sensor System With Bio-Inspired Efficient Coding and Adaptation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Osaka, Japan, by NewsRx correspondents, research stated, “We designed and implemented an image sensor system equipped with three bio-inspired coding and adaptation strategies: logarithmic transform, local average subtraction, and feedback gain control. The system comprises a field-programmable gate array (FPGA), a resistive network, and active pixel sensors (APS), whose light intensity-voltage characteristics are controllable.”

Our news journalists obtained a quote from the research from Osaka University, “The system employs multiple time-varying reset voltage signals for APS in order to realize multiple logarithmic intensity-voltage characteristics, which are controlled so that the entropy of the output image is maximized. The system also employs local average subtraction and gain control in order to obtain images with an appropriate contrast. The local average is calculated by the resistive network instantaneously.”

According to the news editors, the researchers concluded: “The designed system was successfully used to obtain appropriate images of objects that were subjected to large changes in illumination.”

For more information on this research see: Image Sensor System With Bio-Inspired Efficient Coding and Adaptation. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(4):375-384. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Circuits and Systems* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

The news correspondents report that additional information may be obtained from H. Okuno, Osaka University, Suita, Osaka 5650871, Japan. (2012 Sep 26)

## **RWTH Aachen University: A Multisensor Implant for Continuous Monitoring of Intracranial Pressure Dynamics**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Aachen, Germany, by NewsRx correspondents, research stated, “In humans, intracranial pressure (ICP) is not only influenced by pathology, but also by orientation in space and

body movements. Therefore, it is proposed to measure ICP dynamics and body acceleration simultaneously.”

Our news editors obtained a quote from the research from RWTH Aachen University, “An algorithm for acceleration analysis was developed to monitor orientation in space and allow more accurate examination of ICP dynamics during quiet periods. For continuous monitoring, an implant was developed and wireless data transmission was implemented; this prototype was successfully tested in five pigs. Hydrocephalus with increased ICP was experimentally induced in the animals using a surgical kaolin infusion. This model of porcine pathology was then tested with the implant with the aim for eventual use in humans. ICP dynamics and 2D-acceleration data were simultaneously recorded for up to two weeks. This study allowed 24-h monitoring and provided analysable data on porcine ICP dynamics with humanlike ICP waves, the so called B-and P-waves. Results show that acceleration often had a stronger influence on ICP than the amplitudes of the physiological ICP characteristics. With test animals in a standing position, without obvious body movement, ICP varied to an extent that made the characteristic ICP waves difficult to identify.”

According to the news editors, the researchers concluded: “These data allow us to conclude that analysis of both ICP and acceleration may be essential for autonomous implants.”

For more information on this research see: A Multisensor Implant for Continuous Monitoring of Intracranial Pressure Dynamics. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(4):356-365. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Circuits and Systems* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

The news editors report that additional information may be obtained by contacting S. Jetzki, RWTH Aachen Univ Clin, Dept. of Neurosurg, D-52074 Aachen, Germany. (2012 Sep 26)

### **Technical University, Munich: A Magnetic Manipulation System Using an Active Filter for Electronic Detection of Target Cells**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Munich, Germany, by NewsRx journalists, research stated, “Important advances in the development of magnetic manipulation devices have been recorded over the last few years

and promising experimental results have been presented. In this article we first perform a detailed analysis on one of most widely used magnetic actuators, namely a planar microcoil.”

The news reporters obtained a quote from the research from Technical University, “Key parameters that affect the performance of the actuator are identified and our results are in accordance with measured data. Making use of these findings, a lab-on-a-chip system is proposed, that also integrates a novel electronic sensing concept for live monitoring of its activity.”

According to the news reporters, the researchers concluded: “Possible applications of this system include highly selective bioseparation or the possibility to manipulate and assemble marked particles with great precision.”

For more information on this research see: A Magnetic Manipulation System Using an Active Filter for Electronic Detection of Target Cells. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(4):319-325. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Circuits and Systems* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

Our news correspondents report that additional information may be obtained by contacting D. Popescu, Technical Univ Munich TUM, Inst Nanoelect, D-80333 Munich, Germany. (2012 Sep 26)

### **University Hospital, Enshi: Self-expanding stents in the treatment of carotid artery subtotal occlusion: a clinical study on the patients of Hubei and Sichuan in China**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Angiology. According to news reporting from Enshi, People’s Republic of China, by NewsRx journalists, research stated, “Stroke is a major cause of death and disability throughout the world. Subtotal occlusion of the carotid artery is an important risk factor for stroke.”

The news correspondents obtained a quote from the research from University Hospital, “Carotid artery stenting (CAS) is increasingly being used for treatment of carotid artery stenosis. There are many reports on treating carotid artery stenosis by CAS; however, there are few case reports on treating symptomatic carotid artery subtotal occlusion by CAS, especially in China. To test the clinical applicability, technical results, and morbidity of carotid artery stenting (CAS) in the treatment of symptomatic carotid artery subtotal occlusion. The clinical data of 27 symptomatic carotid artery subtotal occlusion patients treated with



carotid stenting from January 2005 to December 2009 at the University Hospital of Hubei University for Nationalities and the West China Hospital of Sichuan University were systematically reviewed and analysed. Our results suggest that after balloon pre-dilation of the stenotic lesion, with the protection of a distal filter protection device, carotid stenting can be performed to treat symptomatic carotid artery subtotal occlusion patients with acceptable safety.”

According to the news reporters, the researchers concluded: “However, the widespread use of this technique still requires large-scale clinical investigation.”

For more information on this research see: Self-expanding stents in the treatment of carotid artery subtotal occlusion: a clinical study on the patients of Hubei and Sichuan in China. *Bio-medical Materials and Engineering*, 2012;22(1-3):27-33.

Our news journalists report that additional information may be obtained by contacting C. Zhang, Dept. of Neurology, University Hospital of Hubei University for Nationalities, Enshi, People’s Taiwan. (2012 Sep 26)

### **University of Edinburgh: Spike-Timing-Dependent Plasticity With Weight Dependence Evoked From Physical Constraints**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Edinburgh, United Kingdom, by NewsRx editors, research stated, “Analogue and mixed-signal VLSI implementations of Spike-Timing-Dependent Plasticity (STDP) are reviewed. A circuit is presented with a compact implementation of STDP suitable for parallel integration in large synaptic arrays.”

Our news journalists obtained a quote from the research from the University of Edinburgh, “In contrast to previously published circuits, it uses the limitations of the silicon substrate to achieve various forms and degrees of weight dependence of STDP. It also uses reverse-biased transistors to reduce leakage from a capacitance representing weight.”

According to the news editors, the researchers concluded: “Chip results are presented showing: various ways in which the learning rule may be shaped; how synaptic weights may retain some indication of their learned values over periods of minutes; and how distributions of weights for synapses convergent on single neurons may shift between more or less extreme bimodality according to the strength of correlational cues in their inputs.”

For more information on this research see: Spike-Timing-Dependent Plasticity With Weight Dependence Evoked From Physical Constraints.

*IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(4):385-398. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Circuits and Systems* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

Our news journalists report that additional information may be obtained by contacting S.A. Bamford, University of Edinburgh, Inst Adapt & Neural Computat, Edinburgh EH8 9AB, Midlothian, United Kingdom. (2012 Sep 26)

### **Washington University School of Medicine, St. Louis: Quantitative photoacoustic imaging: correcting for heterogeneous light fluence distributions using diffuse optical tomography**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Optics is now available. According to news reporting originating from St. Louis, Missouri, by NewsRx correspondents, research stated, “The specificity of molecular and functional photoacoustic (PA) images depends on the accuracy of the photoacoustic absorption spectroscopy. The PA signal is proportional to the product of the optical absorption coefficient and local light fluence; quantitative PA measurements of the optical absorption coefficient therefore require an accurate estimation of optical fluence.”

Our news editors obtained a quote from the research from the Washington University School of Medicine, “Light-modeling aided by diffuse optical tomography (DOT) can be used to map the required fluence and to reduce errors in traditional PA spectroscopic analysis. As a proof-of-concept, we designed a tissue-mimicking phantom to demonstrate how fluence-related artifacts in PA images can lead to misrepresentations of tissue properties. To correct for these inaccuracies, the internal fluence in the tissue phantom was estimated by using DOT to reconstruct spatial distributions of the absorption and reduced scattering coefficients of multiple targets within the phantom. The derived fluence map, which only consisted of low spatial frequency components, was used to correct PA images of the phantom. Once calibrated to a known absorber, this method reduced errors in estimated absorption coefficients from 33% to 6%.”

According to the news editors, the researchers concluded: “These results experimentally demonstrate that combining DOT with PA imaging can significantly reduce fluence-related errors in PA images, while

producing quantitatively accurate, high-resolution images of the optical absorption coefficient.”

For more information on this research see: Quantitative photoacoustic imaging: correcting for heterogeneous light fluence distributions using diffuse optical tomography. *Journal of Biomedical Optics*, 2011;16(9):096016.

The news editors report that additional information may be obtained by contacting A.Q. Bauer, Washington University School of Medicine, Dept. of Radiology, St Louis, Missouri 63110, United States. (2012 Sep 26)

### **Washington University, St. Louis: Three-dimensional photoacoustic tomography based on the focal-line concept**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting out of St. Louis, Missouri, by NewsRx editors, research stated, “A full ring ultrasonic array-based photoacoustic tomography system was recently developed for small animal brain imaging. The 512-element array is cylindrically focused in the elevational direction, and can acquire a two-dimensional (2D) image in 1.6 s.”

Our news journalists obtained a quote from the research from Washington University, “In this letter, we demonstrate the three-dimensional (3D) imaging capability of this system. A novel 3D reconstruction algorithm was developed based on the focal-line concept. Compared to 3D images acquired simply by stacking a series of 2D images, the 3D focal-line reconstruction method renders images with much less artifacts, and improves the elevational resolution by 30% and the signal-to-noise ratio by two times.”

According to the news editors, the researchers concluded: “The effectiveness of the proposed algorithm was first validated by numerical simulations and then demonstrated with a hair phantom experiment and an ex vivo mouse embryo experiment.”

For more information on this research see: Three-dimensional photoacoustic tomography based on the focal-line concept. *Journal of Biomedical Optics*, 2011;16(9):090505.

Our news journalists report that additional information may be obtained by contacting J. Xia, Washington University in St Louis, Optical Imaging Laboratory, Dept. of Biomedical Engineering, St Louis, Missouri 63130, United States. (2012 Sep 26)

**Case Western Reserve University, Cleveland: Combined experimental and mathematical approach for development of microfabrication-based cancer migration assay**

By a News Reporter-Staff News Editor at Cancer Weekly – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Cleveland, Ohio, by NewsRx editors, research stated, “Migration of cancer cells is a key determinant of metastasis, which is correlated with poor prognosis in patients. Evidence shows that cancer cell motility is regulated by stromal cell interactions.”

Our news journalists obtained a quote from the research from Case Western Reserve University, “To quantify the role of homotypic and heterotypic cell-cell interaction in migration, a two-dimensional migration assay has been developed by microfabrication techniques. Two breast cancer cell lines, MDA-MB-231 and MDA-MB-453, were used to develop micropatterns of cancer cells (cell islands) that revealed distinct migration profiles in this assay. Although the individual migration rates of these cells showed only a sevenfold difference, MDA-MB-453 islands migrated significantly lower than MDA-MB-231 islands, indicating differential regulation of migration in isolated cells vs. islands. Island size had the greatest impact on migration, primarily for MDA-MB-231 cells. Migration of MDA-MB-231 islands was decreased by interaction with homotypic cells, and significantly more by heterotypic non-cancer-associated fibroblasts. In addition, a mathematical model of island migration in multi-cellular population has been developed using Stefan-Maxwell’s equation. The model showed qualitative agreement with experimental results and predicted a biphasic relation between cell densities and island sizes.”

According to the news editors, the researchers concluded: “The combined experimental and mathematical model can be used to quantitatively study the impact of cell-cell interactions on migration.”

For more information on this research see: Combined experimental and mathematical approach for development of microfabrication-based cancer migration assay. *Annals of Biomedical Engineering*, 2011;39(9):2346-59. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting S. Sarkar, Dept. of Biomedical Engineering, Case Western Reserve University, Cleveland OH 44106, United States. (2012 Sep 25)

**University of Washington, Seattle: Optical microangiography provides an ability to monitor responses of cerebral microcirculation to hypoxia and hyperoxia in mice**

By a News Reporter-Staff News Editor at Hematology Week – Researchers detail new data in Biomedical Optics. According to news originating from Seattle, Washington, by NewsRx correspondents, research stated, “In vivo imaging of microcirculation can improve our fundamental understanding of cerebral microhemodynamics under various physiological challenges, such as hypoxia and hyperoxia. However, existing techniques often involve the use of invasive procedures or exogenous contrast agents, which would inevitably perturb the intrinsic physiologic responses of microcirculation being investigated.”

Our news journalists obtained a quote from the research from the University of Washington, “We report ultrahigh sensitive optical microangiography (OMAG) for label-free monitoring of microcirculation responses challenged by oxygen inhalation. For the first time, we demonstrate that OMAG is capable of showing the impact of acute hypoxia and hyperoxia on microhemodynamic activities, including the passive and active modulation of microvascular density and flux regulation, within capillary and noncapillary vessels in rodents in vivo.”

According to the news editors, the researchers concluded: “The ability of OMAG to functionally image the intact microcirculation promises future applications for studying cerebral diseases.”

For more information on this research see: Optical microangiography provides an ability to monitor responses of cerebral microcirculation to hypoxia and hyperoxia in mice. *Journal of Biomedical Optics*, 2011;16(9):096019.

The news correspondents report that additional information may be obtained from Y. Jia, University of Washington, Dept. of Bioengineering, Seattle, Washington 98195, United States. (2012 Sep 24)

**Harbin Institute of Technology: Identification and characterization of a novel gene, c1orf109, encoding a CK2 substrate that is involved in cancer cell proliferation**

By a News Reporter-Staff News Editor at Women’s Health Weekly – A new study on Breast Cancer is now available. According to news reporting originating in Harbin, People’s Republic of China, by NewsRx journalists, research stated, “In the present study we identified a novel gene, Homo Sapiens Chromosome 1 ORF109 (c1orf109, GenBank ID:

NM\_017850.1), which encodes a substrate of CK2. We analyzed the regulation mode of the gene, the expression pattern and subcellular localization of the predicted protein in the cell, and its role involving in cell proliferation and cell cycle control.”

The news reporters obtained a quote from the research from the Harbin Institute of Technology, “Dual-luciferase reporter assay, chromatin immunoprecipitation and EMSA were used to analysis the basal transcriptional requirements of the predicted promoter regions. C1ORF109 expression was assessed by western blot analysis. The subcellular localization of C1ORF109 was detected by immunofluorescence and immune colloidal gold technique. Cell proliferation was evaluated using MTT assay and colony-forming assay. We found that two cis-acting elements within the crucial region of the c1orf109 promoter, one TATA box and one CAAT box, are required for maximal transcription of the c1orf109 gene. The 5' flanking region of the c1orf109 gene could bind specific transcription factors and Sp1 may be one of them. Employing western blot analysis, we detected upregulated expression of c1orf109 in multiple cancer cell lines. The protein C1ORF109 was mainly located in the nucleus and cytoplasm. Moreover, we also found that C1ORF109 was a phosphoprotein in vivo and could be phosphorylated by the protein kinase CK2 in vitro. Exogenous expression of C1ORF109 in breast cancer Hs578T cells induced an increase in colony number and cell proliferation. A concomitant rise in levels of PCNA (proliferating cell nuclear antigen) and cyclinD1 expression was observed. Meanwhile, knockdown of c1orf109 by siRNA in breast cancer MDA-MB-231 cells confirmed the role of c1orf109 in proliferation.”

According to the news reporters, the researchers concluded: “Taken together, our findings suggest that C1ORF109 may be the downstream target of protein kinase CK2 and involved in the regulation of cancer cell proliferation.”

For more information on this research see: Identification and characterization of a novel gene, c1orf109, encoding a CK2 substrate that is involved in cancer cell proliferation. *Journal of Biomedical Science*, 2012;19():1-11. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

Our news correspondents report that additional information may be obtained by contacting S.S. Liu, Harbin Inst Technol, Academy Fundamental & Interdisciplinary Sci, Bio X Center, Harbin 150080, People's Republic of China. (2012 Sep 20)

## **University of Pompeu Fabra, Barcelona: Anatomical atlas in the context of head and neck radiotherapy and its use to automatic segmentation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Barcelona, Spain, by NewsRx correspondents, research stated, “In this paper we present a methodology to form an anatomical atlas based on the analysis of dense deformation fields recovered by the Morphons non-rigid registration algorithm. The methodology is based on measuring the bending energy required to register the whole database to a reference, and the atlas is the one image in the database which yields the smallest bending energy when taken as reference.”

Our news journalists obtained a quote from the research from the University of Pompeu Fabra, “The suitability of our atlas is demonstrated in the context of head and neck radiotherapy through its application to a database with thirty-one computed tomography (CT) images of the head and neck region. In head and neck radiotherapy, CT is the most frequently used modality for the segmentation of organs at risk and clinical target volumes. One challenge brought by the use of CT images is the presence of important artifacts caused by dental implants. The presence of such artifacts hinders the use of intensity averages, thus severely limiting the application of most atlas building techniques described in the literature in this context. The results presented in the paper show that our bending energy model faithfully represents the shape variability of patients in the head and neck region; they also show its good performance in segmentation of volumes of interest in radiotherapy.”

According to the news editors, the researchers concluded: “Moreover, when compared to other atlases of similar performance in automatic segmentation, our atlas presents the desirable feature of not being blurred after intensity averaging.”

For more information on this research see: Anatomical atlas in the context of head and neck radiotherapy and its use to automatic segmentation. *Biomedical Signal Processing and Control*, 2012;7(5):447-455. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from A. Parraga, University of Pompeu Fabra, Center Computat Imaging & Simulat Technol Biomed CIS, Informat & Commun Technol Department, Barcelona, Spain. (2012 Sep 19)

**University of Rhode Island, Kingston: Automatic identification of the number of food items in a meal using clustering techniques based on the monitoring of swallowing and chewing**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Diet and Nutrition Disorders. According to news originating from Kingston, Rhode Island, by NewsRx correspondents, research stated, “The number of distinct foods consumed in a meal is of significant clinical concern in the study of obesity and other eating disorders. This paper proposes the use of information contained in chewing and swallowing sequences for meal segmentation by food types.”

Our news journalists obtained a quote from the research from the University of Rhode Island, “Data collected from experiments of 17 volunteers were analyzed using two different clustering techniques. First, an unsupervised clustering technique, Affinity Propagation (AP), was used to automatically identify the number of segments within a meal. Second, performance of the unsupervised AP method was compared to a supervised learning approach based on Agglomerative Hierarchical Clustering (AHC). While the AP method was able to obtain 90% accuracy in predicting the number of food items, the AHC achieved an accuracy >95%.”

According to the news editors, the researchers concluded: “Experimental results suggest that the proposed models of automatic meal segmentation may be utilized as part of an integral application for objective Monitoring of Ingestive Behavior in free living conditions.”

For more information on this research see: Automatic identification of the number of food items in a meal using clustering techniques based on the monitoring of swallowing and chewing. *Biomedical Signal Processing and Control*, 2012;7(5):474-480. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from P. Lopez-Meyer, University of Rhode Island, Dept. of Elect Comp & Biomed Engr, Kingston, RI 02881, United States. (2012 Sep 19)



## **Yeungnam University, Kyongsan: Segmentation of heart sounds based on dynamic clustering**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news originating from Kyongsan, South Korea, by NewsRx correspondents, research stated, “The heart sound signal is first separated into cycles, where the cycle detection is based on an instantaneous cycle frequency. The heart sound data of one cardiac cycle can be decomposed into a number of atoms characterized by timing delay, frequency, amplitude, time width and phase.”

Our news journalists obtained a quote from the research from Yeungnam University, “To segment heart sounds, we made a hypothesis that the atoms of a heart sound congregate as a cluster in time-frequency domains. We propose an atom density function to indicate clusters. To suppress clusters of murmurs and noise, weighted density function by atom energy is further proposed to improve the segmentation of heart sounds. Therefore, heart sounds are indicated by the hybrid analysis of clustering and medical knowledge. The segmentation scheme is automatic and no reference signal is needed. Twenty-six subjects, including 3 normal and 23 abnormal subjects, were tested for heart sound signals in various clinical cases.”

According to the news editors, the researchers concluded: “Our statistics show that the segmentation was successful for signals collected from normal subjects and patients with moderate murmurs.”

For more information on this research see: Segmentation of heart sounds based on dynamic clustering. *Biomedical Signal Processing and Control*, 2012;7(5):509-516. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from H. Tang, Yeungnam University, Dept. of Informat & Commun, Kyongsan 712749, Kyongbuk, South Korea. (2012 Sep 19)

## **University of Alberta, Edmonton: Improved nearest neighbor interpolators based on confidence region in medical image registration**

By a News Reporter-Staff News Editor at Telemedicine Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Edmonton, Canada, by NewsRx journalists, research stated, “In order to reduce artifacts in match metric and improve the registration speed in medical image registration,

three types of improved nearest neighbor (NN) interpolators based on confidence region (CR) are studied. These improved NN interpolators include: (1) NN based on deterministic confidence region (DCR), DCRNN; (2) NN based on stochastic confidence region (SCR), SCRNN; (3) NN based on confidence region integrating deterministic information and stochastic information (DSCR), DSCRNN.”

The news reporters obtained a quote from the research from the University of Alberta, “The values of normalized mutual information (NMI) are deterministic and accurate at any grid translation position when any improved NN interpolator is used. The smoothness of the NMI curves is compared by applying DCRNN, SCRNN, and DSCRNN interpolators to rigid medical image registration with different numbers of intensity bins and random variables.”

According to the news reporters, the researchers concluded: “The results of tests show that the new DSCRNN interpolator outperforms DCRNN and SCRNN in curve smoothness and anti-micro-fluctuation, and outperforms the conditional NN, PVI and LI interpolators in convergence performance and noise immunity.”

For more information on this research see: Improved nearest neighbor interpolators based on confidence region in medical image registration. *Biomedical Signal Processing and Control*, 2012;7(5):525-536. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news correspondents report that additional information may be obtained by contacting S.B. Hu, University of Alberta, Dept. of Elect & Comp Engn, Edmonton, AB T6G2V4, Canada. (2012 Sep 18)

### **University of Bern, Burgdorf: Feedback control of human metabolic work rate during robotics-assisted treadmill exercise**

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on Biomedical Engineering have been presented. According to news originating from Burgdorf, Switzerland, by NewsRx correspondents, research stated, “A novel approach is presented which suggests the use of human metabolic work rate to define and regulate exercise intensity during robotics-assisted treadmill training. The work describes the design and technical validation of the new method.”

Our news journalists obtained a quote from the research from the University of Bern, “A feedback structure is proposed which provides automatic regulation of metabolic work rate, in conjunction with an embedded feedback loop for volitional control of mechanical work rate.

Human metabolic work rate was derived in real time from breath-by-breath measurements of oxygen uptake and carbon dioxide output. The results show that the feedback method provides close to nominal performance for square-wave and ramp reference tracking tasks and that good disturbance rejection properties are obtained. A collateral finding of this work is an estimate of 14.5% of the metabolic efficiency of robotics-assisted treadmill exercise. The use of feedback control of human metabolic work rate provides a direct measure of exercise intensity as perceived by the exercising human as it directly reflects the energy requirements of the working muscles. This complements previous approaches to guiding robotics-assisted treadmill training based on mechanical work rate, heart rate or oxygen uptake. The new approach based on metabolic work rate may have advantages in populations with compromised and widely varying exercise responses.”

According to the news editors, the researchers concluded: “This provides a new approach for driving and controlling active patient participation during robotics-assisted treadmill exercise.”

For more information on this research see: Feedback control of human metabolic work rate during robotics-assisted treadmill exercise. *Biomedical Signal Processing and Control*, 2012;7(5):537-541. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from K.J. Hunt, Bern Univ Appl Sci, Dept. of Mech Engn, Inst Rehabil & Performance Technol, CH-3400 Burgdorf, Switzerland. (2012 Sep 18)

### **Federal University, Florianopolis: Estimation of the noise autocorrelation function in auditory evoked potential applications**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Florianopolis, Brazil, by NewsRx editors, the research stated, “This work presents a simple and accurate method to estimate the noise autocorrelation function in auditory evoked potential applications. It basically consists in applying a conventional correlation function estimator over the contaminated evoked potential signal processed by a comb filter.”

The news reporters obtained a quote from the research from Federal University, “The main feature of the proposed technique is the possibility of obtaining information on large correlation lags without the need

of extra time intervals, minimizing the estimation time. A theoretical analysis is provided showing that, under certain but achievable conditions, the correlation function of the processed signal approximates the real noise correlation function. Simulation results and an example with a single-trial evoked potential estimation technique illustrate the expected performance.”

According to the news reporters, the researchers concluded: “The proposed method is of special interest to either single or small number of trials evoked potential estimation techniques in anaesthesia monitoring applications.”

For more information on this research see: Estimation of the noise autocorrelation function in auditory evoked potential applications. *Biomedical Signal Processing and Control*, 2012;7(5):542-548. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news correspondents report that additional information may be obtained by contacting M.H. Costa, Federal University of Santa Catarina, Dept. of Elect Engn, BR-88040900 Florianopolis, SC, Brazil. (2012 Sep 17)

### **National Central University, Taipei: A comparison of patients' heart rate variability and blood flow variability during surgery based on the Hilbert-Huang Transform**

By a News Reporter-Staff News Editor at Journal of Robotics & Machine Learning – Fresh data on Hilbert-Huang Transform are presented in a new report. According to news reporting out of Taipei, Taiwan, by VerticalNews editors, research stated, “Previous studies have indicated that heart rate variability (HRV) is considered to be one of the effective parameters for assessing autonomous nervous system activity. Therefore, HRV can be used to detect the state of patients during surgery, even for estimating depth of anaesthesia (DOA).”

Our news journalists obtained a quote from the research from National Central University, “However, the heartbeat can be affected by anaesthesia drugs, breathing rate and electric influence during surgery, which can result in inaccurate information about the patient. To contend with this problem, blood flow variability (BFV) is proposed in this paper as an indicator to monitor the patient's status when HRV is not appropriate. In our experiments, thirty patients undergoing ear, nose, and throat (ENT) surgery with different anaesthetics are used to compare the efficiency and validity between the fast Fourier transform (FFT) and the Hilbert-Huang transform (HHT). Of another thirty

patients, twenty patients accepted ENT surgery, of which ten have received Atropine, while the others have not. The other ten patients who have accepted abdominal surgery with an electric knife were compared with the previously mentioned ten patients who did not receive an Atropine injection for ENT surgery. As a result, the FFT that is applied in this study was replaced with the HHT for analysing the data in a particular frequency range of sympathetic and parasympathetic divisions, because of the lesser response of the results that were analysed by FFT for intubation.”

According to the news editors, the researchers concluded: “Also, BFV is proven to be a useful indicator for assisting doctors to assess the state of the patients instead of HRV during the operation in comparison with HRV under drugs (i.e., Atropine and Glycopyrrolate) and diathermy effects (i.e., high frequency interference from electric knife).”

For more information on this research see: A comparison of patients’ heart rate variability and blood flow variability during surgery based on the Hilbert-Huang Transform. *Biomedical Signal Processing and Control*, 2012;7(5):465-473. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting S.Z. Fan, Natl Cent Univ, Center Dynam Biomarkers & Translat Med, Taipei, Taiwan. (2012 Sep 17)

### **University of California, Los Angeles: A study of non-invasive Patlak quantification for whole-body dynamic FDG-PET studies of mice**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Data detailed on Biomedical Engineering have been presented. According to news reporting out of Los Angeles, California, by NewsRx editors, research stated, “Physiological changes in dynamic PET images can be quantitatively estimated by kinetic modeling technique. The process of PET quantification usually requires an input function in the form of a plasma-time activity curve (PTAC), which is generally obtained by invasive arterial blood sampling.”

Our news journalists obtained a quote from the research from the University of California, “However, invasive arterial blood sampling poses many challenges especially for small animal studies, due to the subjects’ limited blood volume and small blood vessels. A simple non-invasive quantification method based on Patlak graphical analysis (PGA) has been recently proposed to use a reference region to derive the relative influx rate for a target region without invasive blood sampling,

and evaluated by using the simulation data of human brain FDG-PET studies. In this study, the non-invasive Patlak (nPGA) method was extended to whole-body dynamic small animal FDG-PET studies. The performance of nPGA was systematically investigated by using experimental mouse studies and computer simulations. The mouse studies showed high linearity of relative influx rates between the nPGA and PGA for most pairs of reference and target regions, when an appropriate underlying kinetic model was used. The simulation results demonstrated that the accuracy of the nPGA method was comparable to that of the PGA method, with a higher reliability for most pairs of reference and target regions.”

According to the news editors, the researchers concluded: “The results proved that the nPGA method could provide a non-invasive and indirect way for quantifying the FDG kinetics of tumor in small animal studies.”

For more information on this research see: A study of non-invasive Patlak quantification for whole-body dynamic FDG-PET studies of mice. *Biomedical Signal Processing and Control*, 2012;7(5):438-446. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting X.J. Zheng, University of California, David Geffen Sch Med, Dept. of Mol & Med Pharmacol, Los Angeles, CA 90095, United States. (2012 Sep 17)

### **Ecole Centrale, Ecully: Digital image correlation of bone sequential microscopic observations**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating from Ecully, France, by NewsRx correspondents, research stated, “A method of image correlation is presented to study sequential microscopic observations of human Haversian cortical bone. Imaging biological tissues is sometimes challenging owing to their complex microstructures in particular when microcracks appear.”

Our news editors obtained a quote from the research from Ecole Centrale, “Bone microfractures can be studied in micro compression tests where the progressive growth of small cracks is imaged by light microscopy. The two-dimensional displacement field on the sample surface is then tracked by various digital image correlation methods based on cross-correlation formulation. Because of the potential high number of sequential observations, the method calculates the displacements at

given growth steps obtained either by direct comparison of the studied step and the undeformed initial state, called direct correlation, or by iterative comparisons of successive pairs of observations, called gradual correlation. In the gradual procedure, two cases are studied, referred to as invariant gradual correlation and varying gradual correlation, when the correlation domain is transferred till the last observation or reinitialised for each image pairs. As bone is highly heterogeneous, two types of correlation procedures are considered with or without domain partition (WDP or WODP) delimiting material and strong discontinuities.”

According to the news editors, the researchers concluded: “The precision of the methods is specifically evaluated for experimental observations.”

For more information on this research see: Digital image correlation of bone sequential microscopic observations. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(8):815-837. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

The news editors report that additional information may be obtained by contacting E. Budyn, Ecole Cent Lyon, LTDS CNRS UMR 5513, F-69134 Ecully, France. (2012 Sep 12)

### **King's College, London: Computational modelling of cardiac electrophysiology: explanation of the variability of results from different numerical solvers**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in London, United Kingdom, by NewsRx journalists, research stated, “A recent verification study compared 11 large-scale cardiac electrophysiology solvers on an unambiguously defined common problem. An unexpected amount of variation was observed between the codes, including significant error in conduction velocity in the majority of the codes at certain spatial resolutions.”

The news reporters obtained a quote from the research from King's College, “In particular, the results of the six finite element codes varied considerably despite each using the same order of interpolation. In this present study, we compare various algorithms for cardiac electrophysiological simulation, which allows us to fully explain the differences between the solvers. We identify the use of mass lumping as the fundamental cause of the largest variations, specifically the combination

of the commonly used techniques of mass lumping and operator splitting, which results in a slightly different form of mass lumping to that supported by theory and leads to increased numerical error. Other variations are explained through the manner in which the ionic current is interpolated.”

According to the news reporters, the researchers concluded: “We also investigate the effect of different forms of mass lumping in various types of simulation.”

For more information on this research see: Computational modelling of cardiac electrophysiology: explanation of the variability of results from different numerical solvers. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(8):890-903. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news correspondents report that additional information may be obtained by contacting P. Pathmanathan, Kings Coll London, Dept. of Biomed Engn, Div Imaging Sci & Biomed Engn, London WC2R 2LS, United Kingdom. (2012 Sep 12)

### **National Sun Yat Sen University, Kaohsiung: Engagement of ubiquitination and de-ubiquitination at rostral ventrolateral medulla in experimental brain death**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Nervous System Diseases and Conditions have been presented. According to news reporting originating in Kaohsiung, Taiwan, by NewsRx journalists, research stated, “Whereas brain death is a vitally important clinical phenomenon, our contemporary understanding on its underlying cellular mechanisms remains elusive. This study evaluated whether the ubiquitin-proteasome system (UPS) in the rostral ventrolateral medulla (RVLM), a neural substrate that our laboratory identified previously to be intimately related to brain death, is engaged in this fatal process.”

The news reporters obtained a quote from the research from National Sun Yat Sen University, “We performed proteomics, Western Blot, real-time PCR, ELISA and pharmacological experiments in conjunction with a clinically relevant experimental endotoxemia model of brain death based on intravenous administration of *Escherichia coli* lipopolysaccharide in adult male Sprague-Dawley rats. Proteomics, Western blot and enzyme activity analyses demonstrated that polyubiquitination was preserved and de-ubiquitination by ubiquitin C-terminal



hydrolase isozyme-L1 (UCH-L1) was sustained, alongside increased monoubiquitin availability or proteasome activity in RVLM over the course of experimental endotoxemia. However, real-time PCR revealed no significant alteration in proteasome subunit alpha type-1, ubiquitin or UCH-L1 at mRNA level. Functionally, whereas microinjection into the bilateral RVLM of proteasome inhibitors (lactacystin or proteasome inhibitor II) potentiated survival, an inhibitor of ubiquitin-recycling (ubiquitin aldehyde) or an UCH-L1 inhibitor exacerbated mortality. We proposed previously that the progression towards brain death entails a tug-of-war between pro-death and pro-life programs in RVLM.”

According to the news reporters, the researchers concluded: “It is conceivable that ubiquitination or de-ubiquitination in RVLM participate in brain death by regulating the degradation of the proteins involved in those programs.”

For more information on this research see: Engagement of ubiquitination and de-ubiquitination at rostral ventrolateral medulla in experimental brain death. *Journal of Biomedical Science*, 2012;19():1-13. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

Our news correspondents report that additional information may be obtained by contacting C.H.Y. Wu, Natl Sun Yat Sen Univ, Inst Biomed Sci, Kaohsiung 80424, Taiwan. (2012 Sep 12)

### **Sunnybrook Research Institute, Toronto: Evaluation of mesh morphing and mapping techniques in patient specific modelling of the human pelvis**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from Toronto, Canada, by NewsRx journalists, research stated, “Robust generation of pelvic finite element models is necessary to understand variation in mechanical behaviour resulting from differences in gender, aging, disease and injury. The objective of this study was to apply and evaluate mesh morphing and mapping techniques to facilitate the creation and structural analysis of specimen-specific finite element (FE) models of the pelvis.”

The news correspondents obtained a quote from the research from Sunnybrook Research Institute, “A specimen-specific pelvic FE model (source mesh) was generated following a traditional user-intensive meshing scheme. The source mesh was morphed onto a computed tomography scan generated target surface of a second pelvis using a landmarked-based approach, in which exterior source nodes were shifted to target surface vertices, while constrained along a normal. A

second copy of the morphed model was further refined through mesh mapping, in which surface nodes of the initial morphed model were selected in patches and remapped onto the surfaces of the target model. Computed tomography intensity-based material properties were assigned to each model. The source, target, morphed and mapped models were analyzed under axial compression using linear static FE analysis, and their strain distributions were evaluated. Morphing and mapping techniques were effectively applied to generate good quality and geometrically complex specimen-specific pelvic FE models.”

According to the news reporters, the researchers concluded: “Mapping significantly improved strain concurrence with the target pelvis FE model.C.”

For more information on this research see: Evaluation of mesh morphing and mapping techniques in patient specific modelling of the human pelvis. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(8):904-913. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; International Journal for Numerical Methods in Biomedical Engineering - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news journalists report that additional information may be obtained by contacting Z. Salo, Sunnybrook Res Inst, Holland Musculoskeletal Res Program Toronto, Toronto, ON, Canada. (2012 Sep 12)

### **University of Isfahan, Shiraz: Iterative Sinc-convolution method for solving planar D-bar equation with application to EIT**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Shiraz, Iran, by NewsRx journalists, research stated, “The numerical solution of D-bar integral equations is the key in inverse scattering solution of many complex problems in science and engineering including conductivity imaging. Recently, a couple of methodologies were considered for the numerical solution of D-bar integral equation, namely product integrals and multigrid.”

The news correspondents obtained a quote from the research from the University of Isfahan, “The first one involves high computational complexity and other one has low convergence rate disadvantages. In this paper, a new and efficient sinc-convolution algorithm is introduced to solve the two-dimensional D-bar integral equation to overcome both of these disadvantages and to resolve the singularity problem not tackled before effectively. The method of sinc-convolution is based on using

collocation to replace multidimensional convolution-form integrals- including the two-dimensional D-bar integral equations - by a system of algebraic equations. Separation of variables in the proposed method allows elimination of the formulation of the huge full matrices and therefore reduces the computational complexity drastically. In addition, the sinc-convolution method converges exponentially with a convergence rate of  $O(e^{-cN})$ ."

According to the news reporters, the researchers concluded: "Simulation results on solving a test electrical impedance tomography problem confirm the efficiency of the proposed sinc-convolution-based algorithm."

For more information on this research see: Iterative Sinc-convolution method for solving planar D-bar equation with application to EIT. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(8):838-860. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; International Journal for Numerical Methods in Biomedical Engineering - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news journalists report that additional information may be obtained by contacting M. Abbasi, Univ Isfahan, Dept. of Comp Engn, Fac Engn, Shiraz, Iran. (2012 Sep 12)

## **University of Missouri, Columbia: Total internal reflection photoacoustic spectroscopy for the detection of $\alpha$ -hematin**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Breast Cancer have been presented. According to news reporting from Columbia, Missouri, by NewsRx journalists, research stated, "Evanescent field sensing methods are currently used to detect many different types of disease markers and biologically important chemicals such as the HER2 breast cancer receptor. Hinoue et al. used Total Internal Reflection Photoacoustic Spectroscopy (TIRPAS) as a method of using the evanescent field to detect an optically opaque dye at a sample interface. Although their methods were successful at detecting dyes, the results at that time did not show a very practical spectroscopic technique, which was due to the less than typical sensitivity of TIRPAS as a spectroscopy modality given the low power (1 to 2 W) lasers being used."

The news correspondents obtained a quote from the research from the University of Missouri, "Contrarily, we have used an Nd:YAG laser with a five nanosecond pulse that gives peak power of 1 MW coupled

with the TIRPAS system to increase the sensitivity of this technique for biological material sensing. All efforts were focused on the eventual detection of the optically absorbing material, hemozoin, which is created as a byproduct of a malarial infection in blood. We used an optically analogous material,  $\alpha$ -hematin, to determine the potential for detection in the TIRPAS system.”

According to the news reporters, the researchers concluded: “In addition, four properties which control the sensitivity were investigated to increase understanding about the sensor’s function as a biosensing method.”

For more information on this research see: Total internal reflection photoacoustic spectroscopy for the detection of  $\alpha$ -hematin. *Journal of Biomedical Optics*, 2012;17(6):061212.

Our news journalists report that additional information may be obtained by contacting B.S. Goldschmidt, University of Missouri-Columbia, Christopher S Bond Life Sciences Center, 1201 East Rollins Road, Columbia, Missouri 65211-7310, United States. (2012 Sep 12)

### **University of Paris, Creteil: Simulation of ultrasonic wave propagation in anisotropic poroelastic bone plate using hybrid spectral/finite element method**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Bone Research have been published. According to news originating from Creteil, France, by NewsRx correspondents, research stated, “This paper deals with the modeling of guided waves propagation in in vivo cortical long bone, which is known to be anisotropic medium with functionally graded porosity. The bone is modeled as an anisotropic poroelastic material by using Biot’s theory formulated in high frequency domain.”

Our news journalists obtained a quote from the research from the University of Paris, “A hybrid spectral/finite element formulation has been developed to find the time-domain solution of ultrasonic waves propagating in a poroelastic plate immersed in two fluid halfspaces. The numerical technique is based on a combined LaplaceFourier transform, which allows to obtain a reduced dimension problem in the frequencywavenumber domain. In the spectral domain, as radiation conditions representing infinite fluid halfspaces may be exactly introduced, only the heterogeneous solid layer needs to be analyzed by using finite element method. Several numerical tests are presented showing very good performance of the proposed procedure.”

According to the news editors, the researchers concluded: “A preliminary study on the first arrived signal velocities computed by using equivalent elastic and poroelastic models will be presented.C.”

For more information on this research see: Simulation of ultrasonic wave propagation in anisotropic poroelastic bone plate using hybrid spectral/finite element method. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(8):861-876. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

The news correspondents report that additional information may be obtained from V.H. Nguyen, Univ Paris Est, MSME UMR CNRS 8208, Lab Modelisat & Simulat Multi Echelle, F-94010 Creteil, France. (2012 Sep 12)

### **National Chiao Tung University, Hsinchu: Capulet and Slingshot share overlapping functions during *Drosophila* eye morphogenesis**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedical Engineering. According to news reporting out of Hsinchu, Taiwan, by NewsRx editors, research stated, “CAP/Capulet (Capt), Slingshot (Ssh) and Cofilin/Twinstar (Tsr) are actin-binding proteins that restrict actin polymerization. Previously, it was shown that low resolution analyses of loss-of-function mutations in *capt*, *ssh* and *tsr* all show ectopic F-actin accumulation in various *Drosophila* tissues.”

Our news journalists obtained a quote from the research from National Chiao Tung University, “In contrast, RNAi depletion of *capt*, *tsr* and *ssh* in *Drosophila* S2 cells all affect actin-based lamella formation differently. Whether loss of these three related genes might cause the same effect in the same tissue remains unclear. Loss-of-function mutant clones were generated using the MARCM or EGUF system whereas overexpression clones were generated using the Flip-out system. Immunostaining were then performed in eye imaginal discs with clones. FRAP was performed in cultured eye discs. Here, we compared their loss-of-function phenotype at single-cell resolution, using a sheet of epithelial cells in the *Drosophila* eye imaginal disc as a model system. Surprisingly, we found that *capt* and *ssh*, but not *tsr*, mutant cells within and posterior to the morphogenetic furrow (MF) shared similar phenotypes. The *capt*/*ssh* mutant cells possessed: (1) hexagonal cell packing with discontinuous adherens junctions; and (2) largely complementary accumulation of excessive phosphorylated myosin light chain (p-MLC) and F-actin rings at the apical cortex. We further showed that

the capt/ssh mutant phenotypes depended on the inactivation of protein kinase A (PKA) and activation of Rho.”

According to the news editors, the researchers concluded: “Although Capt, Ssh and Tsr were reported to negatively regulate actin polymerization, we found that Capt and Ssh, but not Tsr, share overlapping functions during eye morphogenesis.”

For more information on this research see: Capulet and Sling-shot share overlapping functions during *Drosophila* eye morphogenesis. *Journal of Biomedical Science*, 2012;190:1-10. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

Our news journalists report that additional information may be obtained by contacting C.M. Lin, National Chiao Tung University, Dept. of Biol Sci & Technol, Hsinchu 30034, Taiwan. (2012 Sep 11)

### **Royal Melbourne Institute of Technology University: A bioactive peptide analogue for myxoma virus protein with a targeted cytotoxicity for human skin cancer in vitro**

By a News Reporter-Staff News Editor at Cancer Weekly – Current study results on Skin Cancer have been published. According to news reporting from Melbourne, Australia, by NewsRx journalists, research stated, “Cancer is an international health problem, and the search for effective treatments is still in progress. Peptide therapy is focused on the development of short peptides with strong tumoricidal activity and low toxicity.”

The news correspondents obtained a quote from the research from the Royal Melbourne Institute of Technology University, “In this study, we investigated the efficacy of a myxoma virus peptide analogue (RRM-MV) as a candidate for skin cancer therapy. RRM-MV was designed using the Resonant Recognition Model (RRM) and its effect was examined on human skin cancer and normal human skin cells in vitro. Cell cultures were treated with various concentrations of the peptides at different incubation intervals. Cellular morphological changes (apoptosis and necrosis) were evaluated using confocal laser scanning microscopy. The cytotoxic effects of RRM-MV on human skin cancer and normal human skin cells were quantitatively determined by cytotoxicity and cell viability assays. The effect on human erythrocytes was also determined using quantitative hemolysis assay. DNA fragmentation assay was performed to detect early apoptotic events in treated cancer cells. Furthermore, to investigate the possible cell signalling pathway targeted by the peptides treatment, the levels of p-Akt expression in skin cancer and normal cells were detected by immunoblotting. Our results

indicate that RRM-MV has a dose-dependent toxic effect on cancer cells only up to 18 h. The immunoblotting results indicated that the RRM-MV slightly increased p-Akt expression in melanoma and carcinoma cells, but did not seem to affect p-Akt expression in normal skin cells. RRM-MV targets and lethally harms cancer cells and leaves normal cells unharmed. It is able to reduce the cancer cell viability, disrupting the LDH activity in cancer cells and can significantly affect cancer progression.”

According to the news reporters, the researchers concluded: “Further investigation into other cell signalling pathways is needed in the process leading to the in vivo testing of this peptide to prove its safety as a possible effective treatment for skin cancer.”

For more information on this research see: A bioactive peptide analogue for myxoma virus protein with a targeted cytotoxicity for human skin cancer in vitro. *Journal of Biomedical Science*, 2012;19():1-13. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

Our news journalists report that additional information may be obtained by contacting N.M. Almansour, RMIT Univ, Hlth Innovat Res Inst, Melbourne, Vic 3083, Australia. (2012 Sep 11)

### **University of Massachusetts, Lowell: Multimodal optical imaging for detecting breast cancer**

By a News Reporter-Staff News Editor at Cancer Weekly – Investigators publish new report on Breast Cancer. According to news reporting originating in Lowell, Massachusetts, by NewsRx journalists, research stated, “The goal of the study was to evaluate wide-field and high-resolution multimodal optical imaging, including polarization, reflectance, and fluorescence for the intraoperative detection of breast cancer. Lumpectomy specimens were stained with 0.05 mg/ml aqueous solution of methylene blue (MB) and imaged.”

The news reporters obtained a quote from the research from the University of Massachusetts, “Wide-field reflectance images were acquired between 390 and 750 nm. Wide-field fluorescence images were excited at 640 nm and registered between 660 and 750 nm. High resolution confocal reflectance and fluorescence images were excited at 642 nm. Confocal fluorescence images were acquired between 670 nm and 710 nm. After imaging, the specimens were processed for hematoxylin and eosin (H&E) histopathology. Histological slides were compared with wide-field and high-resolution optical images to evaluate correlation of tumor boundaries and cellular morphology, respectively. Fluorescence

polarization imaging identified the location, size, and shape of the tumor in all the cases investigated. Averaged fluorescence polarization values of tumor were higher as compared to normal tissue. Statistical analysis confirmed the significance of these differences. Fluorescence confocal imaging enabled cellular-level resolution. Evaluation and statistical analysis of MB fluorescence polarization values registered from single tumor and normal cells demonstrated higher fluorescence polarization from cancer.”

According to the news reporters, the researchers concluded: “Wide-field high-resolution fluorescence and fluorescence polarization imaging shows promise for intraoperative delineation of breast cancers.”

For more information on this research see: Multimodal optical imaging for detecting breast cancer. *Journal of Biomedical Optics*, 2012;17(6):066008.

Our news correspondents report that additional information may be obtained by contacting R. Patel, University of Massachusetts Lowell, Advanced Biophotonics Laboratory, 175 Cabot Street, Suite 110-111, Lowell, Massachusetts 01854, United States. (2012 Sep 11)

### **China Agricultural University, Beijing: Direct chiral resolution of cloquintocet-mexyl and its application to in vitro degradation combined with clodinafop-propargyl**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Chromatography. According to news originating from Beijing, People’s Republic of China, by NewsRx correspondents, research stated, “A simple chiral high-performance liquid chromatography (HPLC) method with ultraviolet (UV) detection was developed and validated for measuring Cloquintocet-mexyl (CIM) enantiomers and clodinafop-propargyl (CP) using cellulose tris-(3,5-dimethylphenylcarbamate) (CDMPC) as chiral stationary phase (CSP). The effects of mobile phase composition and column temperature on the CIM enantiomer separation were investigated.”

Our news journalists obtained a quote from the research from China Agricultural University, “Good separation was achieved by using a mixture of n-hexane and n-propanol as mobile phase. Based on the chiral HPLC method, enantioselective quantitative determination analysis methods for this herbicide combined with CP in diluted plasma were developed and validated. The assay method was linear over a range of concentrations (0.5-100?g/mL) in diluted plasma and the mean recovery was greater than 80% for both enantiomers and CP. The limits of quantification and detection for both CIM enantiomers and CP were 0.5 and 0.2?g/mL, respectively. Intra-and interday relative standard deviations did not exceed 10% for three tested concentrations.”



According to the news editors, the researchers concluded: “The result suggested that the degradation of CIM enantiomers was stereoselective in rabbit plasma, and both rac-CIM and CP degraded quickly in plasma, showing that the main existing forms with biological effect in animals are their metabolites.”

For more information on this research see: Direct chiral resolution of cloquintocet-mexyl and its application to in vitro degradation combined with clodinafop-propargyl. *Biomedical Chromatography*, 2012;26(9):1058-61. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

The news correspondents report that additional information may be obtained from Z. Shen, Dept. of Applied Chemistry, China Agricultural University, Beijing, 100193, People's Taiwan. (2012 Sep 05)

### **Chinese University of Hong Kong: A mechanical jig for measuring ankle supination and pronation torque in vitro and in vivo**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Hong Kong, People's Republic of China, by NewsRx editors, research stated, “This study presents the design of a mechanical jig for evaluating the ankle joint torque on both cadaver and human ankles. Previous study showed that ankle sprain motion was a combination of plantarflexion and inversion.”

Our news journalists obtained a quote from the research from the Chinese University of Hong Kong, “The device allows measurement of ankle supination and pronation torque with one simple axis in a single step motion. More importantly, the ankle orientation allows rotation starting from an anatomical position. Six cadaveric specimens and six human subjects were tested with simulated and voluntary rotation respectively.”

According to the news editors, the researchers concluded: “The presented mechanical jig makes possible the determination of supination torque for studying ankle sprain injury and the estimation of pronation torque for examining peroneal muscle response.”

For more information on this research see: A mechanical jig for measuring ankle supination and pronation torque in vitro and in vivo. *Medical Engineering & Physics*, 2012;34(6):791-794. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wnps/product/cws\\_home/30456](http://www.elsevier.com/wnps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting D.T.P. Fong, Chinese University of Hong Kong, Fac Med, Hong Kong Jockey Club Sports Med & Hlth Sci Center, Hong Kong, Hong Kong, People's Republic of China. (2012 Sep 05)

### **Hunan Agricultural University, Changsha: Characterization of in vitro metabolites of trimethoprim and diaveridine in pig liver microsomes by liquid chromatography combined with hybrid ion trap/time-of-flight mass spectrometry**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Chromatography have been presented. According to news reporting from Changsha, People's Republic of China, by NewsRx journalists, research stated, “Trimethoprim (TMP) and diaveridine (DVD) are used in combination with sulfonamides and sulfaquinoxaline as an effective antibacterial agent and antiprotozoal agent, respectively, in humans and animals. To gain a better understanding of the metabolism of TMP and DVD in the food-producing animals, the metabolites incubated with liver microsomes of pigs were analyzed for the first time with high-performance liquid chromatography combined with hybrid ion trap/time-of-flight mass spectrometry.”

The news correspondents obtained a quote from the research from Hunan Agricultural University, “Seven TMP-related and six DVD-related metabolites were characterized based on the accurate MS(2) spectra and known structure of the parent drug, respectively. The metabolites of TMP were identified as two O-demethylation metabolites, a di-O-demethylation metabolite, two N-oxides metabolites, a hydroxylated metabolite on the methylene carbon and a hydroxylated metabolite on the methyl group. DVD was also biotransformed to two O-demethylation metabolites, a di-O-demethylation metabolite, an N-oxide metabolite, a hydroxylation metabolite on the methylene carbon and a hydroxylation metabolite followed by O-demethylation. The results indicate that the two compounds have similar biotransformation pathways in pigs. O-Demethylation was the major metabolic route of TMP and DVD in the pig liver microsomes.”

According to the news reporters, the researchers concluded: “The proposed metabolic pathways of TMP and DVD in liver microsomes will provide a basis for further studies of the in vivo metabolism of the two drugs in food-producing animals.”

For more information on this research see: Characterization of in vitro metabolites of trimethoprim and diaveridine in pig liver microsomes by liquid chromatography combined with hybrid ion trap/time-of-flight mass spectrometry. *Biomedical Chromatography*, 2012;26(9):1101-8. (Wiley-Blackwell - <http://www.wiley.com/>;

**Biomedical Chromatography** - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news journalists report that additional information may be obtained by contacting Z.Y. Liu, Hunan Engineering Research Center of Veterinary Drug, College of Veterinary Medicine, Hunan Agricultural University, Changsha, Hunan, 410128, People's Taiwan. (2012 Sep 05)

### **Indiana University-Purdue University, Indianapolis: In vivo interactions between tungsten microneedles and peripheral nerves**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating in Indianapolis, Indiana, by NewsRx journalists, research stated, “Tungsten microneedles are currently used to insert neural electrodes into living peripheral nerves. However, the biomechanics underlying these procedures is not yet well characterized.”

The news reporters obtained a quote from the research from Indiana University-Purdue University, “For this reason, the aim of this work was to model the interactions between these microneedles and living peripheral nerves. A simple mathematical framework was especially provided to model both compression of the external layer of the nerve (epineurium) and the interactions resulting from penetration of the main shaft of the microneedle inside the living nerves. The instantaneous Young's modulus, compression force, the work needed to pierce the tissue, puncturing pressure, and the dynamic friction coefficient between the tungsten microneedles and living nerves were quantified starting from acute experiments, aiming to reproduce the physical environment of real implantations.”

According to the news reporters, the researchers concluded: “Indeed, a better knowledge of the interactions between microneedles and peripheral nerves may be useful to improve the effectiveness of these insertion techniques, and could represent a key factor for designing robot-assisted procedures tailored for peripheral nerve insertion.”

For more information on this research see: In vivo interactions between tungsten microneedles and peripheral nerves. *Medical Engineering & Physics*, 2012;34(6):747-755. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting P.N. Sergi, Indiana Univ Purdue Univ Indianapolis, Dept. of Biomed Engr, Indianapolis, IN, United States. (2012 Sep 05)

**Institute of Molecular Biology and Biotechnology, Crete:  
Kinetics of T-cell receptor-dependent antigen recognition  
determined in vivo by multi-spectral normalized  
epifluorescence laser scanning**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting from Crete, Greece, by NewsRx journalists, research stated, “Detection of multiple fluorophores in conditions of low signal represents a limiting factor for the application of in vivo optical imaging techniques in immunology where fluorescent labels report for different functional characteristics. A noninvasive in vivo Multi-Spectral Normalized Epifluorescence Laser scanning (M-SNELS) method was developed for the simultaneous and quantitative detection of multiple fluorophores in low signal to noise ratios and used to follow T-cell activation and clonal expansion.”

The news correspondents obtained a quote from the research from the Institute of Molecular Biology and Biotechnology, “Colocalized DsRed-and GFP-labeled T cells were followed in tandem during the mounting of an immune response. Spectral unmixing was used to distinguish the overlapping fluorescent emissions representative of the two distinct cell populations and longitudinal data reported the discrete pattern of antigen-driven proliferation. Retrieved values were validated both in vitro and in vivo with flow cytometry and significant correlation between all methodologies was achieved.”

According to the news reporters, the researchers concluded: “Non-invasive M-SNELS successfully quantified two colocalized fluorescent populations and provides a valid alternative imaging approach to traditional invasive methods for detecting T cell dynamics.”

For more information on this research see: Kinetics of T-cell receptor-dependent antigen recognition determined in vivo by multi-spectral normalized epifluorescence laser scanning. *Journal of Biomedical Optics*, 2012;17(7):076013.

Our news journalists report that additional information may be obtained by contacting R. Favicchio, Institute of Molecular Biology and Biotechnology, Foundation for Research and Technology-Hellas, 71110 Heraklion, Crete, Greece. (2012 Sep 05)

## **International University, Rome: Novel Passive Element Circuits for Microdosimetry of Nanosecond Pulsed Electric Fields**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting from Rome, Italy, by NewsRx journalists, research stated, “Microdosimetric models for biological cells have assumed increasing significance in the development of nanosecond pulsed electric field technology for medical applications. In this paper, novel passive element circuits, able to take into account the dielectric dispersion of the cell, are provided.”

The news correspondents obtained a quote from the research from International University, “The circuit analyses are performed on a set of input pulses classified in accordance with the current literature. Accurate data in terms of transmembrane potential are obtained in both time and frequency domains for different cell models. In addition, a sensitivity study of the transfer function for the cell geometrical and dielectric parameters has been carried out.”

According to the news reporters, the researchers concluded: “This analysis offers a new, simple, and efficient tool to characterize the nsPEFs’ action at the cellular level.”

For more information on this research see: Novel Passive Element Circuits for Microdosimetry of Nanosecond Pulsed Electric Fields. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2302-2311. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting C. Merla, Italian Inter Univ Center Electromagnet Fields & Bio, Italian Natl Agcy New Technol Energy & Sustainable, I-00123 Rome, Italy. (2012 Sep 05)

## **Julius Wolff Institute, Berlin: An enhanced and validated generic thoraco-lumbar spine model for prediction of muscle forces**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Berlin, Germany, by NewsRx correspondents, research stated, “A direct measurement of the complete loads in the spine continues to remain elusive. Analytical musculoskeletal

models to predict the internal loading conditions generally neglect or strongly simplify passive soft tissue structures.”

Our news editors obtained a quote from the research from Julius Wolff Institute, “However, during large intervertebral motions, passive structures such as ligaments and the stiffness of the intervertebral discs are thought to play a critical role on the muscle forces required for equilibrium. The objective of the present study was to add the short segmental muscles, lumbar ligaments and disc stiffnesses to an existing base musculoskeletal model of the spine in order to establish what role passive soft tissue structures play in spinal loading, but also validate these results against experimentally determined load data. The long trunk muscles not included in previous models, short segmental muscles, lumbar ligaments and disc stiffnesses were implemented into a commercially available musculoskeletal spine model construct. For several activities of daily living, the loads acting on the vertebral bodies were then calculated relative to the value for standing, and then compared to the corresponding values measured in vivo. Good agreement between calculated and measured results could be achieved in all cases, with a maximum difference of 9%. The highest muscle forces were predicted in the m. longissimus (146 N) for flexion, in the m. rectus abdominis (363 N) for extension, and in the m. psoas major (144 N and 81 N) for lateral bending and axial rotation. This study has demonstrated that the inclusion of the complete set of muscle and ligament structures into musculoskeletal models of the spine is essential before accurate spinal forces can be determined.”

According to the news editors, the researchers concluded: “For the first time, trend validation of spinal loading has been achieved, thus allowing confidence in the precise prediction of muscle forces for a range of activities of daily living.”

For more information on this research see: An enhanced and validated generic thoraco-lumbar spine model for prediction of muscle forces. *Medical Engineering & Physics*, 2012;34(6):709-716. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting K.S. Han, Charite, Julius Wolff Inst, Center Sportwissensch & Sportmed Berlin, D-13353 Berlin, Germany. (2012 Sep 05)

### **Nankai University, Tianjin: Effect of tissue fluid on accurate determination of the complex refractive index of animal tissue**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Optics. According to news reporting originating from Tianjin, People's Republic of China, by NewsRx correspondents, research stated, “We investigate the effect of tissue fluid on the measurement of complex refractive index (RI) of animal tissue. A new model is proposed and verified through experimental results of simulation samples made of glycerol and methyl-red-doped poly(methyl methacrylate).”

Our news editors obtained a quote from the research from Nankai University, “Coupled with polarized optical reflectance measurements performed on several kinds of animal muscle tissues, RIs were resolved using the new model. We find that the tissue fluid existing at the prism-sample interface is unavoidable.”

According to the news editors, the researchers concluded: “We also find that with a change of proportion of the tissue fluid, the RI of muscle tissue can still be measured using the new model.”

For more information on this research see: Effect of tissue fluid on accurate determination of the complex refractive index of animal tissue. *Journal of Biomedical Optics*, 2012;17(7):075011.

The news editors report that additional information may be obtained by contacting J. Wang, Nankai University, The Key Laboratory of Weak-Light Nonlinear Photonics, Ministry of Education, School of Physics and TEDA Applied Physics School, Tianjin 300071, People's Taiwan. (2012 Sep 05)

### **National Central University, Jhongli: Development of a human eye model incorporated with intraocular scattering for visual performance assessment**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Optics is now available. According to news reporting out of Jhongli, Taiwan, by NewsRx editors, research stated, “A biometry-based human eye model was developed by using the empirical anatomic and optical data of ocular parameters. The gradient refractive index of the crystalline lens was modeled by concentric conicoid isoindical surfaces and was adaptive to accommodation and age.”

Our news journalists obtained a quote from the research from National Central University, “The chromatic dispersion of ocular media was described by Cauchy equations. The intraocular scattering model was composed of volumetric Mie scattering in the cornea and the crystalline lens, and a diffusive-surface model at the retina fundus. The

retina was regarded as a Lambertian surface and was assigned its corresponding reflectance at each wavelength. The optical performance of the eye model was evaluated in CodeV and ASAP and presented by the modulation transfer functions at single and multiple wavelengths. The chromatic optical powers obtained from this model resembled that of the average physiological eyes. The scattering property was assessed by means of glare veiling luminance and compared with the CIE general disability glare equation. By replacing the transparent lens with a cataractous lens, the disability glare curve of cataracts was generated to compare with the normal disability glare curve.”

According to the news editors, the researchers concluded: “This model has high potential for investigating visual performance in ordinary lighting and display conditions and under the influence of glare sources.”

For more information on this research see: Development of a human eye model incorporated with intraocular scattering for visual performance assessment. *Journal of Biomedical Optics*, 2012;17(7):075009.

Our news journalists report that additional information may be obtained by contacting Y.C. Chen, National Central University, Institute of Lighting and Display Science, Dept. of Optics and Photonics, Jhongli 320, Taiwan. (2012 Sep 05)

### **Public University of Navarra, Pamplona: Gaze Estimation Interpolation Methods Based on Binocular Data**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Pamplona, Spain, by NewsRx journalists, research stated, “Video oculography (VOG) is one of the most commonly used techniques for gaze tracking because it enables non-intrusive eye detection and tracking. Improving the eye tracking’s accuracy and tolerance to user head movements is a common task in the field of gaze tracking; thus, a thorough study of how binocular information can improve a gaze tracking system’s accuracy and tolerance to user head movements has been carried out.”

The news reporters obtained a quote from the research from the Public University of Navarra, “The analysis is focused on interpolation-based methods and systems with one and two infrared lights. New mapping features are proposed based on the commonly used pupil-glint vector using different distances as the normalization factor. For this study, an experimental procedure with six users based on a real VOG gaze tracking system was performed, and the results were contrasted with an eye simulator. Important conclusions have been obtained in terms of configuration, equation, and mapping features, such as the out performance of the interglint distance as the normalization factor.”



According to the news reporters, the researchers concluded: “Furthermore, the binocular gaze tracking system was found to have a similar or improved level of accuracy compared to that of the monocular gaze tracking system.”

For more information on this research see: Gaze Estimation Interpolation Methods Based on Binocular Data. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2235-2243. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting L. Sesma-Sanchez, Univ Public Navarra, Dept. of Elect & Elect Engn, Pamplona, Spain. (2012 Sep 05)

### **Shanghai Jiao-Tong University: Phase Synchronization Analysis of EEG Signals: An Evaluation Based on Surrogate Tests**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Shanghai, People’s Republic of China, by NewsRx correspondents, research stated, “Phase synchronization (PS) analysis has been demonstrated to be a useful method to infer functional connectivity with multichannel neural signals, e. g., electroencephalography (EEG).”

Our news editors obtained a quote from the research from Shanghai Jiao-Tong University, “Methodological problems on quantifying functional connectivity with PS analysis have been investigated extensively, but some of them have not been fully solved yet. For example, how long a segment of EEG signal should be used in estimating PS index? Which methods are more suitable to infer the significant level of estimated PS index? To address these questions, this paper performs an intensive computation study on PS analysis based on surrogate tests with 1) artificial surrogate data generated by shuffling the rank order, the phase spectra, or the instantaneous frequency of original EEG signals, and 2) intersubject EEG pairs under the assumption that the EEG signals of different subjects are independent.”

According to the news editors, the researchers concluded: “Results show that 1) the phase-shuffled surrogate method is workable for significance test of estimated PS index and yields results similar to those by intersubject EEG surrogate test; 2) generally, a duration of EEG waves covering about 3 similar to 16 cycles is suitable for PS analysis; and 3)

the PS index based on mean phase coherence is more suitable for PS analysis of EEG signals recorded at relatively low sampling rate.”

For more information on this research see: Phase Synchronization Analysis of EEG Signals: An Evaluation Based on Surrogate Tests. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2254-2263. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting J.F. Sun, Shanghai Jiao Tong University, Medical X Res Inst, Shanghai 200030, People's Republic of China. (2012 Sep 05)

### **Skin Cancer Center, Berlin: Applicability of confocal laser scanning microscopy for evaluation and monitoring of cutaneous wound healing**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Optics are presented in a new report. According to news reporting from Berlin, Germany, by NewsRx journalists, research stated, “There is a high demand for noninvasive imaging techniques for wound assessment. In vivo reflectance confocal laser scanning microscopy (CLSM) represents an innovative optical technique for noninvasive evaluation of normal and diseased skin in vivo at near cellular resolution.”

The news correspondents obtained a quote from the research from Skin Cancer Center, “This study was designed to test the feasibility of CLSM for noninvasive analysis of cutaneous wound healing in 15 patients (7 male/8 female), including acute and chronic, superficial and deep dermal skin wounds. A commercially available CLSM system was used for the assessment of wound bed and wound margins in order to obtain descriptive cellular and morphological parameters of cutaneous wound repair noninvasively and over time. CLSM was able to visualize features of cutaneous wound repair in epidermal and superficial dermal wounds, including aspects of inflammation, neovascularisation, and tissue remodelling in vivo. Limitations include the lack of mechanic fixation of the optical system on moist surfaces restricting the analysis of chronic skin wounds to the wound margins, as well as a limited optical resolution in areas of significant slough formation.”

According to the news reporters, the researchers concluded: “By describing CLSM features of cutaneous inflammation, vascularisation, and epithelialisation, the findings of this study support the role of CLSM in modern wound research and management.”

For more information on this research see: Applicability of confocal laser scanning microscopy for evaluation and monitoring of cutaneous wound healing. *Journal of Biomedical Optics*, 2012;17(7):076016.

Our news journalists report that additional information may be obtained by contacting S. Lange-Asschenfeldt, Charite? University Medicine Berlin, Dept. of Dermatology, Skin Cancer Center Charite?, Universita?tsmedizin Berlin, Charite? Campus Mitte, Charite?platz 1, 10117 Berlin, Germany. (2012 Sep 05)

### **Stanford University: Slip Speed Feedback for Grip Force Control**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting out of Stanford, California, by NewsRx editors, research stated, “Grasp stability in the human hand has been resolved by means of an intricate network of mechanoreceptors integrating numerous cues about mechanical events, through an ontogenetic grasp practice. An engineered prosthetic interface introduces considerable perturbation risks in grasping, calling for feedback modalities that address the underlying slip phenomenon.”

Our news journalists obtained a quote from the research from Stanford University, “In this study, we propose an enhanced slip feedback modality, with potential for myoelectric-based prosthetic applications, that relays information regarding slip events, particularly slip occurrence and slip speed. The proposed feedback modality, implemented using electrotactile stimulation, was evaluated in psychophysical studies of slip control in a simplified setup. The obtained results were compared with vision and a binary slip feedback that transmits on-off information about slip detection. The slip control efficiency of the slip speed display is comparable to that obtained with vision feedback, and it clearly outperforms the efficiency of the on-off slip modality in such tasks.”

According to the news editors, the researchers concluded: “These results suggest that the proposed tactile feedback is a promising sensory method for the restoration of stable grasp in prosthetic applications.”

For more information on this research see: Slip Speed Feedback for Grip Force Control. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2200-2210. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting D.D. Damian, Stanford University, Dept. of Mech Engr, Stanford, CA 94305, United States. (2012 Sep 05)

### **Swinburne University of Technology, Hawthorn: Modeling of light absorption in tissue during infrared neural stimulation**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Optics are discussed in a new report. According to news reporting originating from Hawthorn, Australia, by NewsRx correspondents, research stated, “A Monte Carlo model has been developed to simulate light transport and absorption in neural tissue during infrared neural stimulation (INS). A range of fiber core sizes and numerical apertures are compared illustrating the advantages of using simulations when designing a light delivery system.”

Our news editors obtained a quote from the research from the Swinburne University of Technology, “A range of wavelengths, commonly used for INS, are also compared for stimulation of nerves in the cochlea, in terms of both the energy absorbed and the change in temperature due to a laser pulse. Modeling suggests that a fiber with core diameter of 200  $\mu\text{m}$  and NA=0.22 is optimal for optical stimulation in the geometry used and that temperature rises in the spiral ganglion neurons are as low as 0.1°C.”

According to the news editors, the researchers concluded: “The results show a need for more careful experimentation to allow different proposed mechanisms of INS to be distinguished.”

For more information on this research see: Modeling of light absorption in tissue during infrared neural stimulation. *Journal of Biomedical Optics*, 2012;17(7):075002.

The news editors report that additional information may be obtained by contacting A.C. Thompson, Swinburne University of Technology, Faculty of Engineering and Industrial Sciences, PO Box 218, Hawthorn, 3122, Australia. (2012 Sep 05)

### **Taipei Medical University: Cardiovascular protection of magnolol: cell-type specificity and dose-related effects**

By a News Reporter-Staff News Editor at Biotech Week – New research on Apoptosis is the subject of a report. According to news originating from Taipei, Taiwan, by NewsRx correspondents, research stated, “Magnolia officinalis has been widely used in traditional Chinese medicine. Magnolol, an active component isolated from *Magnolia officinalis*, is known to be a cardiovascular protector since 1994.”

Our news journalists obtained a quote from the research from Taipei Medical University, “The multiplex mechanisms of magnolol on cardiovascular protection depends on cell types and dosages, and will be reviewed and discussed in this article. Magnolol under low and moderate dosage possesses the ability to protect heart from ischemic/reperfusion injury, reduces atherosclerotic change, protects endothelial cell against apoptosis and inhibits neutrophil-endothelial adhesion. The moderate to high concentration of magnolol mainly acts on smooth muscle cells and platelets. Magnolol induces apoptosis in vascular smooth muscle cells at moderate concentration and inhibits proliferation at moderate and high concentration. High concentration of magnolol also abrogates platelet activation, aggregation and thrombus formation. Magnolol also serves as an smooth muscle relaxant only upon the high concentration.”

According to the news editors, the researchers concluded: “Oral intake of magnolol to reach the therapeutic level for cardiovascular protection is applicable, thus makes magnolol an agent of great potential for preventing cardiovascular diseases in high-risk patients.”

For more information on this research see: Cardiovascular protection of magnolol: cell-type specificity and dose-related effects. *Journal of Biomedical Science*, 2012;19():70. (BioMed Central - <http://www.biomedcentral.com/>; Journal of Biomedical Science - [www.jbiomedsci.com](http://www.jbiomedsci.com))

The news correspondents report that additional information may be obtained from J.H. Ho, Graduate Institute of Clinical Medicine, Taipei Medical University, Taipei, Taiwan. (2012 Sep 05)

### **Texas A&M University, College Station: A 64-Channel Transmitter for Investigating Parallel Transmit MRI**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from College Station, Texas, by NewsRx journalists, research stated, “Multiple channel radiofrequency (RF) transmitters are being used in magnetic resonance imaging to investigate a number of active research topics, including transmit SENSE and B-1 shimming.

Presently, the cost and availability of multiple channel transmitters restricts their use to relatively few sites.”

The news correspondents obtained a quote from the research from Texas A&M University, “This paper describes the development and testing of a relatively inexpensive transmit system that can be easily duplicated by users with a reasonable level of RF hardware design experience. The system described here consists of 64 channels, each with 100 W peak output level. The hardware is modular at the level of four channels, easily accommodating larger or smaller channel counts. Unique aspects of the system include the use of vector modulators to replace more complex IQ direct digital modulators, 100 W MOSFET RF amplifiers with partial microstrip matching networks, and the use of digital potentiometers to replace more complex and costly digital-to-analog converters to control the amplitude and phase of each channel. Although mainly designed for B1 shimming, the system is capable of dynamic modulation necessary for transmit SENSE by replacing the digital potentiometers controlling the vector modulators with commercially available analog output boards.”

According to the news reporters, the researchers concluded: “The system design is discussed in detail and bench and imaging data are shown, demonstrating the ability to perform phase and amplitude control for B1 shimming as well as dynamic modulation for transmitting complex RF pulses.”

For more information on this research see: A 64-Channel Transmitter for Investigating Parallel Transmit MRI. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2152-2160. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting K. Feng, Texas A&M University, Dept. of Biomed Engn, College Stn, TX 77801, United States. (2012 Sep 05)

### **Thorax Center, Rotterdam: Frequency domain multiplexing for speckle reduction in optical coherence tomography**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Optics are discussed in a new report. According to news reporting originating in Rotterdam, Netherlands, by NewsRx journalists, research stated, “Quantitative analysis of optical coherence tomography data can be strongly hampered by speckle. Here, we introduce a new method to reduce speckle, which leverages from Fourier-domain configurations and operates on individual axial scans.”

The news reporters obtained a quote from the research from Thorax Center, “By subdividing the digitized spectrum into a number of distinct narrower windows, each with a different center frequency, several independent speckle patterns result. These can be averaged to yield a lower-resolution image with strongly reduced speckle. The full resolution image remains available for human interpretation; the low resolution version can be used for parametric imaging or quantitative analysis.”

According to the news reporters, the researchers concluded: “We demonstrate this technique using intravascular optical frequency domain imaging data acquired in vivo.”

For more information on this research see: Frequency domain multiplexing for speckle reduction in optical coherence tomography. *Journal of Biomedical Optics*, 2012;17(7):076018.

Our news correspondents report that additional information may be obtained by contacting G. van Soest, Thorax Center, Erasmus MC, Rotterdam, Netherlands. (2012 Sep 05)

### **Tohoku University, Miyagi: Hemodynamics in the pulmonary artery of a patient with pneumothorax**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Miyagi, Japan, by NewsRx journalists, research stated, “Pneumothorax is characterized by lung collapse and an alteration of lung geometry, resulting in alterations of the pulmonary artery blood flow. Though many clinical studies and animal experiments have investigated the effects of pneumothorax on the hemodynamics of pulmonary arteries, its precise effects remain unclear.”

The news correspondents obtained a quote from the research from Tohoku University, “In this patient-specific study, we investigated the effects of lung deformation and vascular resistance increases due to pneumothorax on the pulmonary blood flow during the acute phase and after recovery. Arterial geometry was extracted up to the fifth generation from computed tomography images, and reconstructed. Computational fluid dynamic analysis was performed, for an unsteady laminar flow with resistance at the outlets, in a reconstructed domain. The results demonstrated a change in flow structure during systole between the acute phase and recovery, and were associated with variations in the flow rate ratio between the right and left lungs. We observed a parabolic-like decrease of the volume flow rate ratio in the affected lung as the resistance increased. Thus, the systemic artery blood oxygenation will rely more on the unaffected lung leading to improved oxygenation of the blood under high resistance in the affected lung.”

According to the news reporters, the researchers concluded: “These findings are significant in our understanding of ventilation function under a pneumothorax.”

For more information on this research see: Hemodynamics in the pulmonary artery of a patient with pneumothorax. *Medical Engineering & Physics*, 2012;34(6):725-732. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting J.J. Christophe, Tohoku University, Dept. of Radiol, Sendai, Miyagi 9808579, Japan. (2012 Sep 05)

### **University of Bern: Automatic scan planning for magnetic resonance imaging of the knee joint**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Bern, Switzerland, by NewsRx journalists, research stated, “Automatic scan planning for magnetic resonance imaging of the knee aims at defining an oriented bounding box around the knee joint from sparse scout images in order to choose the optimal field of view for the diagnostic images and limit acquisition time. We propose a fast and fully automatic method to perform this task based on the standard clinical scout imaging protocol.”

The news correspondents obtained a quote from the research from the University of Bern, “The method is based on sequential Chamfer matching of 2D scout feature images with a three-dimensional mean model of femur and tibia. Subsequently, the joint plane separating femur and tibia, which contains both menisci, can be automatically detected using an information-augmented active shape model on the diagnostic images. This can assist the clinicians in quickly defining slices with standardized and reproducible orientation, thus increasing diagnostic accuracy and also comparability of serial examinations. The method has been evaluated on 42 knee MR images.”

According to the news reporters, the researchers concluded: “It has the potential to be incorporated into existing systems because it does not change the current acquisition protocol.”

For more information on this research see: Automatic scan planning for magnetic resonance imaging of the knee joint. *Annals of Biomedical Engineering*, 2012;40(9):2033-42. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)



Our news journalists report that additional information may be obtained by contacting S. Bauer, Institute for Surgical Technology and Biomechanics, University of Bern, Stauffacherstr 78, 3014, Bern, Switzerland. (2012 Sep 05)

### **University of Calgary: Accelerating Cardiac Bidomain Simulations Using Graphics Processing Units**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating in Calgary, Canada, by NewsRx journalists, research stated, “Anatomically realistic and biophysically detailed multiscale computer models of the heart are playing an increasingly important role in advancing our understanding of integrated cardiac function in health and disease. Such detailed simulations, however, are computationally vastly demanding, which is a limiting factor for a wider adoption of in-silico modeling.”

The news reporters obtained a quote from the research from the University of Calgary, “While current trends in high-performance computing (HPC) hardware promise to alleviate this problem, exploiting the potential of such architectures remains challenging since strongly scalable algorithms are necessitated to reduce execution times. Alternatively, acceleration technologies such as graphics processing units (GPUs) are being considered. While the potential of GPUs has been demonstrated in various applications, benefits in the context of bidomain simulations where large sparse linear systems have to be solved in parallel with advanced numerical techniques are less clear. In this study, the feasibility of multi-GPU bidomain simulations is demonstrated by running strong scalability benchmarks using a state-of-the-art model of rabbit ventricles. The model is spatially discretized using the finite element methods (FEM) on fully unstructured grids. The GPU code is directly derived from a large pre-existing code, the Cardiac Arrhythmia Research Package (CARP), with very minor perturbation of the code base. Overall, bidomain simulations were sped up by a factor of 11.8 to 16.3 in benchmarks running on 620 GPUs compared to the same number of CPU cores.”

According to the news reporters, the researchers concluded: “To match the fastest GPU simulation which engaged 20 GPUs, 476 CPU cores were required on a national supercomputing facility.”

For more information on this research see: Accelerating Cardiac Bidomain Simulations Using Graphics Processing Units. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2281-2290. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers

- <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting A. Neic, University of Calgary, Dept. of Elect & Comp Engn, Calgary, AB T2N 1N4, Canada. (2012 Sep 05)

### **University of California, Los Angeles: An Implantable RF Solenoid for Magnetic Resonance Microscopy and Microspectroscopy**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Los Angeles, California, by NewsRx correspondents, research stated, “Miniature solenoids routinely enhance small volume nuclear magnetic resonance imaging and spectroscopy; however, no such techniques exist for patients. We present an implantable microcoil for diverse clinical applications, with a microliter coil volume.”

Our news editors obtained a quote from the research from the University of California, “The design is loosely based on implantable depth electrodes, in which a flexible tube serves as the substrate, and a metal stylet is inserted into the tube during implantation. The goal is to provide enhanced signal-to-noise ratio (SNR) of structures that are not easily accessed by surface coils. The first-generation prototype was designed for implantation up to 2 cm, and provided initial proof-of-concept for microscopy. Subsequently, we optimized the design to minimize the influence of lead inductances, and to thereby double the length of the implantable depth (4 cm). The second-generation design represents an estimated SNR improvement of over 30% as compared to the original design when extended to 4 cm. Impedance measurements indicate that the device is stable for up to 24 h in body temperature saline. We evaluated the SNR and MR-related heating of the device at 3T.”

According to the news editors, the researchers concluded: “The implantable microcoil can differentiate fat and water peaks, and resolve submillimeter features.”

For more information on this research see: An Implantable RF Solenoid for Magnetic Resonance Microscopy and Microspectroscopy. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2118-2125. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting D.S. Rivera, University of California, Neuroengn Interdept Program, Los Angeles, CA 94607, United States. (2012 Sep 05)

### **University of Florida, Gainesville: Voxelized Computational Model for Convection-Enhanced Delivery in the Rat Ventral Hippocampus: Comparison with In Vivo MR Experimental Studies**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Central Nervous System Diseases. According to news reporting originating in Gainesville, Florida, by NewsRx journalists, research stated, “Convection-enhanced delivery (CED) is a promising local delivery technique for overcoming the blood-brain barrier (BBB) and treating diseases of the central nervous system (CNS). For CED, therapeutics are infused directly into brain tissue and the drug agent is spread through the extracellular space, considered to be highly tortuous porous media.”

The news reporters obtained a quote from the research from the University of Florida, “In this study, 3D computational models developed using magnetic resonance (MR) diffusion tensor imaging data sets were used to predict CED transport in the rat ventral hippocampus using a voxelized modeling previously developed by our group. Predicted albumin tracer distributions were compared with MR-measured distributions from in vivo CED in the ventral hippocampus up to 10 L of Gd-DTPA albumin tracer infusion. Predicted and measured tissue distribution volumes and distribution patterns after 5 and 10 L infusions were found to be comparable. Tracers were found to occupy the underlying landmark structures with preferential transport found in regions with less fluid resistance such as the molecular layer of the dentate gyrus. Also, tracer spread was bounded by high fluid resistance layers such as the granular cell layer and pyramidal cell layer of dentate gyrus.”

According to the news reporters, the researchers concluded: “Leakage of tracers into adjacent CSF spaces was observed towards the end of infusions.”

For more information on this research see: Voxelized Computational Model for Convection-Enhanced Delivery in the Rat Ventral Hippocampus: Comparison with In Vivo MR Experimental Studies. *Annals of Biomedical Engineering*, 2012;40(9):2043-58. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting J.H. Kim, Dept. of Mechanical and Aerospace Engineering, University of Florida, 212 MAE-A, PO Box 116250, Gainesville, FL, 32611-6250, United States. (2012 Sep 05)

## **University of Iowa, Iowa City: Effect of Shear Force on Intervertebral Disc (IVD) Degeneration: An In Vivo Rat Study**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting from Iowa City, Iowa, by NewsRx journalists, research stated, “Mechanical stress on the intervertebral disc (IVD) may contribute significantly to IVD degeneration, although its pathomechanism has not been fully understood. The purpose of this study was to test the hypothesis that sustained application of static shear force would result in IVD degeneration with minimum injury.”

The news correspondents obtained a quote from the research from the University of Iowa, “We applied shear force on the rat lumbar spine (L5-L6) using a custom-designed loading device for 1 or 2 weeks. Degenerative changes such as nucleus pulposus cavity loss and border disruption were observed from the histology sections, indicating that the application of sustained dorsoventral shear force on the L6 vertebra induced degeneration of the IVDs in L5-L6 and adjacent levels of motion segment in 1 and 2 weeks.”

According to the news reporters, the researchers concluded: “The findings of the present study could be useful for gaining a more relevant understanding of the biomechanical load factors of IVD degeneration not only for enabling better therapeutic interventions but also reducing the risk of low back injury.”

For more information on this research see: Effect of Shear Force on Intervertebral Disc (IVD) Degeneration: An In Vivo Rat Study. *Annals of Biomedical Engineering*, 2012;40(9):1996-2004. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting J. Kim, Dept. of Biomedical Engineering, University of Iowa, 1402 Seamans Center, Iowa City, IA, 52242, United States. (2012 Sep 05)

## **University of London Imperial College: A Robust and Sensitive Metric for Quantifying Movement Smoothness**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from London, United Kingdom, by NewsRx correspondents, research stated, “The need for movement smoothness quantification to assess motor learning and recovery has resulted in various measures that look at different aspects of a movement’s profile. This paper

first shows that most of the previously published smoothness measures lack validity, consistency, sensitivity, or robustness.”

Our news journalists obtained a quote from the research from the University of London Imperial College, “It then introduces and evaluates the spectral arc-length metric that uses a movement speed profile’s Fourier magnitude spectrum to quantify movement smoothness. This new metric is systematically tested and compared to other smoothness metrics, using experimental data from stroke and healthy subjects as well as simulated movement data. The results indicate that the spectral arc-length metric is a valid and consistent measure of movement smoothness, which is both sensitive to modifications in motor behavior and robust to measurement noise.”

According to the news editors, the researchers concluded: “We hope that the systematic analysis of this paper is a step toward the standardization of the quantitative assessment of movement smoothness.”

For more information on this research see: A Robust and Sensitive Metric for Quantifying Movement Smoothness. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2126-2136. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from S. Balasubramanian, University of London Imperial College, Dept. of Bioengn, London SW7 2AZ, United Kingdom. (2012 Sep 05)

### **University of Michigan, Ann Arbor: Quantitative Analysis of Molecular Absorption into PDMS Microfluidic Channels**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Ann Arbor, Michigan, by NewsRx journalists, research stated, “Microfluidic devices fabricated using poly(dimethylsiloxane) (PDMS) polymer are routinely used for in vitro cell culture for a wide range of cellular assays. These assays typically involve the incubation of cultured cells with a drug molecule or a fluorescent marker while monitoring a cellular response.”

The news correspondents obtained a quote from the research from the University of Michigan, “The accuracy of these assays depends on achieving a consistent and reproducible concentration of solute molecules in solution. However, hydrophobic therapeutic and fluorescent molecules tend to diffuse into the PDMS walls of the microfluidic devices, which reduce their concentration in solution and consequently

affect the accuracy and reliability of these assays. In this paper, we quantitatively investigate the relationship between the partition coefficient ( $\log P$ ) of a series of markers routinely used in in vitro cellular assays including [3H]-dexamethasone, [3H]-diazepam, [14C]-mannitol, [3H]-phenytoin, and rhodamine 6G and their absorption into PDMS microfluidic channels. Our results show that the absorption of a given solute into PDMS depends on the hydrophilic/hydrophobic balance defined by its  $\log P$  value. Specifically, results demonstrate that molecules with  $\log P$  less than 2.47 exhibit minimal absorption ( $\leq 10\%$ ) into PDMS channels whereas molecules with  $\log P$  larger than 2.62 exhibit extensive absorption ( $\geq 90\%$ ) into PDMS channels.”

According to the news reporters, the researchers concluded: “Further investigations showed that TiO<sub>2</sub> and glass coatings of PDMS channels reduced the absorption of hydrophobic molecules ( $\log P \geq 2.62$ ) by 2- and 4.”

For more information on this research see: Quantitative Analysis of Molecular Absorption into PDMS Microfluidic Channels. *Annals of Biomedical Engineering*, 2012;40(9):1862-73. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting J.D. Wang, Dept. of Biomedical Engineering, University of Michigan, 1101 Beal Avenue, Ann Arbor, MI, 48109, United States. (2012 Sep 05)

### **University of Minnesota, Minneapolis: A sensitive capillary GC-MS method for analysis of topiramate from plasma obtained from single-dose studies**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Brain Diseases are presented in a new report. According to news reporting originating in Minneapolis, Minnesota, by NewsRx journalists, research stated, “Topiramate (Topamax®) is an antiepileptic medication used as adjunctive and monotherapy in patients with epilepsy and for migraine prophylaxis. A GC-MS assay was developed that was capable of detecting topiramate plasma concentrations following a single rectal or oral dose administration.”

The news reporters obtained a quote from the research from the University of Minnesota, “Topiramate plasma samples were prepared by solid-phase extraction and were quantified by GC-MS analysis. The topiramate standard curves were split from 0.1 to 4 g/mL and from 4 to 40 g/mL in order to give a more accurate determination of the topiramate concentration. The accuracy of the standards ranged from 94.6 to 107.3% and the precision (%CV) ranged from 1.0 to 5.3% for both curves at all concentrations. The %CV for quality controls was  $\leq 7.6\%$ .”

According to the news reporters, the researchers concluded: “The assay is both accurate and precise and will be used to complete future pharmacokinetic studies.”

For more information on this research see: A sensitive capillary GC-MS method for analysis of topiramate from plasma obtained from single-dose studies. *Biomedical Chromatography*, 2012;26(9):1071-6. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-0801](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-0801))

Our news correspondents report that additional information may be obtained by contacting J.M. Conway, Experimental and Clinical Pharmacology, College of Pharmacy, University of Minnesota, Minneapolis, MN, United States. (2012 Sep 05)

### **University of Rostock: Ex Vivo Measurement of Postmortem Tissue Changes in the Crystalline Lens by Brillouin Spectroscopy and Confocal Reflectance Microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Rostock, Germany, by NewsRx journalists, research stated, “Use of Brillouin spectroscopy in ophthalmology enables non-invasive, spatially resolved determination of the rheological properties of crystalline lens tissue. Furthermore, the Brillouin shift correlates with the protein concentration inside the lens.”

The news correspondents obtained a quote from the research from the University of Rostock, “In vitro measurements on extracted porcine lenses demonstrate that results obtained with Brillouin spectroscopy depend strongly on time after death. The intensity of the Brillouin signal decreases significantly as early as 5 h postmortem. Moreover, the fluctuation of the Brillouin frequency shift inside the lens increases with postmortem time. Images of lens tissue taken with a confocal reflectance microscope between measurements reveal a degenerative aging process. These tissue changes correlate with our results from Brillouin spectroscopy.”

According to the news reporters, the researchers concluded: “It is concluded that only in vivo measurements appropriately reflect the rheological properties of the eye lens and its protein concentration.”

For more information on this research see: Ex Vivo Measurement of Postmortem Tissue Changes in the Crystalline Lens by Brillouin Spectroscopy and Confocal Reflectance Microscopy. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2348-2354. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical

Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting S. Reiss, University of Rostock, Dept. of Ophthalmol, D-18055 Rostock, Germany. (2012 Sep 05)

### **University of St. Andrews: Fluorescence suppression using wavelength modulated Raman spectroscopy in fiber-probe-based tissue analysis**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Optics have been presented. According to news reporting originating from St. Andrews, United Kingdom, by NewsRx correspondents, research stated, “In the field of biomedical optics, Raman spectroscopy is a powerful tool for probing the chemical composition of biological samples. In particular, fiber Raman probes play a crucial role for in vivo and ex vivo tissue analysis.”

Our news editors obtained a quote from the research from the University of St. Andrews, “However, the high-fluorescence background typically contributed by the auto fluorescence from both a tissue sample and the fiber-probe interferes strongly with the relatively weak Raman signal. Here we demonstrate the implementation of wavelength-modulated Raman spectroscopy (WMRS) to suppress the fluorescence background while analyzing tissues using fiber Raman probes. We have observed a significant signal-to-noise ratio enhancement in the Raman bands of bone tissue, which have a relatively high fluorescence background. Implementation of WMRS in fiber-probe-based bone tissue study yielded usable Raman spectra in a relatively short acquisition time (~30??s), notably without any special sample preparation stage.”

According to the news editors, the researchers concluded: “Finally, we have validated its capability to suppress fluorescence on other tissue samples such as adipose tissue derived from four different species.”

For more information on this research see: Fluorescence suppression using wavelength modulated Raman spectroscopy in fiber-probe-based tissue analysis. *Journal of Biomedical Optics*, 2012;17(7):077006.

The news editors report that additional information may be obtained by contacting B.B. Praveen, University of St Andrews, SUPA, School of Physics & Astronomy, North Haugh, St Andrews, Fife, Scotland KY16 9SS, UK. (2012 Sep 05)



## University of Sussex, Brighton: Bioimpedance Analysis for the Characterization of Breast Cancer Cells in Suspension

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating in Brighton, United Kingdom, by NewsRx journalists, research stated, “The bioimpedance spectroscopy (BIS) technique is potentially a useful tool to differentiate malignancy based on the variation of electrical properties presented by different tissues and cells. The different tissues and cells present variant electrical resistance and reactance when excited at different frequencies.”

The news reporters obtained a quote from the research from the University of Sussex, “The main purpose of this area of research is to use impedance measurements over a low-frequency bandwidth ranging from 1 kHz to 3 MHz to 1) differentiate the pathological stages of cancer cells under laboratory conditions and 2) permit the extraction of electrical parameters related to cellular information for further analysis. This provides evidence to form the basis of bioimpedance measurement at the cellular level and aids the potential future development of rapid diagnostics from biopsy materials. Three cell lines, representing normal breast epithelia and different pathological stages of breast cancer, have been measured using a standard impedance analyzer driving a four-electrode chamber filled with different cell suspensions. We identify the specific BIS profile for each cell type and determine whether these can be differentiated.”

According to the news reporters, the researchers concluded: “In addition, the electrical parameters, e. g., the intracellular conductivity, membrane capacitance/capacity, characteristic frequency, are extracted by the use of equivalent circuit models and physical models to provide details of the cell electric signatures for further analysis of cancer cell pathology.”

For more information on this research see: Bioimpedance Analysis for the Characterization of Breast Cancer Cells in Suspension. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2321-2329. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting G.F. Qiao, University of Sussex, Dept. of Biochem, Brighton BN1 9RH, E Sussex, United Kingdom. (2012 Sep 05)

## University of Warwick, Coventry: Robust Smoothing of Quantitative Genomic Data Using Second-Generation Wavelets and Bivariate Shrinkage

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Coventry, United Kingdom, by NewsRx editors, the research stated, “Recent high-throughput nucleotide sequencing technologies provide large amounts of quantitative genomic data, and thus, biologists currently need to process vast quantities of the data on a regular basis. The first step of the process is almost always smoothing of the data because biomedical data generally tend to contain a lot of noise.”

The news reporters obtained a quote from the research from the University of Warwick, “In this first step, classical wavelet transforms are widely used; however, the second-generation wavelet transform has not been used in biomedical studies. Smoothing based on the second-generation wavelets is more effective than classical wavelets-based methods because it employs data-dependent wavelet functions and does not require predefined explicit base functions. Since biomedical data usually lack regularity, it is more useful in biomedical research to use the second-generation wavelets than to use the classical wavelets. Therefore, we propose a novel smoothing method based on the second-generation wavelets and bivariate shrinkage, which enables to determine robust thresholds for wavelet-based smoothing, and apply it to synthetic and real genomic data.”

According to the news reporters, the researchers concluded: “Experimental results demonstrate the effectiveness of the proposed method.”

For more information on this research see: Robust Smoothing of Quantitative Genomic Data Using Second-Generation Wavelets and Bivariate Shrinkage. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2099-2102. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting H. Hatsuda, University of Warwick, Dept. of Stat, Coventry CV4 7AL, W Midlands, United Kingdom. (2012 Sep 05)

## **Wenzhou Medical College: Anterior corneal asphericity calculated by the tangential radius of curvature**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news reporting originating in Wenzhou, People's Republic of China, by NewsRx journalists, research stated, “We propose a method of calculating the corneal asphericity (Q) and analyze the characteristics of the anterior corneal shape using the tangential radius. Fifty-eight right eyes of 58 subjects were evaluated using the Orbscan II corneal topographer.”

The news reporters obtained a quote from the research from Wenzhou Medical College, “The Q-values of the flat principal semi-meridians calculated by the sagittal radius were compared to those by the tangential radius. Variation in the Q-value with semi-meridian in the nasal and temporal cornea calculated by the tangential radius was analyzed. There were significant differences in Q-values ( $p < 0.001$ ) between the two methods. The mean Q-values of the flat principal semi-meridians calculated by tangential radius with  $-0.33 \pm 0.10$  in the nasal and  $-0.22 \pm 0.12$  in the temporal showed more negative than the corresponding Q-values calculated by the sagittal radius. The Q-values calculated by tangential radius became less negative gradually from horizontal semi-meridians to oblique semi-meridians in both nasal and temporal cornea. Variation in Q-value with semi-meridian was more obvious in the nasal cornea. The method of calculating corneal Q using the tangential radius could provide more reasonable and complete Q-value than that by the sagittal radius.”

According to the news reporters, the researchers concluded: “The model of a whole anterior corneal surface could be reconstructed on the basis of the above method.”

For more information on this research see: Anterior corneal asphericity calculated by the tangential radius of curvature. *Journal of Biomedical Optics*, 2012;17(7):075005.

Our news correspondents report that additional information may be obtained by contacting J. Ying, Dept. of Ophthalmology, The Second Affiliated Hospital of Wenzhou Medical College, XueYuan west Road 109, Wenzhou 325027, People's Taiwan. (2012 Sep 05)

## **Zhejiang University, Hangzhou: A Novel Method for Automatic Identification of Motion Artifact Beats in ECG Recordings**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Hangzhou, People's Republic of China, by NewsRx correspondents, research stated, "This paper presents a novel method for automatic identification of motion artifact beats in ECG recordings. The proposed method is based on the ECG complexes clustering, fuzzy logic and multi-parameters decision."

Our news journalists obtained a quote from the research from Zhejiang University, "Firstly, eight simulated datasets with different signal-to-noise ratio (SNR) were built for identification experiments. Results show that the identification sensitivity of our method is sensitive to SNR levels and acts like a low-pass filter that matches the cardiologists' recognition, while the Norm FP rate and PVB FP rate keep significantly low regardless of SNR. Furthermore, a simulated dataset including random durations of motion activities superimposed segments and two clinical datasets acquired from two different commercial recorders were adopted for the evaluation of accuracy and robustness. The overall identification results on these datasets were: sensitivity  $\geq 94.69\%$ , Norm FP rate  $\leq 0.60\%$  and PVB FP rate  $\leq 2.65\%$ . All the results were obtained without any manual threshold adjustment according to the priori information, thus dissolving the drawbacks of previous published methods."

According to the news editors, the researchers concluded: "Additionally, the total cost time of our method applied to 24 h recordings is less than 1 s, which is extremely suitable in the situation of magnanimity data in long-term ECG recordings."

For more information on this research see: A Novel Method for Automatic Identification of Motion Artifact Beats in ECG Recordings. *Annals of Biomedical Engineering*, 2012;40(9):1917-28. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from Y. Tu, Bio-analytical Instruments Lab, Dept. of Biomedical Engineering, Zhejiang University, Hangzhou, People's Taiwan. (2012 Sep 05)

## **Chang Gung University, Taoyuan: Epigenetic silencing of ribosomal RNA genes by Mybbp1a**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Cell Proliferation. According to news reporting originating from Taoyuan, Taiwan, by NewsRx correspondents, research stated, “Transcription of the ribosomal RNA gene repeats by Pol I occurs in the nucleolus and is a fundamental step in ribosome biogenesis and protein translation. Due to tight coordination between ribosome biogenesis and cell proliferation, transcription of rRNA and stable maintenance of rDNA clusters are thought to be under intricate control by intercalated mechanisms, particularly at the epigenetic level.”

Our news editors obtained a quote from the research from Chang Gung University, “Here we identify the nucleolar protein Myb-binding protein 1a (Mybbp1a) as a novel negative regulator of rRNA expression. Suppression of rDNA transcription by Mybbp1a was linked to promoter regulation as illustrated by its binding to the chromatin around the hypermethylated, inactive rDNA gene promoters. Our data further showed that downregulation of Mybbp1a abrogated the local DNA methylation levels and histone marks associated with gene silencing, and altered the promoter occupancy of various factors such as UBF and HDACs, consequently leading to elevated rRNA expression. Mechanistically, we propose that Mybbp1a maintains rDNA repeats in a silenced state while in association with the negative epigenetic modifiers HDAC1/2. Results from our present work reveal a previously unrecognized co-repressor role of Mybbp1a in rRNA expression.”

According to the news editors, the researchers concluded: “They are further consistent with the scenario that Mybbp1a is an integral constituent of the rDNA epigenetic regulation that underlies the balanced state of rDNA clusters.”

For more information on this research see: Epigenetic silencing of ribosomal RNA genes by Mybbp1a. *Journal of Biomedical Science*, 2012;19():1-11. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

The news editors report that additional information may be obtained by contacting B.C.M. Tan, Chang Gung University, Mol Med Res Center, Tao Yuan 333, Taiwan. (2012 Sep 04)

**Chinese Academy of Sciences, Shanghai: Systematic screening and characterization of the major bioactive components of *Poria cocos* and their metabolites in rats by LC-ESI-MS(n)**

By a News Reporter-Staff News Editor at China Weekly News – New research on Biomedical Chromatography is the subject of a report. According to news reporting out of Shanghai, People’s Republic of China, by VerticalNews editors, research stated, “*Poria cocos* is a well-known medicinal plant widely used in China and other East Asian countries owing to its various therapeutic effects. However, the bioactive constituents responsible for the pharmacological effects of *Poria cocos* and their metabolites in vivo are still unclear to date.”

Our news journalists obtained a quote from the research from the Chinese Academy of Sciences, “The aim of the present study was to develop a practical method based on the combined use of the liquid chromatography coupled with electrospray ionization multistage tandem mass spectrometry (LC-ESI-MS(n)) for the comprehensive and systematic separation and characterization of the bioactive constituents of *Poria cocos* extract and their metabolites in rats. Based on the proposed strategy, a total of 34 compounds were characterized from the extract of *Poria cocos*. Among them, eight were unambiguously identified by comparing their retention times and mass spectra with those of reference standards, and 26 were tentatively identified on the basis of their MS(n) fragmentation behaviors and molecular weight information from literatures. In vivo, seven compounds were successfully detected in rat urine whereas one was found in rat plasma.”

According to the news editors, the researchers concluded: “This study proposed a series of potential bioactive components and provided helpful chemical information for further research on the action mechanism of traditional Chinese medicine.”

For more information on this research see: Systematic screening and characterization of the major bioactive components of *Poria cocos* and their metabolites in rats by LC-ESI-MS(n). *Biomedical Chromatography*, 2012;26(9):1109-17. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-0801)

Our news journalists report that additional information may be obtained by contacting Y. Ling, Shanghai Institute of Materia Medica, Chinese Academy of Sciences, Shanghai, 201203, People’s Taiwan. (2012 Sep 04)

### **Dresden University of Technology: Endoscopic optical coherence tomography device for forward imaging with broad field of view**

By a News Reporter-Staff News Editor at Journal of Technology – Data detailed on Biomedical Optics have been presented. According to news originating from Dresden, Germany, by VerticalNews correspondents, research stated, “One current challenge of studying human tympanic membranes &#8482; with optical coherence tomography (OCT) is the implementation of optics that avoid direct contact with the inflamed tissue. At the moment, no commercial device is available.”

Our news journalists obtained a quote from the research from the Dresden University of Technology, “We report an optics design for contactless forward imaging endoscopic optical coherence tomography (EOCT) with a large working distance (WD) and a broad field of view (FOV) by restricting the overall diameter of the probe to be small (3.5 mm), ensuring a sufficient numerical aperture. Our system uses a gradient-index (GRIN) relay lens and a GRIN objective lens, and executes a fan-shaped optical scanning pattern. The WD and FOV can be adjusted by manually changing the distance between the triplet and the GRIN relay lens. The measured lateral resolution is ~28??m at a WD of 10 mm with a FOV of 10 mm. Additionally, a camera and an illumination beam path were implemented within the probe for image guidance during investigations of the TM.”

According to the news editors, the researchers concluded: “We demonstrated the performance of the EOCT design by 3-D imaging of a human TM ex vivo and in vivo with a k-linear spectral domain OCT system.”

For more information on this research see: Endoscopic optical coherence tomography device for forward imaging with broad field of view. *Journal of Biomedical Optics*, 2012;17(7):071302.

The news correspondents report that additional information may be obtained from A. Burkhardt, Dresden University of Technology, Faculty of Medicine Carl Gustav Carus, Dept. of Clinical Sensing and Monitoring, Fetscherstr 74, 01307 Dresden, Germany. (2012 Sep 04)

### **Dresden University of Technology: Three-dimensional simultaneous optical coherence tomography and confocal fluorescence microscopy for investigation of lung tissue**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Optics are presented in a new report. According to news reporting originating from Dresden, Germany, by NewsRx correspondents, research stated, “Although several strategies exist for a minimal-invasive treatment of patients with lung failure, the mortality

rate of acute respiratory distress syndrome still reaches 30% at minimum. This striking number indicates the necessity of understanding lung dynamics on an alveolar level.”

Our news editors obtained a quote from the research from the Dresden University of Technology, “To investigate the dynamical behavior on a microscale, we used three-dimensional geometrical and functional imaging to observe tissue parameters including alveolar size and length of embedded elastic fibers during ventilation. We established a combined optical coherence tomography (OCT) and confocal fluorescence microscopy system that is able to monitor the distension of alveolar tissue and elastin fibers simultaneously within three dimensions. The OCT system can laterally resolve a 4.9  $\mu\text{m}$  line pair feature and has an approximately 11  $\mu\text{m}$  full-width-half-maximum axial resolution in air. confocal fluorescence microscopy visualizes molecular properties of the tissue with a resolution of 0.75  $\mu\text{m}$  (laterally), and 5.9  $\mu\text{m}$  (axially) via fluorescence detection of the dye sulforhodamine B specifically binding to elastin. For system evaluation, we used a mouse model in situ to perform lung distension by application of different constant pressure values within the physiological regime.”

According to the news editors, the researchers concluded: “Our method enables the investigation of alveolar dynamics by helping to reveal basic processes emerging during artificial ventilation and breathing.”

For more information on this research see: Three-dimensional simultaneous optical coherence tomography and confocal fluorescence microscopy for investigation of lung tissue. *Journal of Biomedical Optics*, 2012;17(7):071310.

The news editors report that additional information may be obtained by contacting M. Gaertner, Dresden University of Technology, Clinical Sensing and Monitoring, Faculty of Medicine Carl Gustav Carus, Fetscherstrasse 74, 01307 Dresden, Germany. (2012 Sep 04)

### **Medical Center, Winston Salem: External landmark, body surface, and volume data of a mid-sized male in seated and standing postures**

By a News Reporter-Staff News Editor at Telemedicine Week – Investigators publish new report on Bone Research. According to news originating from Winston Salem, North Carolina, by NewsRx correspondents, research stated, “The purpose of this study was to acquire external landmark, undeformed surface, and volume data from a pre-screened individual representing a mid-sized male (height 174.9 cm, weight 78.6  $\pm$  0.77 kg) in the seated and standing postures. The individual matched the 50th percentile value of 15 measures of external



anthropometry from previous anthropometric studies with an average deviation of 3%.”

Our news journalists obtained a quote from the research from Medical Center, “As part of a related study, a comprehensive full body medical image data set was acquired from the same individual on whom landmark data were collected. Three dimensional bone renderings from this data were used to visually verify the landmark and surface results. A total of 54 landmarks and external surface data were collected using a 7-axis digitizer. A seat buck designed in-house with removable back and seat pan panels enabled collection of undeformed surface contours of the back, buttocks, and posterior thigh. Eight metrics describing the buck positioning are provided. A repeatability study was conducted with three trials to assess intra-observer variability. Total volume and surface area of the seated model were found to be  $75.8 \times 10(3) \text{ cm}(3)$  and  $18.6 \times 10(3) \text{ cm}(2)$  and match the volume and surface area of the standing posture within 1%. Root mean squared error values from the repeatability study were on average 5.9 and 6.6 mm for the seated and standing postures respectively. The peak RMS error as a percentage of the centroid size of the landmark data sets were 3% for both the seated and standing trials. The data were collected as part of a global program on the development of an advanced human body model for blunt injury simulation.”

According to the news editors, the researchers concluded: “In addition, the reported data can be used for many diverse applications of biomechanical research such as ergonomics and morphometrics studies.”

For more information on this research see: External landmark, body surface, and volume data of a mid-sized male in seated and standing postures. *Annals of Biomedical Engineering*, 2012;40(9):2019-32. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from F.S. Gayzik, VT-WFU Center for Injury Biomechanics, Medical Center Blvd, Winston-Salem, NC, 27157, United States. (2012 Sep 04)

### **Tampere University of Technology: Multilead Measurement System for the Time-Domain Analysis of Bioimpedance Magnitude**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedical Engineering. According to news reporting out of Tampere, Finland, by NewsRx editors, research stated, “Bioimpedance measurement applications range from the characterization of organic matter to the monitoring of biological signals and

physiological parameters. Occasionally, multiple bioimpedances measured in different locations are combined in order to solve complex problems or produce enhanced physiological measures.”

Our news journalists obtained a quote from the research from the Tampere University of Technology, “The present multilead bioimpedance measurement methods are mainly focused on electrical impedance tomography. Systems designed to suit other multilead applications are lacking. In this study, a novel multilead bioimpedance measurement system was designed. This was particularly aimed at the time-domain analysis of bioimpedance magnitude. Frequency division multiplexing was used to avoid overlapping between excitation signals; undersampling, to reduce the hardware requirements; and power isolated active current sources, to reduce the electrical interactions between leads. These theoretical concepts were implemented on a prototype device. The prototype was tested on equivalent circuits and a saline tank in order to assess excitation signal interferences and electrical interactions between leads. The results showed that the proposed techniques are functional and the system’s validity was demonstrated on a real application, multilead impedance pneumography. Potential applications and further improvements were discussed.”

According to the news editors, the researchers concluded: “It was concluded that the novel approach potentially enables accurate and relatively low-power multilead bioimpedance measurements systems.”

For more information on this research see: Multilead Measurement System for the Time-Domain Analysis of Bioimpedance Magnitude. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2273-2280. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting J. Gracia, Tampere Univ Technol, Dept. of Biomed Engn, FIN-33720 Tampere, Finland. (2012 Sep 04)

### **Tianjin Medical University: Expression of Nucleophosmin/NPM1 correlates with migration and invasiveness of colon cancer cells**

By a News Reporter-Staff News Editor at Cancer Weekly – Research findings on Colon Cancer are discussed in a new report. According to news originating from Tianjin, People’s Republic of China, by NewsRx correspondents, research stated, “We aimed to examine the expression level of Nucleophosmin (NPM1) protein in colon cancer tissues and to

investigate the potential role of NPM1 in the regulation of cell migration and invasiveness. Immunohistochemical assay was performed to examine the expression pattern of NPM1 in 31 groups of colonic carcinoma samples, including colon tumors, adjacent normal tissues, and matched metastatic lymph nodes from the same patients.”

Our news journalists obtained a quote from the research from Tianjin Medical University, “Small interfering RNA technique and exogenous expression of wild type NPM1 methods were used to further verify the function of NPM1. High-expression of NPM1 correlates with lymph node metastasis ( $P = 0.0003$ ) and poor survival rate of human colon cancer patients ( $P = 0.017$ ). SiRNA-mediated reduction of NPM1 was also shown to inhibit the migration and invasiveness of metastatic colon cancer HCT116 cell line. In addition, the exogenous expression of NPM1 in HT29 cells, a NPM1 low expression and low invasive colon cancer cell line, enhanced cell migration and invasiveness along with increased cell proliferation.”

According to the news editors, the researchers concluded: “The current study uncovered the critical role of NPM1 in the regulation of colon cancer cells migration and invasion, and NPM1 may serve as a potential marker for the prognosis of colon cancer patients.”

For more information on this research see: Expression of Nucleophosmin/NPM1 correlates with migration and invasiveness of colon cancer cells. *Journal of Biomedical Science*, 2012;19(0):1-10. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

The news correspondents report that additional information may be obtained from Y. Liu, Tianjin Med Univ, Canc Inst & Hosp, Res Center Basic Med Sci, Key Lab Breast Canc Prevent & TherapyMinist Educ, Tianjin 300060, People’s Republic of China. (2012 Sep 04)

### **Tsinghua University, Beijing: Label-free subcellular 3D live imaging of preimplantation mouse embryos with full-field optical coherence tomography**

By a News Reporter-Staff News Editor at Medical Imaging Law Weekly – Investigators discuss new findings in Biomedical Optics. According to news reporting originating from Beijing, People’s Republic of China, by NewsRx correspondents, research stated, “Early patterning and polarity is of fundamental interest in preimplantation embryonic development. Label-free subcellular 3D live imaging is very helpful to its related studies.”

Our news editors obtained a quote from the research from Tsinghua University, “We have developed a novel system of full-field optical coherence tomography (FF-OCT) for noninvasive 3D subcellular live imaging of preimplantation mouse embryos with no need of dye labeling. 3D digitized embryos can be obtained by image processing. Label-free 3D live imaging is demonstrated for the mouse embryos at various typical preimplantation stages with a spatial resolution of 0.7 [micro sign]m and imaging rate of 24 fps. Factors that relate to early patterning and polarity, such as pronuclei in zygote, shapes of zona pellucida, location of second polar body, cleavage planes, and the blastocyst axis, can be quantitatively measured. The angle between the two second cleavage planes is accurately measured to be 87 deg.”

According to the news editors, the researchers concluded: “It is shown that FF-OCT provides a potential breakthrough for early patterning, polarity formation, and many other preimplantation-related studies in mammalian developmental biology.”

For more information on this research see: Label-free subcellular 3D live imaging of preimplantation mouse embryos with full-field optical coherence tomography. *Journal of Biomedical Optics*, 2012;17(7):070503.

The news editors report that additional information may be obtained by contacting J.G. Zheng, Tsinghua University, Dept. of Physics and State Key Lab of Low-Dimensional Quantum Physics, Beijing, People’s Taiwan. (2012 Sep 04)

### **University of Central Florida, Orlando: An Optimization-Based Study of Equivalent Circuit Models for Representing Recordings at the Neuron-Electrode Interface**

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on Neurons have been presented. According to news originating from Orlando, Florida, by NewsRx correspondents, research stated, “Extracellular neuroelectronic interfacing is an emerging field with important applications in the fields of neural prosthetics, biological computation, and biosensors. Traditionally, neuron-electrode interfaces have been modeled as linear point or area contact equivalent circuits but it is now being increasingly realized that such models cannot explain the shapes and magnitudes of the observed extracellular signals.”

Our news journalists obtained a quote from the research from the University of Central Florida, “Here, results were compared and contrasted from an unprecedented optimization-based study of the point contact models for an extracellular ‘on-cell’ neuron-patch electrode and a planar neuron-microelectrode interface. Concurrent electrophysiological recordings from a single neuron simultaneously interfaced to three

distinct electrodes (intracellular, ‘on-cell’ patch, and planar microelectrode) allowed novel insights into the mechanism of signal transduction at the neuron-electrode interface. After a systematic isolation of the nonlinear neuronal contribution to the extracellular signal, a consistent underestimation of the simulated suprathreshold extracellular signals compared to the experimentally recorded signals was observed. This conclusively demonstrated that the dynamics of the interfacial medium contribute nonlinearly to the process of signal transduction at the neuron-electrode interface. Further, an examination of the optimized model parameters for the experimental extracellular recordings from sub-and suprathreshold stimulations of the neuron-electrode junctions revealed that ionic transport at the ‘on-cell’ neuron-patch electrode is dominated by diffusion whereas at the neuron-microelectrode interface the electric double layer (EDL) effects dominate.”

According to the news editors, the researchers concluded: “Based on this study, the limitations of the equivalent circuit models in their failure to account for the nonlinear EDL and ionic electrodiffusion effects occurring during signal transduction at the neuron-electrode interfaces are discussed.”

For more information on this research see: An Optimization-Based Study of Equivalent Circuit Models for Representing Recordings at the Neuron-Electrode Interface. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2338-2347. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from V. Thakore, University of Central Florida, Biomol Sci Center, Orlando, FL 32826, United States. (2012 Sep 04)

### University of Cincinnati: Mapping Infected Cell Phenotype

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Bacterial Infections are presented in a new report. According to news reporting originating in Cincinnati, Ohio, by NewsRx journalists, research stated, “Quantitative modeling of the phenotypic changes in the host cell during the bacterial infection makes it possible to explore an empirical relation between the infection stages and the quantifiable host-cell phenotype. A statistically reliable model of this relation can facilitate therapeutic defense against threats due to natural and genetically engineered bacterium.”

The news reporters obtained a quote from the research from the University of Cincinnati, “In the preliminary experiment, we have collected several thousand cell images over a period of 72 h of infection with a 2-h sampling frequency that covers various stages of infection by *Francisella tularensis* (Ft). Segmentation of macrophages in images was accomplished using a fully automatic, parallel region growing technique. Over two thousand feature descriptors for the host cell were calculated. Multidimensional scaling, followed by hierarchical clustering, was used to group the cells.”

According to the news reporters, the researchers concluded: “Preliminary results show that the host-cell phenotype, as defined by the set of measureable features, groups into different classes that can be mapped to the stages of infection.”

For more information on this research see: Mapping Infected Cell Phenotype. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2362-2371. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting U. Adiga, University of Cincinnati, Center Drug Discovery, Cincinnati, OH 45237, United States. (2012 Sep 04)

### **University of Cyprus, Nicosia: Axial resolution improvement by modulated deconvolution in Fourier domain optical coherence tomography**

By a News Reporter-Staff News Editor at Journal of Technology – Investigators publish new report on Biomedical Optics. According to news reporting out of Nicosia, Cyprus, by VerticalNews editors, research stated, “A novel technique for axial resolution improvement in Fourier domain optical coherence tomography (FDOCT) is presented. The technique is based on the deconvolution of modulated optical coherence tomography signals.”

Our news journalists obtained a quote from the research from the University of Cyprus, “In FDOCT, the real part of the Fourier transform of the interferogram is modulated by a frequency which depends on the position of the interferogram in  $k$  space. A slight numerical  $k$  shift results in a different modulation frequency. By adding two shifted signals, beating can appear in the A-scan. When the amount of shifting is appropriately selected, deconvolution of the resulting depth profile, using suitable modulated kernels, yields a narrower resolution width.”

According to the news editors, the researchers concluded: “A resolution improvement by a factor of  $\sim 7$  can be achieved without the need for a broader bandwidth light source.”

For more information on this research see: Axial resolution improvement by modulated deconvolution in Fourier domain optical coherence tomography. *Journal of Biomedical Optics*, 2012;17(7):071307.

Our news journalists report that additional information may be obtained by contacting E. Bousi, University of Cyprus, KIOS Research Center for Intelligent Systems and Networks, Dept. of Electrical and Computer Engineering, 1678 Nicosia, Cyprus. (2012 Sep 04)

### **University of Delaware, Newark: Robust Closed-Loop Minimal Sampling Method for HIV Therapy Switching Strategies**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Virology have been published. According to news reporting out of Newark, Delaware, by NewsRx editors, research stated, “The emergence of drug-resistant strains of human immunodeficiency virus during antiretroviral therapy is a major cause of treatment failure and disease progression. Development of a resistant strain necessitates switching to a new antiretroviral regimen composed of novel drugs.”

Our news journalists obtained a quote from the research from the University of Delaware, “Recent work has shown that current methods of switching antiviral therapies carry significant unnecessary risk of subsequent failures, and optimal switching schedules to minimize this risk have been proposed. These switching schedules require frequent sampling of viral load during an induced phase of transient viral load reduction, with the goal of switching to the new antiviral regimen at an induced viral load minimum. The proposed frequent sampling carries an unacceptable level of cost both in terms of measurement expense and inconvenience to the patient. In this paper, we propose a closed-loop sampling algorithm to reduce the number of samples required to achieve the desired reduction in risk.”

According to the news editors, the researchers concluded: “We demonstrate through the Monte-Carlo analysis that the proposed method is able to robustly achieve an average 50% reduction in the number of required samples while maintaining a reduction in the risk of subsequent failure to under 3%, despite experimentally verified levels of model and measurement uncertainty.”

For more information on this research see: Robust Closed-Loop Minimal Sampling Method for HIV Therapy Switching Strategies. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2227-2234. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ

08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting E.F. Cardozo, University of Delaware, Dept. of Elect & Comp Engr, Newark, DE 19716, United States. (2012 Sep 04)

### **Center for Addiction and Mental Health, Toronto: A novel method for simultaneous 3D B(1) and T(1) mapping: the method of slopes (MoS)**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Current study results on Biomedicine have been published. According to news reporting from Toronto, Canada, by NewsRx journalists, research stated, “A novel three-dimensional simultaneous B(1) and T(1) mapping method is introduced: the method of slopes (MoS). The linearity of the spoiled gradient recalled echo (SPGR) signal vs flip angle relation is exploited: B(1) mapping is achieved by a two-point extrapolation to signal null with a correction scheme while T(1) mapping uses the slopes of the SPGR signal vs flip angle curves near the origin and near the signal null.”

The news correspondents obtained a quote from the research from Center for Addiction and Mental Health, “This new method improves upon the existing variable flip angle (VFA) T(1) -mapping method in that (i) consistency between B(1) and T(1) maps is ensured (ii) the sampling scheme is T(1) -independent (iii) the noise bias and singularity, associated with using a linear form for the SPGR signal equation, is eliminated by using the full equation. The method is shown to yield accurate and robust results via simulations. Initial estimates of B(1) and T(1) values are obtained from three data points via simple computations and straight line approximations. Initial estimates of B(1) values, for a range of values, are shown to be accurate due to the proposed B(1) correction scheme. The accuracy and robustness of T(1) values is achieved via a non-linear fitting algorithm which includes a fourth data point sampled at high SNR. The MoS was validated by comparing resulting B(1) and T(1) maps with those obtained using other standard methods. Finally, the ability to obtain brain B(1) and T(1) maps using the MoS was demonstrated by in vivo experiments.”

According to the news reporters, the researchers concluded: “The MoS is expected to perform well on other motion-free anatomical regions as well.”

For more information on this research see: A novel method for simultaneous 3D B(1) and T(1) mapping: the method of slopes (MoS). *Nmr In Biomedicine*, 2012;25(9):1043-55. (Wiley-Blackwell - <http://>



[www.wiley.com/](http://www.wiley.com/journal/10.1002/); *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news journalists report that additional information may be obtained by contacting S. Chavez, Research Imaging Centre, Centre for Addiction and Mental Health, Toronto, ON, Canada. (2012 Sep 03)

### **Macquarie University, North Ryde: Points of Interest and Visual Dictionaries for Automatic Retinal Lesion Detection**

By a News Reporter-Staff News Editor at Diabetes Week – Investigators publish new report on Pathology. According to news reporting out of North Ryde, Australia, by NewsRx editors, research stated, “In this paper, we present an algorithm to detect the presence of diabetic retinopathy (DR)-related lesions from fundus images based on a common analytical approach that is capable of identifying both red and bright lesions without requiring specific pre- or postprocessing. Our solution constructs a visual word dictionary representing points of interest (PoIs) located within regions marked by specialists that contain lesions associated with DR and classifies the fundus images based on the presence or absence of these PoIs as normal or DR-related pathology.”

Our news journalists obtained a quote from the research from Macquarie University, “The novelty of our approach is in locating DR lesions in the optic fundus images using visual words that combines feature information contained within the images in a framework easily extendible to different types of retinal lesions or pathologies and builds a specific projection space for each class of interest (e. g., white lesions such as exudates or normal regions) instead of a common dictionary for all classes. The visual words dictionary was applied to classifying bright and red lesions with classical cross validation and cross dataset validation to indicate the robustness of this approach. We obtained an area under the curve (AUC) of 95.3% for white lesion detection and an AUC of 93.3% for red lesion detection using fivefold cross validation and our own data consisting of 687 images of normal retinae, 245 images with bright lesions, 191 with red lesions, and 109 with signs of both bright and red lesions. For cross dataset analysis, the visual dictionary also achieves compelling results using our images as the training set and the RetiDB and Messidor images as test sets. In this case, the image classification resulted in an AUC of 88.1% when classifying the RetiDB dataset and in an AUC of 89.3% when classifying the Messidor dataset, both cases for bright lesion detection. The results indicate the potential for training with different acquisition images under different setup conditions with a high accuracy of referral based on the presence of either red or bright lesions or both.”

According to the news editors, the researchers concluded: “The robustness of the visual dictionary against image quality (blurring), resolution, and retinal background, makes it a strong candidate for DR screening of large, diverse communities with varying cameras and settings and levels of expertise for image capture.”

For more information on this research see: Points of Interest and Visual Dictionaries for Automatic Retinal Lesion Detection. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2244-2253. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting A. Rocha, Macquarie University, Australian Sch Adv Med, N Ryde, NSW 2113, Australia. (2012 Sep 03)

### **Scuola Superiore Sant’Anna, Pisa: Intention-Based EMG Control for Powered Exoskeletons**

By a News Reporter-Staff News Editor at Journal of Robotics & Machine Learning – Research findings on Robotics are discussed in a new report. According to news reporting from Pisa, Italy, by VerticalNews journalists, research stated, “Electromyographical (EMG) signals have been frequently used to estimate human muscular torques. In the field of human-assistive robotics, these methods provide valuable information to provide effectively support to the user.”

The news correspondents obtained a quote from the research from Scuola Superiore Sant’Anna, “However, their usability is strongly limited by the necessity of complex user-dependent and session-dependent calibration procedures, which confine their use to the laboratory environment. Nonetheless, an accurate estimate of muscle torque could be unnecessary to provide effective movement assistance to users. The natural ability of human central nervous system of adapting to external disturbances could compensate for a lower accuracy of the torque provided by the robot and maintain the movement accuracy unaltered, while the effort is reduced. In order to explore this possibility, in this paper we study the reaction of ten healthy subjects to the assistance provided through a proportional EMG control applied by an elbow powered exoskeleton. This system gives only a rough estimate of the user muscular torque but does not require any specific calibration.”

According to the news reporters, the researchers concluded: “Experimental results clearly show that subjects adapt almost instantaneously to the assistance provided by the robot and can reduce their effort while

keeping full control of the movement under different dynamic conditions (i.e., no alterations of movement accuracy are observed).”

For more information on this research see: Intention-Based EMG Control for Powered Exoskeletons. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2180-2190. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting T. Lenzi, Scuola Super Sant Anna, BioRobot Inst, I-56025 Pisa, Italy. (2012 Sep 03)

### **University of Alberta, Edmonton: Integrated micro-endoscopy system for simultaneous fluorescence and optical-resolution photoacoustic imaging**

By a News Reporter-Staff News Editor at Hematology Week – Researchers detail new data in Biomedical Optics. According to news reporting from Edmonton, Canada, by NewsRx journalists, research stated, “We present a new integrated micro-endoscopy system combining label-free, fiber-based, real-time C-scan optical-resolution photoacoustic microscopy (F-OR-PAM) and a high-resolution fluorescence micro-endoscopy system for visualizing fluorescently labeled cellular components and optically absorbing microvasculature simultaneously. With a diode-pumped 532-nm fiber laser, the F-OR-PAM sub-system is able to reach a resolution of ~7??m.”

The news correspondents obtained a quote from the research from the University of Alberta, “The fluorescence subsystem, which does not require any mechanical scanning, consists of a 447.5-nm-centered diode laser as the light source, an objective lens, and a CCD camera. Proflavine is used as the fluorescent contrast agent by topical application. The scanning laser and the diode laser light source share the same light path within an optical fiber bundle containing 30,000 individual single-mode fibers. The absorption of proflavine at 532 nm is low, which mitigates absorption bleaching of the contrast agent by the photoacoustic excitation source. We demonstrate imaging in live murine models. The system is able to provide cellular morphology with cellular resolution co-registered with the structural information given by F-OR-PAM.”

According to the news reporters, the researchers concluded: “Therefore, the system has the potential to serve as a virtual biopsy technique, helping visualize angiogenesis and the effects of anti-cancer drugs on both cells and the microcirculation, as well as aid in the study of other diseases.”

For more information on this research see: Integrated micro-endoscopy system for simultaneous fluorescence and optical-resolution photoacoustic imaging. *Journal of Biomedical Optics*, 2012;17(7):076024.

Our news journalists report that additional information may be obtained by contacting P. Shao, University of Alberta, Dept. of Electrical and Computer Engineering, Edmonton, Alberta, T6G 2V4, Canada. (2012 Sep 03)

### **University of Colorado, Boulder: Characterization and experimental results of a novel sensor for measuring the contact force from myenteric contractions**

By a News Reporter-Staff News Editor at Gastroenterology Week – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Boulder, Colorado, by NewsRx editors, research stated, “The intraluminal pressures and traction forces associated with the migrating motor complex are well understood; however, the contact forces directly exerted by the bowel wall on a solid, or near solid, bolus have not previously been measured. Quantifying contact forces is an important component to understanding the net force experienced by an in vivo robotic capsule endoscope.”

Our news journalists obtained a quote from the research from the University of Colorado, “In this paper, we develop a novel sensor, the migrating motor complex force sensor (MFS), for measuring the contact force generated by the contracting myenteron of the small intestine. The MFS consists of a perfused manometer connected to four torus-shaped balloons custom formed of natural latex rubber and embedded with temperature and pressure sensors. Force exerted on the balloon causes sensor pressure change. In vivo, the MFS measures the magnitude and axial location of contact pressure exerted by the myenteron. The device is tested in vivo in a live porcine model on the middle small bowel.”

According to the news editors, the researchers concluded: “The mean total force per centimeter of axial length of intestine that occurred over a 16-min interval in vivo was 1.04 N/cm (-1) in the middle region of the small intestine; the measured force is in the range of theoretical values.”

For more information on this research see: Characterization and experimental results of a novel sensor for measuring the contact force from myenteric contractions. *Ieee Transactions On Bio-medical Engineering*, 2012;59(7):1971-7.

Our news journalists report that additional information may be obtained by contacting B.S. Terry, University of Colorado, Boulder, CO 80309, United States. (2012 Sep 03)

## University of Oslo: Uncertainty Analysis of Ventricular Mechanics Using the Probabilistic Collocation Method

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of Oslo, Norway, by NewsRx editors, research stated, “Uncertainty and variability in material parameters are fundamental challenges in computational biomechanics. Analyzing and quantifying the resulting uncertainty in computed results with parameter sweeps or Monte Carlo methods has become very computationally demanding.”

Our news journalists obtained a quote from the research from the University of Oslo, “In this paper, we consider a stochastic method named the probabilistic collocation method, and investigate its applicability for uncertainty analysis in computing the passive mechanical behavior of the left ventricle. Specifically, we study the effect of uncertainties in material input parameters upon response properties such as the increase in cavity volume, the elongation of the ventricle, the increase in inner radius, the decrease in wall thickness, and the rotation at apex. The numerical simulations conducted herein indicate that the method is well suited for the problem of consideration, and is far more efficient than the Monte Carlo simulation method for obtaining a detailed uncertainty quantification.”

According to the news editors, the researchers concluded: “The numerical experiments also give interesting indications on which material parameters are most critical for accurately determining various global responses.”

For more information on this research see: Uncertainty Analysis of Ventricular Mechanics Using the Probabilistic Collocation Method. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2171-2179. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting H. Osnes, University of Oslo, Dept. of Informat, NO-0316 Oslo, Norway. (2012 Sep 03)

## **University of Parma: Heterogeneity of Intrinsic Repolarization Properties Within the Human Heart: New Insights From Simulated Three-Dimensional Current Surfaces**

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of Parma, Italy, by NewsRx editors, the research stated, “Heterogeneity of repolarization properties is pivotal for both physiology and pathology of the heart and mathematical models of different cardiac cell types that are tuned to experimental data in order to reproduce it in silico. Repolarization heterogeneity is described most of the times with reference to one or the other of the many repolarization parameters, like action potential (AP) form and duration, or the maximum conductance of a given ion current, which are nonlinearly connected and frequently overdetermined.”

Our news journalists obtained a quote from the research from the University of Parma, “A compact representation of models dynamics would help their standardization, their use, and the understanding of the underlying physiology. A 3-D representation of cardiac AP derived from the measure of instantaneous current-voltage relationships during repolarization has been previously described. Here, it is shown that such a representation compactly summarizes important features of repolarization which are relevant particularly for what concerns its electrotonic modulation within the human heart. It is found that, according to the tested models, late phase of AP repolarization displays autoregenerativity only within the ventricle, and that this property is heterogeneously distributed across the wall.”

According to the news editors, the researchers concluded: “Three-dimensional current representations of the AP also provide precise estimation of the time course of membrane resistance, which changes throughout the heart, and can be used to predict entrainment of repolarization during AP propagation.”

For more information on this research see: Heterogeneity of Intrinsic Repolarization Properties Within the Human Heart: New Insights From Simulated Three-Dimensional Current Surfaces. *IEEE Transactions on Biomedical Engineering*, 2012;59(8):2372-2380. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting M. Zaniboni, University of Parma, Center Excellence Toxicol Res, Italian Workers Compensat Author Res Center, I-43125 Parma, Italy. (2012 Sep 03)

### **University of Strathclyde, Glasgow: Eumelanin fibrils**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators publish new report on Biomedical Optics. According to news originating from Glasgow, United Kingdom, by NewsRx correspondents, research stated, “We describe the auto-oxidation of 3, 4-dihydroxy-L-phenylalanine (L-DOPA) in the synthesis of eumelanin to spontaneously produce fibrils upon drying. The self-assembled fibrils are of characteristic diameter  $\sim 1$  to 2  $\mu\text{m}$ , composed of filaments, and are unidirectional, apart from branches that are formed at typically an angle of 20 to 22 deg.”

Our news journalists obtained a quote from the research from the University of Strathclyde, “The fibrils are characterized using fluorescence spectroscopy, fluorescence decay times, scanning electron microscopy, atomic force microscopy, and fluorescence lifetime imaging microscopy. The fibrils mimic natural melanin in consisting of core eumelanin with efficient nonradiative properties, but they also display pockets of electronically isolated species with higher radiative rates on the nanosecond timescale. Eumelanin fibrils formed occasionally in solution are tentatively attributed to a scaffold of bacteria or fungus.”

According to the news editors, the researchers concluded: “Fabricating and characterizing novel synthetic eumelanin structures such as fibrils are of interest in helping to reveal a functional structure for eumelanin, in understanding its photophysics, in learning more about L-DOPA as it is used in the treatment of Parkinson’s disease, and in producing novel materials which might embody some of the diverse properties of eumelanin.”

For more information on this research see: Eumelanin fibrils. *Journal of Biomedical Optics*, 2012;17(7):075001.

The news correspondents report that additional information may be obtained from R. McQueenie, University of Strathclyde, Dept. of Physics, Photophysics Group, Centre for Molecular Nanometrology, SUPA, Glasgow, G4 0NG, UK. (2012 Sep 03)

**Xiamen University: High-resolution NMR spectroscopy in inhomogeneous fields via Hadamard-encoded intermolecular double-quantum coherences**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators discuss new findings in Biomedicine. According to news reporting originating from Xiamen, People's Republic of China, by NewsRx correspondents, research stated, "A new pulse sequence based on intermolecular double-quantum coherences was proposed to obtain one-dimensional high-resolution liquid NMR spectra in inhomogeneous magnetic fields via Hadamard encoding. In contrast with the conventional intermolecular multiple-quantum coherences method with a two-dimensional acquisition to obtain one one-dimensional high-resolution spectrum, the new method can provide relatively high-resolution spectra directly through one-dimensional acquisition, and can greatly improve the signal-to-noise ratio of the spectrum within a relatively short acquisition time."

Our news editors obtained a quote from the research from Xiamen University, "Theoretical derivation was performed and analytical expressions of the resulting signals are given. Solution samples in purposely de-shimmed magnetic fields and pig brain tissue samples were tested. The experimental results demonstrate that this sequence can retain useful structural information, even when the field inhomogeneity is sufficiently severe to erase almost all spectral information with conventional one-dimensional single-quantum coherence techniques, and good solvent suppression can be achieved."

According to the news editors, the researchers concluded: "This method may provide a promising technique for applications in in vivo and in vitro NMR."

For more information on this research see: High-resolution NMR spectroscopy in inhomogeneous fields via Hadamard-encoded intermolecular double-quantum coherences. *Nmr In Biomedicine*, 2012;25(9):1088-94. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - [http://onlinelibrary.wiley.com/](http://onlinelibrary.wiley.com/journal/10.1002/) journal/10.1002/ (ISSN) 1099-1492)

The news editors report that additional information may be obtained by contacting Y. Chen, Dept. of Communication Engineering, Fujian Provincial Key Laboratory of Plasma and Magnetic Resonance, Xiamen University, Xiamen, People's Taiwan. (2012 Sep 03)



## **Chang Gung University, Taoyuan: Design and validation of a dynamic stretch splint for plantar fasciitis**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Medical Engineering and Physics. According to news reporting out of Taoyuan, Taiwan, by NewsRx editors, research stated, “Plantar fascia stretch plays an important role in the treatment of plantar fasciitis. Existing stretch splints mostly provide stretch to Achilles tendon but not to the plantar fascia.”

Our news journalists obtained a quote from the research from Chang Gung University, “The ones that do are inefficient and uncomfortable because of their static nature. In this paper a dynamic stretch splint featured both ankle and metatarsophalangeal joint stretch was designed and developed. This splint should provide continuous stable stretch and be able to monitor the load of stretch during clinical application. To validate the design, twenty volunteers were tested under two stretch conditions, static and dynamic. Forces generated between the splint and the foot across 30-min testing were registered. Level of comfort and joint range-of-motion changes after splint application were evaluated. Statistical results demonstrated significant differences in load of stretch and in level of comfort between the static and dynamic conditions, but not in joint range-of-motion. The findings indicated that the designed splint could provide a continuous load of stretch, eliminate discomfort and increase user compliance comparing to static splint. Its long term effect onto joint angle improvement needs further investigation.”

According to the news editors, the researchers concluded: “Potentially it may be used on subjects with plantar fasciitis, and subjects with foot problems accompanying plantar tissue contracture.”

For more information on this research see: Design and validation of a dynamic stretch splint for plantar fasciitis. *Medical Engineering & Physics*, 2012;34(7):920-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting H.Y. Cheng, Graduate Institute of Early Intervention, Chang Gung University, 259 Wen-Hua 1st Rd, Tao-Yuan, Taiwan. (2012 Aug 31)

## **Medical University, Innsbruck: Measurement of intraarticular wrist joint biomechanics with a force controlled system**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators discuss new findings in Medical Engineering and Physics. According to news reporting originating in Innsbruck, Austria, by NewsRx journalists, research stated, “Pathologies of the wrist, such as fractures or instabilities, can lead to alterations in joint biomechanics. Accurate treatment of these pathologies is a frequent challenge for the surgeon.”

The news reporters obtained a quote from the research from Medical University, “For biomechanical investigations, a test-setup that applies physiological loading of the wrist joint is necessary. A force controlled test-bench with agonistic and antagonistic muscle forces was built to move six fresh frozen human upper extremities through flexion and extension of the wrist joint. Tendon forces, range of motion, intraarticular contact area and contact pressure of the lunate and scaphoid facet as well as tendon excursion were investigated and compared with the current literature. During wrist motion the extensors exerted double the force of the flexors. Capsulotomy and sensor insertion decreased the range of motion from 63.4°; (SD 14.1) to 45.9°; (SD 23.7). The ratio of force transmitted through the radius and ulna was 77:23 and pressure distribution between the scaphoid and lunate facet showed a 70:30 relationship. The obtained data indicate a good agreement with the available literature.”

According to the news reporters, the researchers concluded: “Therefore, the force controlled test-bench in combination with intraarticular radiocarpal measurements can be used to investigate the influence of wrist pathologies on joint biomechanics.”

For more information on this research see: Measurement of intraarticular wrist joint biomechanics with a force controlled system. *Medical Engineering & Physics*, 2012;34(7):900-5. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting S. Erhart, Medical University of Innsbruck, Dept. of Trauma Surgery, Anichstrabe 35, A-6020 Innsbruck, Austria. (2012 Aug 31)

**Nanyang Technological University, Singapore: Compliant model of a coupled sequential coronary arterial bypass graft: Effects of vessel wall elasticity and non-Newtonian rheology on blood flow regime and hemodynamic parameters distribution**

By a News Reporter-Staff News Editor at Health & Medicine Week – Researchers detail new data in Bypass Graft. According to news originating from Singapore, Singapore, by NewsRx correspondents, research stated, “We have recently developed a novel design for coronary arterial bypass surgical grafting, consisting of coupled sequential side-to-side and end-to-side anastomoses. This design has been shown to have beneficial blood flow patterns and wall shear stress distributions which may improve the patency of the CABG, as compared to the conventional end-to-side anastomosis.”

Our news journalists obtained a quote from the research from Nanyang Technological University, “In our preliminary computational simulation of blood flow of this coupled sequential anastomoses design, the graft and the artery were adopted to be rigid vessels and the blood was assumed to be a Newtonian fluid. Therefore, the present study has been carried out in order to (i) investigate the effects of wall compliance and non-Newtonian rheology on the local flow field and hemodynamic parameters distribution, and (ii) verify the advantages of the CABG coupled sequential anastomoses design over the conventional end-to-side configuration in a more realistic bio-mechanical condition. For this purpose, a two-way fluid-structure interaction analysis has been carried out. A finite volume method is applied to solve the three-dimensional, time-dependent, laminar flow of the incompressible, non-Newtonian fluid; the vessel wall is modeled as a linearly elastic, geometrically non-linear shell structure. In an iteratively coupled approach the transient shell equations and the governing fluid equations are solved numerically. The simulation results indicate a diameter variation ratio of up to 4% and 5% in the graft and the coronary artery, respectively. The velocity patterns and qualitative distribution of wall shear stress parameters in the distensible model do not change significantly compared to the rigid-wall model, despite quite large side-wall deformations in the anastomotic regions. However, less flow separation and reversed flow is observed in the distensible models. The wall compliance reduces the time-averaged wall shear stress up to 32% (on the heel of the conventional end-to-side model) and somewhat increases the oscillatory nature of the flow. It is found that the effects of wall compliance and non-Newtonian rheology are not independent, and they interact with each other. In spite of the modest influence of wall compliance and non-Newtonian rheology on the hemodynamic parameters distribution, the

inclusion of these properties has unveiled further advantages of the coupled sequential anastomoses model over the conventional end-to-side anastomosis which had not been revealed in the previous study with the rigid-wall and Newtonian fluid models.”

According to the news editors, the researchers concluded: “Hence, the inclusion of wall compliance and non-Newtonian rheology in flow simulation of blood vessels can be essential in quantitative and comparative investigations.”

For more information on this research see: Compliant model of a coupled sequential coronary arterial bypass graft: Effects of vessel wall elasticity and non-Newtonian rheology on blood flow regime and hemodynamic parameters distribution. *Medical Engineering & Physics*, 2012;34(7):860-72. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from F. Kabinejadian, School of Mechanical and Aerospace Engineering, Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798, Singapore. (2012 Aug 31)

### **Rheinische Friedrich-Wilhelms University, Bonn: Influence of abutment design on the success of immediately loaded dental implants: Experimental and numerical studies**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Medical Engineering and Physics have been published. According to news originating from Bonn, Germany, by NewsRx correspondents, research stated, “The aim of the present study was to investigate experimentally and numerically the influence of a fine threaded-against a roughened-cervical region of immediately loaded dental implants in combination with straight and 20°-angled abutments on the implant primary stability. A total of 30 implants were inserted in bovine rib-segments, 14 cervically roughened implants and 16 implants with fine cervical threads.”

Our news journalists obtained a quote from the research from Rheinische Friedrich-Wilhelms University, “Each implant system received two abutments, straight and 20°-angled. Implant displacements and rotations were measured using a biomechanical measurement system. Subsequently, eight samples were selected for geometrical reconstruction and numerical investigation of stress and strain distributions in the bone by means of the finite element method. Experimentally, both implant systems showed similar behaviour with the straight abutments concerning displacements and rotations. However, fine threaded implants showed much less displacement and rotation against roughened implants when angled abutments were considered.

Numerically, stresses were within 35-45MPa in the cortical bone for both implant systems. The strains showed highest values within the spongy bone with the roughened implants connected to angled abutments. The results indicate that implants with fine cervical threads could be recommended in particular with angled abutments.”

According to the news editors, the researchers concluded: “The outcomes of this study are currently confirmed by long-term clinical investigations.”

For more information on this research see: Influence of abutment design on the success of immediately loaded dental implants: Experimental and numerical studies. *Medical Engineering & Physics*, 2012;34(7):817-25. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from I. Hasan, Endowed Chair of Oral Technology, Rheinische Friedrich-Wilhelms University, Welschonnenstr 17, 53111 Bonn, Germany. (2012 Aug 31)

### **University of Quebec, Montreal: Postural control adjustments during progressive inclination of the support surface in children**

By a News Reporter-Staff News Editor at Health & Medicine Week – Research findings on Medical Engineering and Physics are discussed in a new report. According to news reporting originating in Montreal, Canada, by NewsRx journalists, research stated, “One of the most important postural challenges in daily life is to continuously correct the destabilizing torque due to gravity that accelerates the body further away from the upright position. This study examined children’s (7.9 years old) (n=7) and adults’ (n=10) capacity to generate continuous corrective torque during a progressive perturbation.”

The news reporters obtained a quote from the research from the University of Quebec, “The experimental task was to maintain an upright quiet standing on a platform that gradually and slowly toes-down tilted to a maximum of 14°; without visual cues. The vertical forces applied on the platform and the electromyograms from the tibialis anterior and the gastrocnemius were measured. The results showed that children had a different postural response to the perturbation than adults. When the platform was stationary before the inclination, children shifted their body weight backward whereas adults had a more balanced distribution of their weight. During the inclination, children applied a stronger forward force, suggesting a larger postero-anterior displacement of their body weight. Muscular activities were higher in

children for both the tibialis anterior and the gastrocnemius, and their tibialis anterior activation profile was different.”

According to the news reporters, the researchers concluded: “This study showed that in children aged from 7 to 10 years old neuromuscular responses were not mature enough to generate continuous postural corrective torque in response to the perturbation.”

For more information on this research see: Postural control adjustments during progressive inclination of the support surface in children. *Medical Engineering & Physics*, 2012;34(7):1019-23. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting M. Blanchet, Universite du Quebec a Montreal - Kinanthropologie, Faculte des Sciences, 141 President-Kennedy, Montreal, QC H2X 1Y4, Canada. (2012 Aug 31)

### **Kings College London Hospital: Turbulent flow chromatography in bioanalysis: a review**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Biomedical Engineering have been published. According to news reporting originating in London, United Kingdom, by VerticalNews editors, the research stated, “With advances in fast chromatography techniques, and highly sensitive and selective detection methods such as tandem mass spectrometry, very high-throughput bioanalytical methods can now be easily developed. The bottleneck of the analytical process then becomes the sample preparation, which it is now realized is crucial to the robust operation of the analytical system, especially for quantitative assays.”

The news reporters obtained a quote from the research from Kings College London Hospital, “Turbulent flow liquid chromatography was developed in the late 1990s, and combines size exclusion and traditional stationary phase column chemistry to separate macromolecules, such as proteins, from smaller molecules and analytes of interest in biological fluids. By definition, the process is very rapid, and the instrumentation and software have been developed for fully automated, on-line extraction of neat biological fluids.”

According to the news reporters, the researchers concluded: “This work aims to review the chromatographic theory of turbulent flow chromatography and illustrate, using examples from recent literature, the application of this technique to a range of analytes from a number of different biological matrices.”

For more information on this research see: Turbulent flow chromatography in bioanalysis: a review. *Biomedical Chromatography*, 2012;26(8):892-905. *Biomedical Chromatography* can be contacted at:

Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news correspondents report that additional information may be obtained by contacting L. Couchman, Kings Coll London Hosp, Toxicol Unit, Dept. of Clin Biochem, London SE5 9RS, United Kingdom. (2012 Aug 30)

### **Charite University Hospital and School of Medicine, Berlin: Biomechanical analysis of screw fixation vs. K-wire fixation of a slipped capital femoral epiphysis model**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of Berlin, Germany, by NewsRx editors, research stated, “Previous data have shown that due to the technical ease, low-morbidity, and lower complication rates, the in situ single-implant fixation is the current standard for stabilization of slipped capital femoral epiphysis (SCFE) fixation.”

Our news journalists obtained a quote from the research from the Charite University Hospital and School of Medicine, “Multiple-implant fixation is thought to be combined with a higher incidence of serious complications. The purpose of the current study was to evaluate single-vs. multiple-implant fixation regarding strength and stiffness.”

According to the news editors, the researchers concluded: “Furthermore, different screw designs, including telescopic screw, were evaluated regarding the stiffness, strength, and especially fixation failure.”

For more information on this research see: Biomechanical analysis of screw fixation vs. K-wire fixation of a slipped capital femoral epiphysis model. *Biomedizinische Technik Biomedical Engineering*, 2012;57(3):157-62.

Our news journalists report that additional information may be obtained by contacting C. Druschel, Center for Musculoskeletal Surgery, Campus Virchow, Charite-University Medicine, Berlin, Germany. (2012 Aug 29)

### **Charite University Hospital and School of Medicine, Berlin: Determination of typical patterns from strongly varying signals**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Berlin, Germany, by NewsRx correspondents, research stated, “Forces measured in human joints vary considerably when an activity such as walking is carried out by different subjects or when it is repeated. ‘Typical’ standardised force-time patterns are needed to test and improve joint implants. Mechanically most important for their endurance are the magnitudes and times of force maxima and minima.”

Our news editors obtained a quote from the research from the Charite University Hospital and School of Medicine, “They should equal the arithmetic means from the single measurements. Similar problems exist when evaluating other strongly varying signals, as in gait analysis. The new method to calculate typical signals (TSs) enhances existing dynamic time warping (DTW) procedures. It allows us to combine any number of signals. The sequence of input signals—used for calculating the TS—has only a minor influence.”

According to the news editors, the researchers concluded: “The accuracy of the method was tested numerically on signals for which the typical patterns could be defined exactly, and also on real joint forces that varied to different extents.”

For more information on this research see: Determination of typical patterns from strongly varying signals. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(7):761-9.

The news editors report that additional information may be obtained by contacting A. Bender, Julius Wolff Institute, Charite-Universitätsmedizin Berlin, Augustenburger Platz 1, D-13353, Berlin, Germany. (2012 Aug 29)

### **Cukurova University, Adana: A hybrid image processing system for X-ray images of an external fixator**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting out of Adana, Turkey, by NewsRx editors, research stated, “In the field of orthopaedics, treatment of extremity deformities can be realised by means of external fixators. However, control of such biomedical system is very difficult.”

Our news journalists obtained a quote from the research from Cukurova University, “Some different mathematical models have been developed to improve quality of this service. Most of the parameters,



which are used in these models, have been obtained from two orthogonal X-ray images: one from anteroposterior, AP, direction and the other from a lateral, L, direction. The quality of the results of this model is dependent on the accuracy of the input parameters. Measuring these parameters is a time-consuming issue, and the accuracy of the results is also low. To increase the quality of the measurement, the reference points should be chosen from the edges of the biomedical system, and it is important to find the edges without noise. To achieve this purpose, Sobel edge detector, binary large object analysis, thresholding and inverting are applied as image processing steps. The results are compared with manual measurement values which have been obtained earlier. The results show that semi-automatic measurement of the parameters is more accurate and faster than manual measurement.”

According to the news editors, the researchers concluded: “It shows that the efficiency of the fixator method has been improved.”

For more information on this research see: A hybrid image processing system for X-ray images of an external fixator. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(7):753-9.

Our news journalists report that additional information may be obtained by contacting A. Aydin, Electrical and Electronics Engineering, Cukurova University, Adana, Turkey. (2012 Aug 29)

### **Henan University, Kaifeng: Quantification of fexofenadine in biological matrices: a review of bioanalytical methods**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news originating from Kaifeng, People’s Republic of China, by NewsRx correspondents, research stated, “Fexofenadine (FEX) has been extensively used for therapeutic benefits after the market withdrawal of terfenadine. Recently, the popularity of FEX has emerged owing to its unique disposition via drug transporters and, hence, it has been used as a model probe for both in vitro and in vivo investigations to understand mechanistic aspects of drugdrug interactions (DDI).”

Our news journalists obtained a quote from the research from Henan University, “Going hand in hand with the increased use of FEX in therapy and research, numerous bioanalytical methods for FEX have been published. The various published bioanalytical methods for FEX are collated in this review to provide a comprehensive information on extraction methodology, assay conditions, chromatography and detection systems.”

According to the news editors, the researchers concluded: “Generally, the published methods have been adequately validated and can be readily used to support the use of FEX in pharmacokinetic, DDI and mechanistic investigations.”

For more information on this research see: Quantification of fexofenadine in biological matrices: a review of bioanalytical methods. *Biomedical Chromatography*, 2012;26(8):942-961. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-0801)

The news correspondents report that additional information may be obtained from M. Yao, Henan Univ, Key Lab Special Funct Mat, Kaifeng 475001, Henan, People's Republic of China. (2012 Aug 29)

### **Institute of Materia Medica, Jinan: Development and validation of an LC-MS-MS method for determination of methyl kulonate in rat plasma**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Pharmacokinetics are discussed in a new report. According to news reporting out of Jinan, People's Republic of China, by NewsRx editors, research stated, “A sensitive, rapid and specific LC-MS-MS method was established and validated for determination of methyl kulonate, a major bioactive constituent isolated from *Meliae Cortex*, in rat plasma. Plasma samples were treated by precipitating protein with methanol and were chromatographed using a Capcell Pak C18 column (100 x 4.6 mm, 5 m) with the mobile phase comprising a mixture of methanol, 10 mM ammonium formate and formic acid (95:5:0.1, v/v/v).”

Our news journalists obtained a quote from the research from the Institute of Materia Medica, “Detection and quantification were performed by mass spectrometry in the multiple reaction monitoring mode with positive atmospheric ionization at  $m/z$  467 – >311 for methyl kulonate, and  $m/z$  469 – >451 for dubione B (internal standard), respectively. A good linear response was observed over the concentration range 1.00-500 ng/mL with the lower limit of quantification 1.00 ng/mL in rat plasma. The method also afforded satisfactory results base on sensitivity, specificity, precision, accuracy, recovery, freeze-thaw and long-time stability. The validated method was successfully applied to determine the pharmacokinetic properties of methyl kulonate in rats after oral administration at dose of 100 mg/kg.”

According to the news editors, the researchers concluded: “This pharmacokinetic study of methyl kulonate is reported here for the first time.”

For more information on this research see: Development and validation of an LC-MS-MS method for determination of methyl kulonate in rat plasma. *Biomedical Chromatography*, 2012;26(7):857-62. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography*

- <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news journalists report that additional information may be obtained by contacting Z. Deng, Institute of Materia Medica, Shandong Academy of Medical Sciences, Jinan 250062, People's Taiwan. (2012 Aug 29)

### **Tohoku University, Sendai: Patient-specific modelling of pulmonary airflow using GPU cluster for the application in medical practice**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news originating from Sendai, Japan, by NewsRx correspondents, research stated, “In this paper, we propose a novel patient-specific method of modelling pulmonary airflow using graphics processing unit (GPU) computation that can be applied in medical practice. To overcome the barriers imposed by computation speed, installation price and footprint to the application of computational fluid dynamics, we focused on GPU computation and the lattice Boltzmann method (LBM).”

Our news journalists obtained a quote from the research from Tohoku University, “The GPU computation and LBM are compatible due to the characteristics of the GPU. As the optimisation of data access is essential for the performance of the GPU computation, we developed an adaptive meshing method, in which an airway model is covered by isotropic subdomains consisting of a uniform Cartesian mesh. We found that 4(3) size subdomains gave the best performance.”

According to the news editors, the researchers concluded: “The code was also tested on a small GPU cluster to confirm its performance and applicability, as the price and footprint are reasonable for medical applications.”

For more information on this research see: Patient-specific modelling of pulmonary airflow using GPU cluster for the application in medical practice. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(7):771-8.

The news correspondents report that additional information may be obtained from T. Miki, Dept. of Biomedical Engineering, Tohoku University, Aoba 6-6-01, Sendai, 980-8579, Japan. (2012 Aug 29)

### **Washington State University, Pullman: Neck muscle paths and moment arms are significantly affected by wrapping surface parameters**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Pullman, Washington, by NewsRx journalists, research stated, “In this paper, we studied the effects of wrapping surfaces on muscle paths and moment arms of the neck muscle, semispinalis capitis. Sensitivities to wrapping surface size and the kinematic linkage to vertebral segments were evaluated.”

The news correspondents obtained a quote from the research from Washington State University, “Kinematic linkage, but not radius, significantly affected the accuracy of model muscle paths compared to centroid paths from images. Both radius and linkage affected the moment arm significantly. Wrapping surfaces that provided the best match to centroid paths over a range of postures had consistent moment arms. For some wrapping surfaces with poor matches to the centroid path, a kinematic method (tendon excursion) predicted flexion moment arms in certain postures, whereas geometric method (distance to instant centre) predicted extension. This occurred because the muscle lengthened as it wrapped around the surface.”

According to the news reporters, the researchers concluded: “This study highlights the sensitivity of moment arms to wrapping surface parameters and the importance of including multiple postures when evaluating muscle paths and moment arm.”

For more information on this research see: Neck muscle paths and moment arms are significantly affected by wrapping surface parameters. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(7):735-44.

Our news journalists report that additional information may be obtained by contacting B.L. Suderman, School of Mechanical and Materials Engineering, Washington State University, Pullman, WA 99163, United States. (2012 Aug 29)

### **University of Leicester: Liquid chromatography and mass spectrometry of haem biosynthetic intermediates: a review**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Leicester, United Kingdom, by NewsRx journalists, research stated, “This article discusses the separation, analysis and characterisation of intermediates and oxidative by-products of the haem biosynthetic pathway by liquid chromatography and mass spectrometry.”

The news reporters obtained a quote from the research from the University of Leicester, “Techniques reviewed include high-performance liquid chromatography, ultra-high-performance liquid chromatography, capillary electrophoresis, ion mobility spectrometry, mass spectrometry and tandem mass spectrometry.”

According to the news reporters, the researchers concluded: “The emphasis was on the analysis of biological and clinical samples.”

For more information on this research see: Liquid chromatography and mass spectrometry of haem biosynthetic intermediates: a review. *Biomedical Chromatography*, 2012;26(8):1009-1023. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-0801](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-0801))

Our news correspondents report that additional information may be obtained by contacting C.M. Benton, University of Leicester, RKCSB, Leicester LE2 7LX, Leics, United Kingdom. (2012 Aug 28)

### **University of Oxford: Computational modelling for the embolization of brain arteriovenous malformations**

By a News Reporter-Staff News Editor at Ivy League Week – Data detailed on Central Nervous System have been presented. According to news reporting from Oxford, United Kingdom, by NewsRx journalists, research stated, “Treatment of arteriovenous malformations (AVMs) of the brain often requires the injection of a liquid embolic material to reduce blood flow through the malformation. The type of the liquid and the location of injection have to be carefully planned in a pre-operative manner.”

The news correspondents obtained a quote from the research from the University of Oxford, “We introduce a new model of the interaction of liquid embolic materials with blood for the simulation of their propagation and solidification in the AVM. Solidification is mimicked by an increase of the material’s viscosity. Propagation is modelled by using the concept of two-fluids modelling and that of scalar transport. The method is tested on digital phantoms and on one anatomically derived patient AVM case. Simulations showed that intuitive behaviour of the two-fluid system can be confirmed and that two types of glue propagation through the malformation can be reproduced.”

According to the news reporters, the researchers concluded: “Distinction between the two types of propagation could be used to identify fistulous and plexiform compartments composing the AVM and to characterize the solidification of the embolic material in them.”

For more information on this research see: Computational modelling for the embolization of brain arteriovenous malformations. *Medical Engineering & Physics*, 2012;34(7):873-81. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting P. Orlowski, Institute of Biomedical Engineering, Dept. of Engineering Science, University of Oxford, Oxford, UK. (2012 Aug 28)

### **University of Texas, Austin: Conformational studies of common protein templates in macromolecularly imprinted polymers**

By a News Reporter-Staff News Editor at Life Science Weekly – Researchers detail new data in Biomedical Microdevices. According to news reporting originating from Austin, Texas, by NewsRx correspondents, research stated, “Unlike the molecular imprinting of small molecule templates, molecularly imprinted polymers specific to large templates (>1,500 Da), have achieved limited success to date. Conformational stability of these labile macromolecules is one of the main factors that prevent the direct extension of successful procedures from the small molecule regime.”

Our news editors obtained a quote from the research from the University of Texas, “We continue our systematic investigation of the effect of common components in macromolecular MIPs on the conformation of protein templates. Circular dichroism was used to show that frequently employed monomers and crosslinkers induce significant changes in the secondary structures of lysozyme and bovine hemoglobin. The extent to which this change occurs, at ligand concentrations far below what are typically used reported work, is cause for concern and provides as rational explanation for the lack of success in this arena. This is because a change in the template structure prior to polymerization would lead to the binding sites formed during polymerization to be specific to this alternate conformation. Subsequent studies with the macromolecule in its native state and the crosslinked network would not be successful.”

According to the news editors, the researchers concluded: “Using this information as a guide, we offer suggestions as to where work in macromolecular imprinted polymers should focus going forward in order for these antibody mimics to reach their vast potential as a new class of biomedical diagnostic devices.”

For more information on this research see: Conformational studies of common protein templates in macromolecularly imprinted polymers. *Biomedical Microdevices*, 2012;14(4):679-87. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013,

USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news editors report that additional information may be obtained by contacting D.R. Kryscio, Cockrell School of Engineering, Dept. of Chemical Engineering, The University of Texas at Austin, 1 University Station C0400, Austin, TX, 78712-1062, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Aug 28)

### **Islamic Azad University, Tabriz: Microextraction techniques in therapeutic drug monitoring**

By a News Reporter-Staff News Editor at Pharma Business Week – Data detailed on Biomedical Engineering have been presented. According to news reporting from Tabriz, Iran, by NewsRx journalists, research stated, “Therapeutic drug monitoring (TDM), as part of clinical process of medical treatments, is commonly used to maintain therapeutic drug concentrations. TDM is useful to identify the causes of unwanted or unexpected responses, to prevent unnecessary diagnostic testing, to improve clinical outcomes, and even to save lives.”

The news correspondents obtained a quote from the research from Islamic Azad University, “The determination of drug concentration in blood samples requires an excellent sample preparation procedure. Recent trends in sample preparation include miniaturization, automation, high-throughput performance, on-line coupling with analytical instruments and low-cost operation through extremely low or no solvent consumption. Microextraction techniques, such as liquid- and solid-phase microextraction, have these advantages over the traditional techniques.”

According to the news reporters, the researchers concluded: “This paper reviews the recent developments in microextraction techniques used for drug monitoring in serum, plasma or blood samples.”

For more information on this research see: Microextraction techniques in therapeutic drug monitoring. *Biomedical Chromatography*, 2012;26(8):972-989. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news journalists report that additional information may be obtained by contacting K. Farhadi, Islamic Azad Univ, Dept. of Chem, Sci & Res Branch, Tabriz, Iran. (2012 Aug 27)

## Koc University, Istanbul: Estimation of fracture toughness of liver tissue: Experiments and validation

By a News Reporter-Staff News Editor at Robotics & Machine Learning – A new study on Robotics is now available. According to news reporting originating in Istanbul, Turkey, by VerticalNews journalists, research stated, “The mechanical interaction between the surgical tools and the target soft tissue is mainly dictated by the fracture toughness of the tissue in several medical procedures, such as catheter insertion, robotic-guided needle placement, suturing, cutting or tearing, and biopsy. Despite the numerous experimental works on the fracture toughness of hard biomaterials, such as bone and dentin, only a very limited number of studies have focused on soft tissues, where the results do not show any consistency mainly due to the negligence of the puncturing/cutting tool geometry.”

The news reporters obtained a quote from the research from Koc University, “In order to address this issue, we performed needle insertion experiments on 3 bovine livers with 4 custom-made needles having different diameters. A unique value for fracture toughness ( $J=164\pm 6\text{J/m}^2$ ) was obtained for the bovine liver by fitting a line to the toughness values estimated from the set of insertion experiments. In order to validate the experimental results, a finite element model of the bovine liver was developed and its hyper-viscoelastic material properties were estimated through an inverse solution based on static indentation and ramp-and-hold experiments. Then, needle insertion into the model was simulated utilizing an energy-based fracture mechanics approach.”

According to the news reporters, the researchers concluded: “The insertion forces estimated from the FE simulations show an excellent agreement with those acquired from the physical experiments for all needle geometries.”

For more information on this research see: Estimation of fracture toughness of liver tissue: Experiments and validation. *Medical Engineering & Physics*, 2012;34(7):882-91. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting C. Gokgol, College of Engineering, Koc University, Istanbul 34450, Turkey. (2012 Aug 27)



## **University of Aberdeen: Automated clarity assessment of retinal images using regionally based structural and statistical measures**

By a News Reporter-Staff News Editor at Diabetes Week – Current study results on Medical Engineering and Physics have been published. According to news reporting out of Aberdeen, United Kingdom, by NewsRx editors, research stated, “An automated image analysis system for application in mass medical screening must assess the clarity of the images before analysing their content. This is the case in grading for diabetic retinopathy screening where the failure to assess clarity could result in retinal images of people with retinopathy being erroneously classed as normal.”

Our news journalists obtained a quote from the research from the University of Aberdeen, “This paper compares methods of clarity assessment based on the degradation of visible structures and based on the deviation of image properties outside expected norms caused by clarity loss. Vessel visibility measures and statistical measures were determined at locations in the image which have high saliency and these were used to obtain an image clarity assessment using supervised classification. The usefulness of the measures as indicators of image clarity was assessed. Tests were performed on 987 disc-centred and macula-centred retinal photographs (347 with inadequate clarity) obtained from the English National Screening Programme. Images with inadequate clarity were detected with 92.6% sensitivity at 90% specificity. In a set of 2000 macula-centred images (200 with inadequate clarity) from the Scottish Screening Programme, inadequate clarity was detected with 96.7% sensitivity at 90% specificity.”

According to the news editors, the researchers concluded: “This study has shown that structural and statistical measures are equally useful for retinal image clarity assessment.”

For more information on this research see: Automated clarity assessment of retinal images using regionally based structural and statistical measures. *Medical Engineering & Physics*, 2012;34(7):849-59. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting A.D. Fleming, University of Aberdeen, Aberdeen University and Grampian University Hospitals, Foresterhill, Aberdeen AB25 2ZD, UK. (2012 Aug 27)

## University of Cadiz: Automated frequency domain analysis of oxygen saturation as a screening tool for SAHS

By a News Reporter-Staff News Editor at Respiratory Therapeutics Week – New research on Respiratory Tract Diseases and Conditions is the subject of a report. According to news reporting originating in Cadiz, Spain, by NewsRx journalists, research stated, “Sleep apnea-hypopnea syndrome (SAHS) is significantly underdiagnosed and new screening systems are needed. The analysis of oxygen desaturation has been proposed as a screening method.”

The news reporters obtained a quote from the research from the University of Cadiz, “However, when oxygen saturation ( $\text{SpO}_2$ ) is used as a standalone single channel device, algorithms working in time domain achieve either a high sensitivity or a high specificity, but not usually both. This limitation arises from the dependence of time-domain analysis on absolute  $\text{SpO}_2$  values and the lack of standardized thresholds defined as pathological. The aim of this study is to assess the degree of concordance between SAHS screening using offline frequency domain processing of  $\text{SpO}_2$  signals and the apnea-hypopnea index (AHI), and the diagnostic performance of such a new method.  $\text{SpO}_2$  signals from 115 subjects were analyzed. Data were divided in a training data set (37) and a test set (78). Power spectral density was calculated and related to the desaturation index scored by physicians. A frequency desaturation index (FDI) was then estimated and its accuracy compared to the classical desaturation index and to the apnea-hypopnea index. The findings point to a high diagnostic agreement: the best sensitivity and specificity values obtained were 83.33% and 80.44%, respectively.”

According to the news reporters, the researchers concluded: “Moreover, the proposed method does not rely on absolute  $\text{SpO}_2$  values and is highly robust to artifacts.”

For more information on this research see: Automated frequency domain analysis of oxygen saturation as a screening tool for SAHS. *Medical Engineering & Physics*, 2012;34(7):946-53. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting D.S. Morillo, Universidad de Cadiz - Escuela Superior de Ingenieria, Dpto de Ingenieria de Sistemas y Automatica, C, Chile s, n, CP 11002 Cadiz, Spain. (2012 Aug 27)

## **University of Miami Miller School of Medicine: Recent trends in assistive technology for mobility**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting out of Miami, Florida, by NewsRx editors, research stated, “Loss of physical mobility makes maximal participation in desired activities more difficult and in the worst case fully prevents participation. This paper surveys recent work in assistive technology to improve mobility for persons with a disability, drawing on examples observed during a tour of academic and industrial research sites in Europe.”

Our news journalists obtained a quote from the research from the University of Miami Miller School of Medicine, “The underlying theme of this recent work is a more seamless integration of the capabilities of the user and the assistive technology. This improved integration spans diverse technologies, including powered wheelchairs, prosthetic limbs, functional electrical stimulation, and wearable exoskeletons. Improved integration is being accomplished in three ways: 1) improving the assistive technology mechanics; 2) improving the user-technology physical interface; and 3) sharing of control between the user and the technology.”

According to the news editors, the researchers concluded: “We provide an overview of these improvements in user-technology integration and discuss whether such improvements have the potential to be transformative for people with mobility impairments.”

For more information on this research see: Recent trends in assistive technology for mobility. *Journal of Neuroengineering and Rehabilitation*, 2012;9():20. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Neuroengineering and Rehabilitation* - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

Our news journalists report that additional information may be obtained by contacting R.E. Cowan, Dept. of Neurological Surgery, The Miami Project to Cure Paralysis, University of Miami Miller School of Medicine, 1095 NW 14th Terrace, Miami, FL, 33136, United States. (2012 Aug 22)

## **Indian Institute of Technology, Roorkee: Amino acids as chiral selectors in enantioresolution by liquid chromatography**

By a News Reporter-Staff News Editor at Life Science Weekly – New research on Amino Acids is the subject of a report. According to news originating from Roorkee, India, by NewsRx correspondents, research stated, “Amino acids are unique in terms of their structural features and multidimensional uses. With their simple structures and the ready

availability of both enantiomers, amino acids not only serve as a chiral pool for synthesis but also provide an inexpensive pool for resolution studies.”

Our news journalists obtained a quote from the research from the Indian Institute of Technology, “There has been no attempt to review the application of amino acids as chiral selectors for chromatographic enantioresolution of pharmaceuticals and other compounds. The present paper deals with application of l-amino acids and complexes of l-amino acids with a metal ion, particularly Cu(II), as an impregnating reagent in thin-layer chromatography or as a chiral ligand exchange reagent or a chiral mobile phase additive in both thin-layer chromatography and high-performance liquid chromatography.”

According to the news editors, the researchers concluded: “Enantiomeric resolution of  $\alpha$ -blockers, nonsteroidal anti-inflammatories, amino acids (and their derivatives) and certain other compounds is discussed.”

For more information on this research see: Amino acids as chiral selectors in enantioresolution by liquid chromatography. *Biomedical Chromatography*, 2012;26(8):962-71. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

The news correspondents report that additional information may be obtained from R. Bhushan, Dept. of Chemistry, Indian Institute of Technology Roorkee, Roorkee, 247667, India. (2012 Aug 14)

### **Jubilant Biosystems, Bangalore: Review of HPLC methods and HPLC methods with mass spectrometric detection for direct determination of aspirin with its metabolite(s) in various biological matrices**

By a News Reporter-Staff News Editor at Pharma Business Week – Data detailed on Pharmacodynamics have been presented. According to news reporting out of Bangalore, India, by NewsRx editors, research stated, “Aspirin, the most widely used drug in the world, has been known to mankind for over a century. It is not only the pharmacologically active entity, but is also biotransformed into a major metabolite, i.e. salicylic acid, which also exhibits similar pharmacologic/pharmacodynamic properties.”

Our news journalists obtained a quote from the research from Jubilant Biosystems, “Hence it is necessary to quantitate aspirin along with its metabolite(s) in various biological matrices accurately and precisely to correlate with pharmacological/pharmacodynamic activity. This paper provides a comprehensive overview of various bioanalytical methods

(HPLC and LC-MS/MS) that have been reported for direct quantitation of aspirin along with its metabolite(s).”

According to the news editors, the researchers concluded: “The review also provides general information on sample collection, sample processing, internal standard selection, conditions for chromatographic separation, succinct validation data and applicable conclusions for reported assays in a structured manner.”

For more information on this research see: Review of HPLC methods and HPLC methods with mass spectrometric detection for direct determination of aspirin with its metabolite(s) in various biological matrices. *Biomedical Chromatography*, 2012;26(8):906-41. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news journalists report that additional information may be obtained by contacting R. Mullangi, Drug Metabolism and Pharmacokinetics, Jubilant Biosys Ltd, Industrial Suburb, Yeshwanthpur, Bangalore, 560 022, India. (2012 Aug 13)

### **Albanova University, Stockholm: Improvement in cell capture throughput using parallel bioactivated microfluidic channels**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Stockholm, Sweden, by NewsRx journalists, research stated, “Optimization of targeted cell capture with microfluidic devices continues to be a challenge. On the one hand, microfluidics allow working with microliter volumes of liquids, whereas various applications in the real world require detection of target analyte in large volumes, such as capture of rare cell types in several ml of blood.”

The news reporters obtained a quote from the research from Albanova University, “This contrast of volumes (microliter vs. ml) has prevented the emergence of microfluidic cell capture sensors in the clinical setting. Here, we study the improvement in cell capture and throughput achieved using parallel bioactivated microfluidic channels. The device consists of channels in parallel with each other tied to a single channel.”

According to the news reporters, the researchers concluded: “We discuss fabrication and testing of our devices, and show the ability for an improvement in throughput detection of target cells.”

For more information on this research see: Improvement in cell capture throughput using parallel bioactivated microfluidic channels. *Biomedical Microdevices*, 2012;14(4):625-629. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311

Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news correspondents report that additional information may be obtained by contacting M. Javanmard, AlbaNova Univ Center, Dept. of Biotechnol, KTH, Stockholm, Sweden. (2012 Aug 08)

### **Catholic University of Leuven, Louvain: Integrated high pressure microhydraulic actuation and control for surgical instruments**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting from Louvain, Belgium, by NewsRx journalists, research stated, “To reduce the surgical trauma to the patient, minimally invasive surgery is gaining considerable importance since the eighties. More recently, robot assisted minimally invasive surgery was introduced to enhance the surgeon’s performance in these procedures.”

The news correspondents obtained a quote from the research from the Catholic University of Leuven, “This resulted in an intensive research on the design, fabrication and control of surgical robots over the last decades. A new development in the field of surgical tool manipulators is presented in this article: a flexible manipulator with distributed degrees of freedom powered by microhydraulic actuators. The tool consists of successive flexible segments, each with two bending degrees of freedom. To actuate these compliant segments, dedicated fluidic actuators are incorporated, together with compact hydraulic valves which control the actuator motion. Especially the development of microvalves for this application was challenging, and are the main focus of this paper. The valves distribute the hydraulic power from one common high pressure supply to a series of artificial muscle actuators.”

According to the news reporters, the researchers concluded: “Tests show that the angular stroke of the each segment of this medical instrument is 90A degrees.”

For more information on this research see: Integrated high pressure microhydraulic actuation and control for surgical instruments. *Biomedical Microdevices*, 2012;14(4):699-708. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting A.J.M. Moers, Catholic University of Leuven, Dept. of Mech Engn, B-3001 Louvain, Belgium. (2012 Aug 08)

**Dalian Institute of Chemical Physics: Multiparameter evaluation of the longevity in C-elegans under stress using an integrated microfluidic device**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from Dalian, People's Republic of China, by NewsRx journalists, research stated, "Caenorhabditis elegans (C. elegans) is an excellent model organism for the study of aging and longevity. In this work, we presented a microfluidic approach for the evaluation of longevity in C. elegans under stress."

The news correspondents obtained a quote from the research from the Dalian Institute of Chemical Physics, "The microfluidic device integrated multiple microvalves with parallel channels, which enabled the long-term culture and flexible manipulation of C. elegans in real-time. The utility of the device was demonstrated by characterizing the lifespan, mobility behavior and fluorescence expression of oxidative stress in mutant strain CL2166 simultaneously at single animal resolution. A certain dose of polydatin was found to enable the extension of mean lifespan of CL2166 for the first time, and the prolonged longevity activity was possibly mediated by the protective response to oxidative stress, indicating the promising role of polydatin involved in aging process."

According to the news reporters, the researchers concluded: "The device is simple to operate, easy for real-time imaging and multiparameter evaluations in parallel, providing the powerful platform for drug evaluation/screening in highthroughput format."

For more information on this research see: Multiparameter evaluation of the longevity in C-elegans under stress using an integrated microfluidic device. *Biomedical Microdevices*, 2012;14(4):721-728. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting H. Wen, Chinese Academy Sci, Dalian Inst Chem Phys, Dalian 116023, People's Republic of China. (2012 Aug 08)

## **Hofstra Northern Shore Long Island Jewish School of Medicine, Hempstead: Micromachined lab-on-a-tube sensors for simultaneous brain temperature and cerebral blood flow measurements**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Hempstead, New York, by NewsRx journalists, research stated, “This work describes the development of a micromachined lab-on-a-tube device for simultaneous measurement of brain temperature and regional cerebral blood flow. The device consists of two micromachined gold resistance temperature detectors with a 4-wire configuration.”

The news correspondents obtained a quote from the research from the Hofstra Northern Shore Long Island Jewish School of Medicine, “One is used as a temperature sensor and the other as a flow sensor. The temperature sensor operates with AC excitation current of 500  $\mu$ A and updates its outputs at a rate of 5 Hz. The flow sensor employs a periodic heating and cooling technique under constant-temperature mode and updates its outputs at a rate of 0.1 Hz. The temperature sensor is also used to compensate for temperature changes during the heating period of the flow sensor to improve the accuracy of flow measurements. To prevent thermal and electronic crosstalk between the sensors, the temperature sensor is located outside the ‘thermal influence’ region of the flow sensor and the sensors are separated into two different layers with a thin-film Copper shield. We evaluated the sensors for accuracy, crosstalk and long-term drift in human blood-stained cerebrospinal fluid. These in vitro experiments showed that simultaneous temperature and flow measurements with a single lab-on-a-tube device are accurate and reliable over the course of 5 days. It has a resolution of 0.013  $^{\circ}$ C and 0.18 ml/100 g/min; and achieves an accuracy of 0.1  $^{\circ}$ C and 5 ml/100 g/min for temperature and flow sensors respectively.”

According to the news reporters, the researchers concluded: “The prototype device and techniques developed here establish a foundation for a multi-sensor lab-on-a-tube, enabling versatile multimodality monitoring applications.”

For more information on this research see: Micromachined lab-on-a-tube sensors for simultaneous brain temperature and cerebral blood flow measurements. *Biomedical Microdevices*, 2012;14(4):759-768. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)



Our news journalists report that additional information may be obtained by contacting C.Y. Li, Hofstra N Shore LIJ Sch Med, Cushing Neurosci Inst, Hempstead, NY 11549, United States. (2012 Aug 08)

**Michigan State University, East Lansing: A polymer microfluidic chip for quantitative detection of multiple water- and foodborne pathogens using real-time fluorogenic loop-mediated isothermal amplification**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating in East Lansing, Michigan, by NewsRx journalists, research stated, “Inexpensive, portable, and easy-to-use devices for rapid detection of microbial pathogens are needed to ensure safety of water and food. In this study, a disposable polymer microfluidic chip for quantitative detection of multiple pathogens using isothermal nucleic acid amplification was developed.”

The news reporters obtained a quote from the research from Michigan State University, “The chip contains an array of 15 interconnected reaction wells with dehydrated primers for loop-mediated isothermal amplification (LAMP), and requires only a single pipetting step for dispensing of sample. To improve robustness of loading and amplification, hydrophobic air vents and microvalves were monolithically integrated in the multi-layered structure of the chip using an inexpensive knife plotter. For quantification, LAMP was performed with a highly fluorescent DNA binding dye (SYTO-82) and the reactions monitored in real-time using a low-cost fluorescence imaging system previously developed by our group (Ahmad et al., *Biomed. Microdevices* 13(5), 929-937). Starting from genomic DNA mixtures, the chip was successfully evaluated for rapid analysis of multiple virulence and marker genes of *Salmonella*, *Campylobacter jejuni*, *Shigella*, and *Vibrio cholerae*, enabling detection and quantification of 10-100 genomes per  $\mu\text{l}$  in less than 20 min.”

According to the news reporters, the researchers concluded: “It is anticipated that the microfluidic chip, along with the real-time imaging system, may be a key enabling technology for developing inexpensive and portable systems for on-site screening of multiple pathogens relevant to food and water safety.”

For more information on this research see: A polymer microfluidic chip for quantitative detection of multiple water- and foodborne pathogens using real-time fluorogenic loop-mediated isothermal amplification. *Biomedical Microdevices*, 2012;14(4):769-778. *Biomedical Microdevices* can be contacted at:

Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news correspondents report that additional information may be obtained by contacting D.M. Turlousse, Michigan State University, Dept. of Microbiol & Mol Genet, East Lansing, MI 48824, United States. (2012 Aug 08)

### **Nanyang Technological University, Singapore: A high-flux isopore micro-fabricated membrane for effective concentration and recovering of waterborne pathogens**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating from Singapore, Singapore, by NewsRx correspondents, research stated, “A high-flux metallic micro/nano-filtration membrane has been fabricated and validated for isolation of waterborne pathogens from drinking water. Obtained membrane with smooth surface and perfectly ordered pores was achieved by a high yield and cost effective multilevel lithography and electroplating technique.”

Our news editors obtained a quote from the research from Nanyang Technological University, “The micro-fabricated membrane was also strengthened with an integrated back-support, which can withstand a high pressure during filtration. The results of microfiltration tests with model particles revealed the superior performance of the micro-fabricated filter than current commercial filters in sample throughput, recovery ratio, and reusability.”

According to the news editors, the researchers concluded: “This study highlighted the potential application of micro-fabricated filter in rapid filtration and recovery of *C. parvum* oocysts for downstream analysis.”

For more information on this research see: A high-flux isopore micro-fabricated membrane for effective concentration and recovering of waterborne pathogens. *Biomedical Microdevices*, 2012;14(4):669-677. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news editors report that additional information may be obtained by contacting M.E. Warkiani, Nanyang Technological University, Sch Mech & Aersp Engn, Singapore 639798, Singapore. (2012 Aug 08)

### **University Hospital, Nancy: Ambivalent properties of hyaluronate and hylan during post-traumatic OA in the rat knee**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Joint Diseases and Conditions have been published. According to news originating from Nancy, France, by NewsRx correspondents, research stated, “To determine whether viscosupplementation with intra-articular (i.a.) low-or high-molecular-weight hyaluronate (HA) injections influenced both chondral and synovial lesions in rats with surgically-induced OA knee. On D0, rats underwent anterior cruciate ligament transection (ACLX) and were divided in 4 groups: sham group, ACLX-saline control group, ACLX-hyaluronate group, ACLX-hylan group.”

Our news journalists obtained a quote from the research from University Hospital, “IA injections were performed on D7, D14 and D21. Histological grading of chondral and synovial lesions were performed on D28. Concomitant immunostainings of Caspase3a and Hsp70 were also performed. Articular damages were significantly reduced in both HAS-treated knee joints. In contrast, a significant increase of histological score of synovial inflammation was noted in both ACLX + HAs groups. Apoptotic events significantly decreased as anti-apoptotic Hsp70 expression increased significantly in both HAs groups.”

According to the news editors, the researchers concluded: “HAs may exert, independently of its molecular weight, ambivalent properties on articular structures, simultaneously exerting chondroprotective properties and promoting long-term subacute synovitis.”

For more information on this research see: Ambivalent properties of hyaluronate and hylan during post-traumatic OA in the rat knee. *Bio-medical Materials and Engineering*, 2012;22(4):235-42.

The news correspondents report that additional information may be obtained from L. Galois, UMR 7561 CNRS, Universite de Lorraine, Nancy, France Dept. of Orthopaedic Surgery, University Hospital of Nancy, France. (2012 Aug 08)

### **University of Missouri, Columbia: Micromachined Coulter counter for dynamic impedance study of time sensitive cells**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Drugs and Therapies. According to news reporting originating in Columbia, Missouri, by NewsRx journalists, research stated, “This paper describes the design, modeling, fabrication and characterization MEMS Coulter counter that can detect and monitor the dynamic cell impedance changes in situ as a function of time

after mixing isolated cell populations with different extracellular media within 0.3 s from the start of mixing. The novelty of this design is the use of multi-electrodes with vertical sidewalls to enable the measurements of time sensitive cells with significantly enhanced sensitivity as well as the integration of passive mixing, focusing of cells in line and impedance detection using the vertical electrodes on a single chip that is made mainly using multilayer of SU-8, which has not been reported before.”

The news reporters obtained a quote from the research from the University of Missouri, “The devices were tested with both fluidic and electrical functionality using yeast cells in cryoprotectant agent (diluted dimethyl sulfoxide), red blood cells, microbeads with different dimensions, and dyed fluids. The results demonstrate rapid changes of cell volume within the first 0.6 s after mixing followed by a stable and a fixed cell volume. The micromixer was initially simulated using COMSOL finite element tool.”

According to the news reporters, the researchers concluded: “Image processing technique was used to quantitatively evaluate mixing efficiency by analyzing color intensities variation of captured images of 2 dyed fluids mixed in the channel at flow rates between 0.1-0.4  $\mu$ l/min, the mixing efficiencies were between 87 %-95 %, respectively.”

For more information on this research see: Micromachined Coulter counter for dynamic impedance study of time sensitive cells. *Biomedical Microdevices*, 2012;14(4):739-750. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news correspondents report that additional information may be obtained by contacting Y.F. Wu, University of Missouri, Columbia, MO 65211, United States. (2012 Aug 08)

### **Chiba University: Isolation of cell nuclei in microchannels by short-term chemical treatment via two-step carrier medium exchange**

By a News Reporter-Staff News Editor at Life Science Weekly – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Chiba, Japan, by NewsRx correspondents, research stated, “Separation/purification of nuclei from cells is a critical process required for medical and biochemical research applications. Here, we report a flow-through microfluidic device for isolating cell nuclei by selectively digesting the cell membrane by using the concept of hydrodynamic filtration (HDF).”

Our news journalists obtained a quote from the research from Chiba University, “When a cell suspension is continuously introduced into a

microchannel (main channel) possessing multiple side channels, cells flow through the main channel, whereas the carrier medium of the cells is drained through the side channels. Introductions of a cell treatment solution containing a surfactant and a washing buffer enable the two-step exchange of the carrier-medium and the cell treatment by the surfactant for a short span of time. The precise control of the treatment time by changing the flow rate and/or the size of the microchannel enables the selective digestion of cell membranes, resulting in the isolation of cell nuclei after separation from membrane debris and cytoplasmic components according to size. We examined several surfactant molecules and demonstrated that Triton X-100 exhibited high efficiency regarding nucleus isolation for both adherent (HeLa) and nonadherent (JM) cells, with a recovery ratio of similar to 80 %. In addition, the isolation efficiency was evaluated by western blotting.”

According to the news editors, the researchers concluded: “The presented flow-through microfluidic cell-nucleus separator may be a useful tool for general biological applications, because of its simplicity in operation, high reproducibility, and accuracy.”

For more information on this research see: Isolation of cell nuclei in microchannels by short-term chemical treatment via two-step carrier medium exchange. *Biomedical Microdevices*, 2012;14(4):751-757. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news correspondents report that additional information may be obtained from K. Toyama, Chiba University, Dept. of Appl Chem & Biotechnol, Grad Sch Engn, Inage Ku, Chiba 2638522, Japan. (2012 Aug 07)

### **University of Nantes: Absolute quantification of metabolites in breast cancer cell extracts by quantitative 2D (1) H INADEQUATE NMR**

By a News Reporter-Staff News Editor at Cancer Weekly – Investigators discuss new findings in Breast Cancer. According to news reporting out of Nantes, France, by NewsRx editors, research stated, “Metabolomic studies by NMR spectroscopy are increasingly employed for a variety of biomedical applications. A very standardized 1D proton NMR protocol is generally employed for data acquisition, associated with multivariate statistical tests.”

Our news journalists obtained a quote from the research from the University of Nantes, “Even if targeted approaches have been proposed to quantify metabolites from such experiments, quantification is often made difficult by the high degree of overlap characterizing (1) H NMR

spectra of biological samples. Two-dimensional spectroscopy presents a high potential for accurately measuring concentrations in complex samples, as it offers a much higher discrimination between metabolite resonances. We have recently proposed an original approach relying on the (1) H 2D INADEQUATE pulse sequence, optimized for fast quantitative analysis of complex metabolic mixtures. Here, the first application of the quantitative (1) H 2D INADEQUATE experiment to a real metabonomic study is presented. Absolute metabolite concentrations are determined for different breast cancer cell line extracts, by a standard addition procedure. The protocol is characterized by high analytical performances (accuracy better than 1%, excellent linearity), even if it is affected by relatively long acquisition durations (15?min to 1?h per spectrum). It is applied to three different cell lines, expressing different hormonal and tyrosine kinase receptors. The absolute concentrations of 15 metabolites are determined, revealing significant differences between cell lines. The metabolite concentrations measured are in good agreement with previous studies regarding metabolic profile changes of breast cancer.”

According to the news editors, the researchers concluded: “While providing a high degree of discrimination, this methodology offers a powerful tool for the determination of relevant biomarkers.”

For more information on this research see: Absolute quantification of metabolites in breast cancer cell extracts by quantitative 2D (1) H INADEQUATE NMR. *Nmr In Biomedicine*, 2012;25(8):985-92. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news journalists report that additional information may be obtained by contacting E. Martineau, Universite de Nantes, CNRS, CEISAM UMR 6230, BP 92208, 2 rue de la Houssiniere, F-44322, Nantes Cedex 03, France. (2012 Aug 07)

### **University of Southampton: Multiplexed suspension array platform for high-throughput protein assays**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Biomedical Engineering have been published. According to news originating from Southampton, United Kingdom, by NewsRx correspondents, research stated, “A multiplexed suspension array platform, based on SU8 disks patterned with machine-readable binary identification codes is presented. Multiple probe molecules, each attached to individual disks with different unique codes, provide multiplexed detection of targets in a small sample volume.”

Our news journalists obtained a quote from the research from the University of Southampton, “The experimental system consists of a microfluidic chamber for arraying the particles in a manner suitable for high throughput imaging using a simple fluorescent microscope, together with custom software for automated code readout and analysis of assay response. The platform is demonstrated with a multiplexed antibody assay targeting 3 different human inflammatory cytokines.”

According to the news editors, the researchers concluded: “The suitability of the platform for other bio-analytical applications is discussed.”

For more information on this research see: Multiplexed suspension array platform for high-throughput protein assays. *Biomedical Microdevices*, 2012;14(4):651-657. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news correspondents report that additional information may be obtained from S.W. Birtwell, University of Southampton, Sch Chem, Southampton SO17 1BJ, Hants, United Kingdom. (2012 Aug 07)

### **Kagawa University, Takamatsu: A perfusable microfluidic device with on-chip total internal reflection fluorescence microscopy (TIRFM) for in situ and real-time monitoring of live cells**

By a News Reporter-Staff News Editor at Gastroenterology Week – Investigators discuss new findings in Peptide Proteins. According to news reporting from Takamatsu, Japan, by NewsRx journalists, research stated, “A microfluidic device integrated with a Total Internal Reflection (TIR)-based chip for cell observation and analysis was developed. This integrated device enables in situ Total Internal Reflection Fluorescence Microscopy (TIRFM) on adherent cells cultured under continuous medium perfusion.”

The news correspondents obtained a quote from the research from Kagawa University, “This TIR-based chip, allows TIRFM to be easily performed on cells without the assembly of complicated optical components and cell culture chambers. The integrated device was evaluated by tracking the movement of fluorescent beads and monitoring the location of insulin granules in mouse pancreatic beta-cells. This system offers higher signal-to-noise (S/N) ratio than epi-fluorescence microscopy (EPIFM), and comparable image quality to commercial TIRFM systems when imaging insulin granules.”

According to the news reporters, the researchers concluded: “We also detected repetitive changes in intracellular Ca<sup>2+</sup> concentration in

MIN6-m9 cells stimulated with KCl, which demonstrates quick perfusion for cell analysis while maintaining high S/N ratio.”

For more information on this research see: A perfusable microfluidic device with on-chip total internal reflection fluorescence microscopy (TIRFM) for in situ and real-time monitoring of live cells. *Biomedical Microdevices*, 2012;14(4):791-797. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting R. Yokokawa, Kagawa Univ, Dept. of Intelligent Mech Syst Engrn, Takamatsu, Kagawa 7610396, Japan. (2012 Aug 06)

### **National Center for Scientific Research (CNRS), Vandoeuvre les Nancy: Effect of dynamic loading on MSCs chondrogenic differentiation in 3-D alginate culture**

By a News Reporter-Staff News Editor at Stem Cell Week – Investigators publish new report on Bone Research. According to news reporting from Vandoeuvre les Nancy, France, by NewsRx journalists, research stated, “Mesenchymal stem cells (MSCs) are regarded as a potential autologous source for cartilage repair, because they can differentiate into chondrocytes by transforming growth factor-beta (TGF- $\beta$ 223;) treatment under the 3-dimensional (3-D) culture condition. In addition to these molecular and biochemical methods, the mechanical regulation of differentiation and matrix formation by MSCs is only starting to be considered.”

The news correspondents obtained a quote from the research from National Center for Scientific Research (CNRS), “Recently, mechanical loading has been shown to induce chondrogenesis of MSCs in vitro. In this study, we investigated the effects of a calibrated agitation on the chondrogenesis of human bone MSCs (MSCs) in a 3-D alginate culture (day 28) and on the maintenance of chondrogenic phenotypes. Biomechanical stimulation of MSCs increased: (i) types 1 and 2 collagen formation; (ii) the expression of chondrogenic markers such as COMP and SOX9; and (iii) the capacity to maintain the chondrogenic phenotypes. Notably, these effects were shown without TGF- $\beta$ 223; treatment. These results suggest that a mechanical stimulation could be an efficient method to induce chondrogenic differentiation of MSCs in vitro for cartilage tissue engineering in a 3-D environment.”

According to the news reporters, the researchers concluded: “Additionally, it appears that MSCs and chondrocyte responses to mechanical stimulation are not identical.”



For more information on this research see: Effect of dynamic loading on MSCs chondrogenic differentiation in 3-D alginate culture. *Bio-medical Materials and Engineering*, 2012;22(4):209-18.

Our news journalists report that additional information may be obtained by contacting C. Henrionnet, UMR 7561 CNRS - Universite de Lorraine, Vandoeuvre-les-Nancy, France. (2012 Aug 06)

### **Charite University Hospital and School of Medicine, Berlin: Optimised in vitro applicable loads for the simulation of lateral bending in the lumbar spine**

By a News Reporter-Staff News Editor at Health & Medicine Week – Research findings on Medical Engineering and Physics are discussed in a new report. According to news reporting from Berlin, Germany, by NewsRx journalists, researchers stated “In in vitro studies of the lumbar spine simplified loading modes (compressive follower force, pure moment) are usually employed to simulate the standard load cases flexion-extension, axial rotation and lateral bending of the upper body. However, the magnitudes of these loads vary widely in the literature.”

The news correspondents obtained a quote from the research from the Charite University Hospital and School of Medicine, “Thus the results of current studies may lead to unrealistic values and are hardly comparable. It is still unknown which load magnitudes lead to a realistic simulation of maximum lateral bending. A validated finite element model of the lumbar spine was used in an optimisation study to determine which magnitudes of the compressive follower force and bending moment deliver results that fit best with averaged in vivo data. The best agreement with averaged in vivo measured data was found for a compressive follower force of 700N and a lateral bending moment of 7.8Nm. These results show that loading modes that differ strongly from the optimised one may not realistically simulate maximum lateral bending. The simplified but in vitro applicable loading cannot perfectly mimic the in vivo situation. However, the optimised magnitudes are those which agree best with averaged in vivo measured data.”

According to the news reporters, the researchers concluded: “Its consequent application would lead to a better comparability of different investigations.”

For more information on this research see: Optimised in vitro applicable loads for the simulation of lateral bending in the lumbar spine. *Medical Engineering & Physics*, 2012;34(6):777-80. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting M. Dreischarf, Julius Wolff Institute, Charite

- Universitätsmedizin Berlin, Augustenburger Platz 1, 13353 Berlin, Germany. (2012 Aug 03)

### **Delft University of Technology: Needle-tissue interaction forces - A survey of experimental data**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Medical Engineering and Physics have been published. According to news reporting originating in Delft, Netherlands, by NewsRx journalists, researchers stated “The development of needles, needle-insertion simulators, and needle-wielding robots for use in a clinical environment depends on a thorough understanding of the mechanics of needle-tissue interaction. It stands to reason that the forces arising from this interaction are influenced by numerous factors, such as needle type, insertion speed, and tissue characteristics.”

The news reporters obtained a quote from the research from the Delft University of Technology, “However, exactly how these factors influence the force is not clear. For this reason, the influence of various factors on needle insertion-force was investigated by searching literature for experimental data. This resulted in a comprehensive overview of experimental insertion-force data available in the literature, grouped by factor for quick reference. In total, 99 papers presenting such force data were found, with typical peak forces in the order of 1-10N. The data suggest, for example, that higher velocity tends to decrease puncture force and increase friction. Furthermore, increased needle diameter was found to increase peak forces, and conical needles were found to create higher peak forces than beveled needles.”

According to the news reporters, the researchers concluded: “However, many questions remain open for investigation, especially those concerning the influence of tissue characteristics.”

For more information on this research see: Needle-tissue interaction forces - A survey of experimental data. *Medical Engineering & Physics*, 2012;34(6):665-80. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting D.J. van Gerwen, Delft University of Technology, Dept. of Biomechanical Engineering, Mekelweg 2, 2628 CD, Delft, Netherlands. (2012 Aug 03)

**Federal University, Recife: In situ gold nanoparticles formation: contrast agent for dental optical coherence tomography**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Nanoparticles have been published. According to news reporting originating in Recife, Brazil, by NewsRx journalists, researchers stated “In this work we demonstrate the potential use of gold nanoparticles as contrast agents for the optical coherence tomography (OCT) imaging technique in dentistry. Here, a new in situ photothermal reduction procedure was developed, producing spherical gold nanoparticles inside dentinal layers and tubules.”

The news reporters obtained a quote from the research from Federal University, “Gold ions were dispersed in the primer of commercially available dental bonding systems. After the application and permeation in dentin by the modified adhesive systems, the dental bonding materials were photopolymerized concurrently with the formation of gold nanoparticles. The gold nanoparticles were visualized by scanning electron microscopy (SEM). The SEM images show the presence of gold nanospheres in the hybrid layer and dentinal tubules. The diameter of the gold nanoparticles was determined to be in the range of 40 to 120 nm. Optical coherence tomography images were obtained in two- and three-dimensions. The distribution of nanoparticles was analyzed and the extended depth of nanosphere production was determined.”

According to the news reporters, the researchers concluded: “The results show that the OCT technique, using in situ formed gold nanoparticles as contrast enhancers, can be used to visualize dentin structures in a non-invasive and non-destructive way.”

For more information on this research see: In situ gold nanoparticles formation: contrast agent for dental optical coherence tomography. *Journal of Biomedical Optics*, 2012;17(6):329-333. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting A.K.S. Braz, Federal University of Pernambuco, Dept. of Phys, BR-50670901 Recife, PE, Brazil. (2012 Aug 03)

## **Las Palmas University, Las Palmas de Gran Canaria: Screw locking elements: A means to modify the flexibility of osteoporotic fracture fixation with DCPs without compromising system strength or stability**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Medical Engineering and Physics have been published. According to news reporting originating in Las Palmas de Gran Canaria, Spain, by NewsRx journalists, researchers stated “This paper analyses whether it is possible to use dynamic compression plates (DCPs) and screw locking elements (SLEs) to vary the flexibility of osteoporotic fracture fixation without compromising the strength and stability of the construct. Compression, torsion and four-point bending static strength tests were conducted.”

The news reporters obtained a quote from the research from Las Palmas University, “Cyclic load tests of up to 10,000 load cycles were also carried out to determine stiffness performance. Four fixation systems were mounted onto polyurethane bone models. Group 1 consists of the DCP and six cortical screws. Group 2, idem, but with the addition of two SLEs. Group 3, idem, but with the addition of six SLEs. Group 4 used the locking compression plate (LCP) and locking screws. The results indicated no significant difference ( $p > 0.05$ ) in the strength of groups 2-4. It was also observed that the torsional stiffness of group 3 ( $0.30\text{Nm}/^\circ$ ) was higher than that of group 2 ( $0.23\text{Nm}/^\circ$ ) and similar to that of group 4 ( $0.28\text{Nm}/^\circ$ ). Compression stiffness of group 4 ( $124\text{N/mm}$ ) was higher than that of group 2 ( $102\text{N/mm}$ ), but lower than that of group 3 ( $150\text{N/mm}$ ). No notable differences were observed for structural bending stiffness.”

According to the news reporters, the researchers concluded: “It is concluded that by using the DCP with SLEs it is possible to modify the stiffness of the fixation construct for the repair of osteoporotic fractures and, in this way, facilitate the conditions suitable on secondary bone healing.”

For more information on this research see: Screw locking elements: A means to modify the flexibility of osteoporotic fracture fixation with DCPs without compromising system strength or stability. *Medical Engineering & Physics*, 2012;34(6):717-24. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - <http://www.elsevier.com/locate/medengphys>)

Our news correspondents report that additional information may be obtained by contacting A. Yanez, Dept. of Mechanical Engineering, Biomechanical Laboratory, Las Palmas University, Engineering Departmental Building, Campus de Tafira Baja, 35017 Las Palmas de Gran Canaria, Spain. (2012 Aug 03)

## **National Institute for Occupational Safety and Health, Morgantown: Inverse dynamic analysis of the biomechanics of the thumb while pipetting: A case study**

By a News Reporter-Staff News Editor at Health & Medicine Week – Fresh data on Medical Engineering and Physics are presented in a new report. According to news reporting from Morgantown, West Virginia, by NewsRx journalists, researchers stated “Thumb-push manual pipettes are commonly used tools in many medical, biological, and chemical laboratories. Epidemiological studies indicate that the use of thumb-push mechanical pipettes is associated with musculoskeletal disorders in the hand.”

The news correspondents obtained a quote from the research from National Institute for Occupational Safety and Health, “The goal of the current study was to evaluate the kinematics and joint loading of the thumb during pipetting. The time-histories of joint angles and the interface contact force between the thumb and plunger during the pipetting action were determined experimentally, and the joint loadings and joint power in the thumb were calculated via an inverse dynamic approach. The moment, power, and energy absorption in each joint of the thumb during the extraction and dispensing actions were analyzed. The results indicate that the majority of the power is generated in the interphalangeal (IP) and carpometacarpal (CMC) joints for the pipetting action.”

According to the news reporters, the researchers concluded: “The analysis method and results in the current study will be helpful in exploring the mechanism for musculoskeletal injuries of the hand associated with pipetting, providing a preliminary foundation for ergonomic design of the pipette.”

For more information on this research see: Inverse dynamic analysis of the biomechanics of the thumb while pipetting: A case study. *Medical Engineering & Physics*, 2012;34(6):693-701. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting J.Z. Wu, National Institute for Occupational Safety and Health, Morgantown, WV 26505, United States. (2012 Aug 03)

## **Shiraz University: Numerical simulation of the fluid dynamics in vitreous cavity due to saccadic eye movement**

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Medical Engineering and Physics is the subject of a report. According to news reporting originating from Shiraz, Iran, by NewsRx correspondents, researchers stated “In this study, the flow dynamics of vitreous due to saccadic movements following vitreous liquefaction or in post-vitrectomy eyes is investigated. Using a dynamic mesh technique, the eye motion was modeled and unsteady three-dimensional forms of continuity and Navier-Stokes equations were solved numerically.”

Our news editors obtained a quote from the research from Shiraz University, “Firstly, the numerical model was validated for a sphere as a model of vitreous chamber and agrees well with the results based on available analytic solutions and experimental data. Then, numerical simulation was performed based on a deformed sphere with an indentation representing the lens. This consists of a vitreous cavity filled with a liquid having the viscosity of liquefied vitreous and balanced salt solution. The wall shear stress on the retina was computed and compared for various saccade amplitudes. Also, the effect of variation in vitreous viscosity and the size of lens indentation are investigated. The results show that the secondary flow in the vertical direction in the vitreous cavity is much higher for the liquefied vitreous and balanced salt solution compared with that for silicone oil. The possible effect of shear stress on the retinal detachment for all studied cases is discussed.”

According to the news editors, the researchers concluded: “A semi-analytic correlation is also developed for maximum wall shear stress of the spherical domain that is subjected to sinusoidal rotations.”

For more information on this research see: Numerical simulation of the fluid dynamics in vitreous cavity due to saccadic eye movement. *Medical Engineering & Physics*, 2012;34(6):681-92. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting O. Abouali, School of Mechanical Engineering, Shiraz University, Shiraz, Iran. (2012 Aug 03)

### **University Medical Center, Groningen: Stabilizing moments of force on a prosthetic knee during stance in the first steps after gait initiation**

By a News Reporter-Staff News Editor at Health & Medicine Week – Data detailed on Medical Engineering and Physics have been presented. According to news reporting out of Groningen, Netherlands, by NewsRx editors, researchers stated “In this study, the occurrences of stabilizing and destabilizing external moments of force on a prosthetic knee during stance, in the first steps after gait initiation, in inexperienced users were investigated. Primary aim was to identify the differences in the external moments during gait initiation with the sound leg leading and the prosthetic leg leading.”

Our news journalists obtained a quote from the research from University Medical Center, “A prosthetic leg simulator device, with a flexible knee, was used to test able-bodied subject, with no walking aid experience. Inverse dynamics calculations were performed to calculate the external moments. The subjects learned to control the prosthetic leg within 100 steps, without walking aids, evoking similar patterns of external moments of force during the steps after the gait initiation, either with their sound leg loading or prosthetic leg leading.”

According to the news editors, the researchers concluded: “Critical phases in which a sudden flexion of the knee can occur were found just after heelstrike and just before toe off, in which the external moment of force was close to the internal moment produced by a knee extension aiding spring in the opposite direction.”

For more information on this research see: Stabilizing moments of force on a prosthetic knee during stance in the first steps after gait initiation. *Medical Engineering & Physics*, 2012;34(6):733-9. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting H.G. van Keeken, Center for Human Movement Sciences, University Medical Center Groningen, University of Groningen, Groningen, Netherlands. (2012 Aug 03)

### **University of Toronto: A comprehensive three-dimensional dynamic model of the human head and trunk for estimating lumbar and cervical joint torques and forces from upper body kinematics**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Medical Engineering and Physics have been published. According to news reporting originating in Toronto, Canada,

by NewsRx journalists, researchers stated “Linked-segment representations of human body dynamics have been used extensively in biomechanics, ergonomics, and rehabilitation research to systemize thinking, make predictions, and suggest novel experiments. In the scope of upper body biomechanics, these models play an even more essential role as the human spine dynamics are difficult to study in vivo.”

The news reporters obtained a quote from the research from the University of Toronto, “No study exists to date, however, that specifically disseminates the technical details of a comprehensive three-dimensional model of the upper body for the purpose of estimating spinal joint torques and forces for a wide range of scenarios. Consequently, researchers are still bound to develop and implement their own models. Therefore, the objective of this study was to design a dynamic model of the upper body that can comprehensively estimate spinal joint torques and forces from upper body kinematics. The proposed three-dimensional model focuses on the actions of the lumbar and cervical vertebrae and consists of five lumbar segments (L1 to L5), the thorax, six cervical segments (C2 to C7), and the head. Additionally, the model: (1) is flexible regarding the kinematic nature of the spinal joints (free, constrained, or fixed); (2) incorporates all geometric and mass-inertia parameters from a single, high-resolution source; and (3) can be feasibly implemented via different inverse dynamics formulations. To demonstrate its practicality, the model was finally employed to estimate the lumbar and cervical joint torques during perturbed sitting using experimental motion data.”

According to the news reporters, the researchers concluded: “Considering the growing importance of mathematical predictions, the developed model should become an important resource for researchers in different fields.”

For more information on this research see: A comprehensive three-dimensional dynamic model of the human head and trunk for estimating lumbar and cervical joint torques and forces from upper body kinematics. *Medical Engineering & Physics*, 2012;34(5):640-9. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting A.H. Vette, Institute of Biomaterials and Biomedical Engineering, University of Toronto, 164 College Street, Toronto, Ontario M5S 3G9, Canada. (2012 Aug 03)



### **University of Zaragoza, Huesca: Technical variability of the GT3X accelerometer**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Medical Engineering and Physics. According to news reporting out of Huesca, Spain, by NewsRx editors, researchers stated “To analyze the intra-and inter-instrument reliability of the ActiGraph GT3X accelerometer using a vibration table on each orthogonal axis and at five frequencies of motion. Ten GT3X units were subjected to a specific vibration using a motorized vibration table along the vertical, horizontal right-left and horizontal front-back axis, and at 1.1, 2.1, 3.1, 4.1 and 10.2Hz.”

Our news journalists obtained a quote from the research from the University of Zaragoza, “The 5min data for each frequency were analyzed separately for frequency, axis effects, and inter-and intra-instrument variability. We found overall high intra-and inter-instrument reliability for the GT3X accelerometer at frequencies between 2.1 and 4.1Hz. For frequencies ranging between 2.1 and 4.1Hz, the intra-instrument coefficient of variation was=2.5%. The inter-instrument coefficient of variation ranged widely along axes and frequencies, with the lowest values (=9%) corresponding to 2.1-4.1Hz. The intra-class correlation coefficient for activity counts across frequencies and for all axes was 0.97.”

According to the news editors, the researchers concluded: “Overall, our findings support the use of the GT3X accelerometer as an accurate tool to estimate free-living physical activity, at least within those frequencies that are common to most types of human daily activities.”

For more information on this research see: Technical variability of the GT3X accelerometer. *Medical Engineering & Physics*, 2012;34(6):787-90. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting A. Santos-Lozano, Faculty of Health and Sport Science, University of Zaragoza, Huesca, Spain. (2012 Aug 03)

### **Wilmer Eye Institute, Baltimore: Characterization of novel microsphere chain fiber optic tips for potential use in ophthalmic laser surgery**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Baltimore, Maryland, by NewsRx correspondents, researchers stated “Ophthalmic surgery may benefit from use of more precise fiber delivery systems during laser surgery.

Some current ophthalmic surgical techniques rely on tedious mechanical dissection of tissue layers.”

Our news editors obtained a quote from the research from Wilmer Eye Institute, “In this study, chains of sapphire microspheres integrated into a hollow waveguide distal tip are used for erbium:YAG laser ablation studies in contact mode with ophthalmic tissues, ex vivo. The laser’s short optical penetration depth combined with the small spot diameters achieved with this fiber probe may provide more precise tissue removal. One-, three-, and five-microsphere chain structures were characterized, resulting in FWHM diameters of 67, 32, and 30  $\mu\text{m}$  in air, respectively, with beam profiles comparable to simulations. Single Er:YAG pulses of 0.1 mJ and 75- $\mu\text{s}$  duration produced ablation craters with average diameters of 44, 30, and 17  $\mu\text{m}$  and depths of 26, 10, and 8  $\mu\text{m}$ , for one-, three-, and five-sphere structures, respectively. Microsphere chains produced spatial filtering of the multimode Er: YAG laser beam and fiber, providing spot diameters not otherwise available with conventional fiber systems.”

According to the news editors, the researchers concluded: “Because of the extremely shallow treatment depth, compact focused beam, and contact mode operation, this probe may have potential for use in dissecting epiretinal membranes and other ophthalmic tissues without damaging adjacent retinal tissue.”

For more information on this research see: Characterization of novel microsphere chain fiber optic tips for potential use in ophthalmic laser surgery. *Journal of Biomedical Optics*, 2012;17(6):601-607. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting T.C. Hutchens, Wilmer Eye Inst, Johns Hopkins Med Inst, Baltimore, MD 21287, United States. (2012 Aug 03)

### **Catholic University of Leuven, Louvain: Evaluating the Noise in Electrically Evoked Compound Action Potential Measurements in Cochlear Implants**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Louvain, Belgium, by NewsRx journalists, researchers stated “Electrically evoked compound action potentials (ECAPs) are widely used to study the excitability of the auditory nerve and stimulation properties in cochlear implant (CI) users. However, ECAP detection can be difficult and very subjective at near-threshold stimulation levels or in spread of excitation measurements.”

The news correspondents obtained a quote from the research from the Catholic University of Leuven, “In this study, we evaluated the statistical properties of the background noise (BN) and the postaverage residual noise (RN) in ECAP measurements in order to determine an objective detection criterion. For the estimation of the BN and the RN, a method currently used in auditory brainstem response measurements was applied. The potential benefit of using weighted (Bayesian) averages was also examined. All estimations were performed with a set of approximately 360 ECAP measurements recorded from five human CI users of the CII or HiRes90K device (advanced bionics). Results demonstrated that the BN was normally distributed and the RN decreased according to the square root of the number of averages. No additional benefit was observed by using weighted averaging. The noise was not significantly different either at different stimulation intensities or across recording electrodes along the cochlea.”

According to the news reporters, the researchers concluded: “The analysis of the statistical properties of the noise indicated that a signal-to-noise ratio of 1.7 dB as a detection criterion corresponds to a false positive detection rate of 1% with the used measurement setup.”

For more information on this research see: Evaluating the Noise in Electrically Evoked Compound Action Potential Measurements in Cochlear Implants. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1912-1923. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting J.A. Undurraga, Catholic University of Leuven, Dept. of Neurosci, B-3000 Louvain, Belgium. (2012 Aug 01)

### **City University of London: 3-D Quantitative Vascular Shape Analysis for Arterial Bifurcations via Dynamic Tube Fitting**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in London, United Kingdom, by NewsRx journalists, researchers stated “Reliable and reproducible estimation of vessel centerlines and reference surfaces is an important step for the assessment of luminal lesions. Conventional methods are commonly developed for quantitative analysis of the ‘straight’ vessel segments and have limitations in defining the precise location of the centerline and the reference

lumen surface for both the main vessel and the side branches in the vicinity of bifurcations.”

The news reporters obtained a quote from the research from the City University of London, “To address this, we propose the estimation of the centerline and the reference surface through the registration of an elliptical cross-sectional tube to the desired constituent vessel in each major bifurcation of the arterial tree. The proposed method works directly on the mesh domain, thus alleviating the need for image upsampling, usually required in conventional volume domain approaches. We demonstrate the efficiency and accuracy of the method on both synthetic images and coronary CT angiograms. Experimental results show that the new method is capable of estimating vessel centerlines and reference surfaces with a high degree of agreement to those obtained through manual delineation.”

According to the news reporters, the researchers concluded: “The centerline errors are reduced by an average of 62.3% in the regions of the bifurcations, when compared to the results of the initial solution obtained through the use of mesh contraction method.”

For more information on this research see: 3-D Quantitative Vascular Shape Analysis for Arterial Bifurcations via Dynamic Tube Fitting. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1850-1860. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting Y. Wang, City University of London, Informat Engn & Med Imaging Grp, London EC1V 0HB, United Kingdom. (2012 Aug 01)

### **ESPCI, Paris: Photoacoustic-guided ultrasound therapy with a dual-mode ultrasound array**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Paris, France, by NewsRx journalists, researchers stated “Photoacoustics has recently been proposed as a potential method to guide and/or monitor therapy based on high-intensity focused ultrasound (HIFU). We experimentally demonstrate the creation of a HIFU lesion at the location of an optical absorber, by use of photoacoustic signals emitted by the absorber detected on a dual mode transducer array.”

The news reporters obtained a quote from the research from ESPCI, “To do so, a dedicated ultrasound array intended to both detect photoacoustic waves and emit HIFU with the same elements was used. Such a dual-mode array provides automatically coregistered reference frames for photoacoustic detection and HIFU emission, a highly desired feature for methods involving guidance or monitoring of HIFU by use of photoacoustics. The prototype is first characterized in terms of both photoacoustic and HIFU performances.”

According to the news reporters, the researchers concluded: “The probe is then used to perform an idealized scenario of photoacoustic-guided therapy, where photoacoustic signals generated by an absorbing thread embedded in a piece of chicken breast are used to automatically refocus a HIFU beam with a time-reversal mirror and necrose the tissue at the location of the absorber.”

For more information on this research see: Photoacoustic-guided ultrasound therapy with a dual-mode ultrasound array. *Journal of Biomedical Optics*, 2012;17(6):119-124. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting A. Prost, ESPCI ParisTech, Inst Langevin, CNRS UMR 7587, INSERM ERL U979, F-75231 Paris 05, France. (2012 Aug 01)

### **George W. Woodruff School of Mechanical Engineering, Atlanta: Sensitivity analysis of near-infrared functional lymphatic imaging**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Atlanta, Georgia, by NewsRx correspondents, researchers stated “Near-infrared imaging of lymphatic drainage of injected indocyanine green (ICG) has emerged as a new technology for clinical imaging of lymphatic architecture and quantification of vessel function, yet the imaging capabilities of this approach have yet to be quantitatively characterized. We seek to quantify its capabilities as a diagnostic tool for lymphatic disease.”

Our news editors obtained a quote from the research from the George W. Woodruff School of Mechanical Engineering, “Imaging is performed in a tissue phantom for sensitivity analysis and in hairless rats for in vivo testing. To demonstrate the efficacy of this imaging approach to quantifying immediate functional changes in lymphatics, we investigate the effects of a topically applied nitric oxide (NO) donor glyceryl trinitrate ointment. Premixing ICG with albumin induces greater fluorescence intensity, with the ideal concentration being 150  $\mu$ g/mL

ICG and 60 g/L albumin. ICG fluorescence can be detected at a concentration of 150  $\mu\text{g/mL}$  as deep as 6 mm with our system, but spatial resolution deteriorates below 3 mm, skewing measurements of vessel geometry. NO treatment slows lymphatic transport, which is reflected in increased transport time, reduced packet frequency, reduced packet velocity, and reduced effective contraction length.”

According to the news editors, the researchers concluded: “NIR imaging may be an alternative to invasive procedures measuring lymphatic function in vivo in real time.”

For more information on this research see: Sensitivity analysis of near-infrared functional lymphatic imaging. *Journal of Biomedical Optics*, 2012;17(6):466-476. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting M. Weiler, Georgia Inst Technol, George W Woodruff Sch Mech Engr, Wallace H Coulter Dept. of Biomed Engr, Parker H Petit Inst Bioengn & Biosci, Atlanta, GA 30332, United States. (2012 Aug 01)

### **Harvard University, Bedford: A Muscle’s Force Depends on the Recruitment Patterns of Its Fibers**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating in Bedford, Massachusetts, by NewsRx journalists, researchers stated “Biomechanical models of whole muscles commonly used in simulations of musculoskeletal function and movement typically assume that the muscle generates force as a scaled-up muscle fiber. However, muscles are comprised of motor units that have different intrinsic properties and that can be activated at different times.”

The news reporters obtained a quote from the research from Harvard University, “This study tested whether a muscle model comprised of motor units that could be independently activated resulted in more accurate predictions of force than traditional Hill-type models. Forces predicted by the models were evaluated by direct comparison with the muscle forces measured in situ from the gastrocnemii in goats. The muscle was stimulated tetanically at a range of frequencies, muscle fiber strains were measured using sonomicrometry, and the activation patterns of the different types of motor unit were calculated from electromyographic recordings. Activation patterns were input into five different muscle models. Four models were traditional Hill-type models with different intrinsic speeds and fiber-type properties. The fifth model incorporated differential groups of fast and slow motor units. For all

goats, muscles and stimulation frequencies the differential model resulted in the best predictions of muscle force.”

According to the news reporters, the researchers concluded: “The in situ muscle output was shown to depend on the recruitment of different motor units within the muscle.”

For more information on this research see: A Muscle’s Force Depends on the Recruitment Patterns of Its Fibers. *Annals of Biomedical Engineering*, 2012;40(8):1708-1720. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting J.M. Wakeling, Harvard University, Dept. of Organism & Evolutionary Biol, Concord Field Stn, Bedford, MA 01730, United States. (2012 Aug 01)

### **Heriot Watt University, Edinburgh: A New Framework for Particle Detection in Low-SNR Fluorescence Live-Cell Images and Its Application for Improved Particle Tracking**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Edinburgh, United Kingdom, by NewsRx correspondents, researchers stated “Image denoising and signal enhancement are two common steps to improve particle contrast for detection in low-signal-to-noise ratio (SNR) fluorescence live-cell images. However, denoising may oversmooth features of interest, particularly weak features, leading to false negative detection.”

Our news editors obtained a quote from the research from Heriot Watt University, “Here, we propose a robust framework for particle detection in which image denoising in the grayscale image is not needed, so avoiding image oversmoothing. A key to our approach is the new development of a particle enhancement filter based on the recently proposed particle probability image to obtain significantly enhanced particle features and greatly suppressed background in low-SNR and low-contrast environments. The new detection method is formed by combining foreground and background markers with watershed transform operating in both particle probability and grayscale spaces; dynamical switchings between the two spaces can optimally make use the information in images for accurate determination of particle position, size, and intensity. We further develop the interacting multiple mode filter for particle motion modeling and data association by incorporating the extra information obtained from our particle detector to enhance the efficiency of multiple particle tracking.”

According to the news editors, the researchers concluded: “We find that our methods lead to significant improvements in particle detection and tracking efficiency in fluorescence live-cell applications.”

For more information on this research see: A New Framework for Particle Detection in Low-SNR Fluorescence Live-Cell Images and Its Application for Improved Particle Tracking. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):2040-2050. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting L. Yang, Heriot Watt University, Dept. of Phys, EPS, Edinburgh EH14 4AS, Midlothian, United Kingdom. (2012 Aug 01)

### **Hubei University, Wuhan: Cellulose nanowhiskers: Preparation, characterization and cytotoxicity evaluation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating in Wuhan, People’s Republic of China, by NewsRx journalists, researchers stated “To characterize the structure and to evaluate the cytotoxicity of cellulose nanowhiskers (CNW) prepared from cotton linters. A series of CNW dispersions was prepared by hydrolyzing cotton linters with sulfuric acid.”

The news reporters obtained a quote from the research from Hubei University, “The structure of CNW was characterized by scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier transform infrared spectroscopy (FT-IR) and X-ray diffraction (XRD). The cytotoxicity of CNW dispersions to L929 cells was preliminarily investigated by cell culture and MTT assay. SEM and TEM observation showed that the original cotton linters have been successfully acid-hydrolyzed into cellulose nanowhiskers having needle-or short rod-like structure with an average length of 250 nm and diameter of 10 nm. XRD patterns suggested that degree of crystalline in the CNW was much higher than that in the cotton linters as a result that the acid-hydrolysis process has removed the amorphous domains in the cotton linters. The results from MTT assay and cell morphology observation indicated that CNW with concentration from 0.01% to 0.2% had low toxicity to L929 cells, while cytotoxicity showed an increase tendency with an increase in the concentration of CNW. Cellulose nanowhiskers dispersion could be prepared from cotton linters by acid-hydrolysis process.”



According to the news reporters, the researchers concluded: “CNW showed potential applications as nanobiomaterials due to its low cytotoxicity.”

For more information on this research see: Cellulose nanowhiskers: Preparation, characterization and cytotoxicity evaluation. *Bio-medical Materials and Engineering*, 2012;22(1):121-7.

Our news correspondents report that additional information may be obtained by contacting H. Ni, School of Life Science, Hubei University, Wuhan, People’s Taiwan. (2012 Aug 01)

### **Johns Hopkins University, Baltimore: Real-time photoacoustic imaging of prostate brachytherapy seeds using a clinical ultrasound system**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news originating from Baltimore, Maryland, by NewsRx correspondents, researchers stated “Prostate brachytherapy is a popular prostate cancer treatment option that involves the permanent implantation of radioactive seeds into the prostate. However, contemporary brachytherapy procedure is limited by the lack of an imaging system that can provide real-time seed-position feedback.”

Our news journalists obtained a quote from the research from Johns Hopkins University, “While many other imaging systems have been proposed, photoacoustic imaging has emerged as a potential ideal modality to address this need, since it could easily be incorporated into the current ultrasound system used in the operating room. We present such a photoacoustic imaging system built around a clinical ultrasound system to achieve the task of visualizing and localizing seeds. We performed several experiments to analyze the effects of various parameters on the appearance of brachytherapy seeds in photoacoustic images. We also imaged multiple seeds in an ex vivo dog prostate phantom to demonstrate the possibility of using this system in a clinical setting.”

According to the news editors, the researchers concluded: “Although still in its infancy, these initial results of a photoacoustic imaging system for the application of prostate brachytherapy seed localization are highly promising.”

For more information on this research see: Real-time photoacoustic imaging of prostate brachytherapy seeds using a clinical ultrasound system. *Journal of Biomedical Optics*, 2012;17(6):345-351. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from N. Kuo, Johns Hopkins University, Dept. of Radiol, Baltimore, MD 21218, United States. (2012 Aug 01)

### **Johns Hopkins University, Baltimore: Therapeutic response in musculoskeletal soft tissue sarcomas: evaluation by MRI**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedicine have been published. According to news reporting from Baltimore, Maryland, by NewsRx journalists, researchers stated “This article provides a literature review of the use of MRI in monitoring the treatment response of soft tissue sarcomas. The basic classification and physiology of soft tissue tumors are introduced.”

The news correspondents obtained a quote from the research from Johns Hopkins University, “Then, the major treatment options for soft tissue sarcomas are summarized with brief coverage of possible responses and grading systems. Four major branches of MRI techniques are covered, including conventional T(1) -and T(2) -weighted imaging, contrast-enhanced MRI, MR diffusion and perfusion imaging, and MRS, with a focus on the tumor microenvironment. Although this literature survey focuses on recent clinical developments using these MRI techniques, research venues in preclinical studies, as well as in potential applications other than soft tissue sarcomas, are also included when comparable and/or mutually supporting.”

According to the news reporters, the researchers concluded: “Examples from other less-discussed MRI modalities are also briefly covered, not only to complement, but also to expand, the scope and depth of information for various kinds of lesions.”

For more information on this research see: Therapeutic response in musculoskeletal soft tissue sarcomas: evaluation by MRI. *Nmr In Biomedicine*, 2011;24(6):750-63. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news journalists report that additional information may be obtained by contacting X. Wang, Russell H Morgan Dept. of Radiology and Radiological Sciences, Johns Hopkins University, Baltimore, MD, United States. (2012 Aug 01)

## **Mayo Clinic, Rochester: Evanescent field shapes excitation profile under axial epi-illumination**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from Rochester, Minnesota, by NewsRx editors, the researcher stated “Axial epi-illuminating light transmitting a&t;1.3-numerical-aperture microscope objective creates an excitation volume at focus with size and shape dictated by diffraction and due to refraction by the objective and by the coverslip interface separating a specimen in aqueous buffer from the oil immersion objective. The evanescent field on the coverslip aqueous side affects primarily the excitation volume axial dimension as the specimen in focus approaches the interface to within a few hundred nanometers.”

The news correspondents obtained a quote from the research from Mayo Clinic, “Following excitation, an excited stationary dipole moment emits fluorescence in a spatially varying pattern collected over the large objective aperture. Collected light propagates in parallel rays toward the tube lens that forms a real three-dimensional image that is decoded to identify dipole orientation. An integral representation of the excitation and emitted fields for infinity-corrected optics-including effects of finite conjugate illumination, fluorescence emission near an interface, emitter dipole orientation, spherical aberration, light transmission through a dichroic filter, and for real microscopic specifications-accurately models observed field intensities including the substantial excitation from the evanescent field.”

According to the news reporters, the researchers concluded: “The goal is to develop and verify the practical depiction of excitation and emission in a real microscope for quantitative interpretation of the 3-D emission pattern.”

For more information on this research see: Evanescent field shapes excitation profile under axial epi-illumination. *Journal of Biomedical Optics*, 2012;17(6):484-492. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting T.P. Burghardt, Mayo Clin Rochester, Dept. of Physiol & Biomed Engn, Rochester, MN 55905, United States. (2012 Aug 01)

### **Middle East Technical University, Ankara: Statistically Reliable and Fast Direct Estimation of Phase-Amplitude Cross-Frequency Coupling**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news originating from Ankara, Turkey, by NewsRx editors, the researcher stated “There is growing interest in phase-amplitude cross-frequency coupling (PAC), which is widely observed in human and animal brain recordings. The choice of the estimation method is vital while extracting accurate PAC parameters from data.”

Our news journalists obtained a quote from the research from Middle East Technical University, “Two desired properties of PAC estimators are reliability and computational efficiency. This study offers a methodology called normalized direct PAC (ndPAC) for the rapid and statistically reliable estimation of PAC strength. A plain confidence limit formula, depending solely on data length and confidence level, is derived. Confidence level derivation is validated numerically. It is shown through simulations that ndPAC exhibits high specificity and sensitivity performances.”

According to the news editors, the researchers concluded: “The suggested methodology is also demonstrated on monkey electrocorticogram recorded during a visual task.”

For more information on this research see: Statistically Reliable and Fast Direct Estimation of Phase-Amplitude Cross-Frequency Coupling. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1943-1950. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from T.E. Ozkurt, Middle East Technical University, Dept. of Hlth Informat, Inst Informat, TR-06800 Ankara, Turkey. (2012 Aug 01)

### **Monash University, Clayton: A Methodology for Detecting Field Potentials from the External Ear Canal: NEER and EVestG**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating from Clayton, Australia, by NewsRx editors, the researcher stated “An algorithm called the neural event extraction routine (NEER) and a method called Electrovestibulography

(EVestG) for extracting field potentials (FPs) from artefact rich and noisy ear canal recordings is presented. Averaged FP waveforms can be used to aid detection of acoustic and or vestibular pathologies.”

Our news editors obtained a quote from the research from Monash University, “FPs were recorded in the external ear canal proximal to the ear drum. These FPs were extracted using an algorithm called NEER. NEER utilises a modified complex Morlet wavelet analysis of phase change across multiple scales and a template matching (matched filter) methodology to detect FPs buried in noise and biological and environmental artefacts. Initial simulation with simulated FPs shows NEER detects FPs down to -30 dB SNR (power) but only 13-23% of those at SNR's  $\leq -6$  dB. This was deemed applicable to longer duration recordings wherein averaging could be applied as many FPs are present. NEER was applied to detect both spontaneous and whole body tilt evoked FPs. By subtracting the averaged tilt FP response from the averaged spontaneous FP response it is believed this difference is more representative of the vestibular response. Significant difference ( $p \leq 0.05$ ) between up and down whole body (supine and sitting) movements was achieved.”

According to the news editors, the researchers concluded: “Pathologic and physiologic evidence in support of a vestibular and acoustic origin is also presented.”

For more information on this research see: A Methodology for Detecting Field Potentials from the External Ear Canal: NEER and EVestG. *Annals of Biomedical Engineering*, 2012;40(8):1835-1850. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting B. Lithgow, Monash University, Diagnost & Neurosignal Proc Res Lab, Clayton, Vic, Australia. (2012 Aug 01)

### **National Research Council of Canada, Boucherville: Non-contact biomedical photoacoustic and ultrasound imaging**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting out of Boucherville, Canada, by NewsRx editors, researchers stated “The detection of ultrasound in photoacoustic tomography (PAT) usually relies on ultrasonic transducers in contact with the biological tissue through a coupling medium. This is a major drawback for important potential applications such as surgery.”

Our news journalists obtained a quote from the research from the National Research Council of Canada, “Here we report the use of a remote optical method, derived from industrial laser-ultrasonics, to detect ultrasound in tissues. This approach enables non-contact PAT (NCPAT) without exceeding laser exposure safety limits. The sensitivity of the method is based on the use of suitably shaped detection laser pulses and a confocal Fabry-Perot interferometer in differential configuration. Reliable image reconstruction is obtained by measuring remotely the surface profile of the tissue with an optical coherence tomography system. The proposed method also allows non-contact ultrasound imaging (US) by applying a second reconstruction algorithm to the data acquired for NCPAT. Endogenous and exogenous inclusions exhibiting optical and acoustic contrasts were detected ex vivo in chicken breast and calf brain specimens. Inclusions down to 0.3 mm in size were detected at depths exceeding 1 cm.”

According to the news editors, the researchers concluded: “The method could expand the scope of photoacoustic and US to in-vivo biomedical applications where contact is impractical.”

For more information on this research see: Non-contact biomedical photoacoustic and ultrasound imaging. *Journal of Biomedical Optics*, 2012;17(6):228-234. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting G. Rousseau, Natl Res Council Canada, Inst Ind Mat, Boucherville, PQ J4B 6Y4, Canada. (2012 Aug 01)

### **National Research Council, Florence: Protein conformation and molecular order probed by second-harmonic-generation microscopy**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Florence, Italy, by NewsRx journalists, researchers stated “Second-harmonic-generation (SHG) microscopy has emerged as a powerful tool to image unstained living tissues and probe their molecular and supramolecular organization. In this article, we review the physical basis of SHG, highlighting how coherent summation of second-harmonic response leads to the sensitivity of polarized SHG to the three-dimensional distribution of emitters within the focal volume.”

The news correspondents obtained a quote from the research from National Research Council, “Based on the physical description of the process, we examine experimental applications for probing the molecular organization within a tissue and its alterations in response to different biomedically relevant conditions. We also describe the approach

for obtaining information on molecular conformation based on SHG polarization anisotropy measurements and its application to the study of myosin conformation in different physiological states of muscle.”

According to the news reporters, the researchers concluded: “The capability of coupling the advantages of nonlinear microscopy (micrometer-scale resolution in deep tissue) with tools for probing molecular structure in vivo renders SHG microscopy an extremely powerful tool for the advancement of biomedical optics, with particular regard to novel technologies for molecular diagnostic in vivo.”

For more information on this research see: Protein conformation and molecular order probed by second-harmonic-generation microscopy. *Journal of Biomedical Optics*, 2012;17(6):71-78. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting F. Vanzi, CNR, INO, Florence, Italy. (2012 Aug 01)

### **National Taiwan University, Taipei: Magnetic Control System Targeted for Capsule Endoscopic Operations in the Stomach-Design, Fabrication, and in vitro and ex vivo Evaluations**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating in Taipei, Taiwan, by NewsRx journalists, researchers stated “This paper presents a novel solution of a hand-held external controller to a miniaturized capsule endoscope in the gastrointestinal (GI) tract. Traditional capsule endoscopes move passively by peristaltic wave generated in the GI tract and the gravity, which makes it impossible for endoscopists to manipulate the capsule endoscope to the diagnostic disease areas.”

The news reporters obtained a quote from the research from National Taiwan University, “In this study, the main objective is to present an endoscopic capsule and a magnetic field navigator (MFN) that allows endoscopists to remotely control the locomotion and viewing angle of an endoscopic capsule. The attractive merits of this study are that the maneuvering of the endoscopic capsule can be achieved by the external MFN with effectiveness, low cost, and operation safety, both from a theoretical and an experimental point of view. In order to study the magnetic interactions between the endoscopic capsule and the external MFN, amagnetic-analysis model is established for computer-based finite-element simulations. In addition, experiments are conducted to

show the control effectiveness of the MFN to the endoscopic capsule. Finally, several prototype endoscopic capsules and a prototype MFN are fabricated, and their actual capabilities are experimentally assessed via in vitro and ex vivo tests using a stomach model and a resected porcine stomach, respectively.”

According to the news reporters, the researchers concluded: “Both in vitro and ex vivo test results demonstrate great potential and practicability of achieving high-precision rotation and controllable movement of the capsule using the developed MFN.”

For more information on this research see: Magnetic Control System Targeted for Capsule Endoscopic Operations in the Stomach-Design, Fabrication, and in vitro and ex vivo Evaluations. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):2068-2079. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting G.S. Lien, National Taiwan University, Dept. of Elect Engrn, Taipei 10617, Taiwan. (2012 Aug 01)

### **Northwestern University, Chicago: Galvanic Vestibular Stimulation Elicits Consistent Head-Neck Motion in Seated Subjects**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Chicago, Illinois, by NewsRx correspondents, researchers stated “Humans actively stabilize the head-neck system based on vestibular, proprioceptive and visual information. Galvanic vestibular stimulation (GVS) has been used previously to demonstrate the role of vestibular feedback in standing balance.”

Our news editors obtained a quote from the research from Northwestern University, “This study explores the effect of GVS on head-neck kinematics and evaluates the approach to investigate the vestibular contribution to head-neck stabilization. GVS was applied to 11 seated subjects using seven different stimuli (single sinusoids and multisines) at amplitudes of 0.5-2 mA and frequencies of 0.4-5.2 Hz using a bilateral bipolar configuration while 3-D head and torso kinematics were recorded using motion capture. System identification techniques were used evaluating coherence and frequency response functions (FRFs). GVS resulted in significant coherence in roll, yaw and lateral translation, consistent with effects of GVS while standing as reported in the



literature. The gain of the FRFs varied with frequency and no modulation was observed across the stimulus amplitudes, indicating a linear system response for the stimulations considered. Compared to single sine stimulation, equivalent FRFs were observed during unpredictable multisine stimulation, suggesting the responses during both stimuli to be of a reflexive nature.”

According to the news editors, the researchers concluded: “These results demonstrate the potential of GVS to investigate the vestibular contribution to head-neck stabilization.”

For more information on this research see: Galvanic Vestibular Stimulation Elicits Consistent Head-Neck Motion in Seated Subjects. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1978-1984. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting F. Ehtemam, Northwestern University, Chicago, IL 60611, United States. (2012 Aug 01)

### **Philips, Briarcliff Manor: In vivo three-dimensional photoacoustic imaging based on a clinical matrix array ultrasound probe**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Drugs and Therapies is now available. According to news reporting from Briarcliff Manor, New York, by NewsRx journalists, researchers stated “We present an integrated photoacoustic and ultrasonic three-dimensional (3-D) volumetric imaging system based on a two-dimensional (2-D) matrix array ultrasound probe. A wavelength-tunable dye laser pumped by a Q-switched Nd:YAG laser serves as the light source and a modified commercial ultrasound imaging system (iU22, Philips Healthcare) with a 2-D array transducer (X7-2, Philips Healthcare) detects both the pulse-echo ultrasound and photoacoustic signals.”

The news correspondents obtained a quote from the research from Philips, “A multichannel data acquisition system acquires the RF channel data. The imaging system enables rendering of co-registered 3-D ultrasound and photoacoustic images without mechanical scanning. The resolution along the azimuth, elevation, and axial direction are measured to be 0.69, 0.90 and 0.84 mm for photoacoustic imaging. In vivo 3-D photoacoustic mapping of the sentinel lymph node was demonstrated in a rat model using methylene blue dye.”

According to the news reporters, the researchers concluded: “These results highlight the clinical potential of 3-D PA imaging for identification of sentinel lymph nodes for cancer staging in humans.”

For more information on this research see: In vivo three-dimensional photoacoustic imaging based on a clinical matrix array ultrasound probe. *Journal of Biomedical Optics*, 2012;17(6):144-148. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting Y. Wang, Philips Res N Amer, Briarcliff Manor, NY 10510, United States. (2012 Aug 01)

### **Philips, St. Louis: Aberration correction for transcranial photoacoustic tomography of primates employing adjunct image data**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting out of St. Louis, Missouri, by NewsRx editors, researchers stated “A challenge in photoacoustic tomography (PAT) brain imaging is to compensate for aberrations in the measured photoacoustic data due to their propagation through the skull. By use of information regarding the skull morphology and composition obtained from adjunct x-ray computed tomography image data, we developed a subject-specific imaging model that accounts for such aberrations.”

Our news journalists obtained a quote from the research from Philips, “A time-reversal-based reconstruction algorithm was employed with this model for image reconstruction. The image reconstruction methodology was evaluated in experimental studies involving phantoms and monkey heads.”

According to the news editors, the researchers concluded: “The results establish that our reconstruction methodology can effectively compensate for skull-induced acoustic aberrations and improve image fidelity in transcranial PAT.”

For more information on this research see: Aberration correction for transcranial photoacoustic tomography of primates employing adjunct image data. *Journal of Biomedical Optics*, 2012;17(6):439-446. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting C. Huang, Philips Res N Amer, St Louis, MO, United States. (2012 Aug 01)

## **Queen's University, Kingston: Biopsy Needle Artifact Localization in MRI-Guided Robotic Transrectal Prostate Intervention**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Kingston, Canada, by NewsRx correspondents, researchers stated “Recently a number of robotic intervention systems for magnetic resonance image (MRI)-guided needle placement in the prostate have been reported. In MRI-guided needle interventions, after a needle is inserted, the needle position is often confirmed with a volumetric MRI scan.”

Our news editors obtained a quote from the research from Queen's University, “Commonly used titanium needles are not directly visible in an MRI, but they generate a susceptibility artifact in the immediate neighborhood of the needle. This paper reports the results of a quantitative study of the relationship between the true position of titanium biopsy needle and the corresponding needle artifact position in MRI, thereby providing a better understanding of the influence of needle artifact on targeting errors.”

According to the news editors, the researchers concluded: “The titanium needle tip artifact extended 9 mm beyond the actual needle tip location with tendency to bend toward the scanner's B-0 magnetic field direction, and axially displaced 0.38 and 0.32 mm (mean) in scanner's frequency and phase encoding direction, respectively.”

For more information on this research see: Biopsy Needle Artifact Localization in MRI-Guided Robotic Transrectal Prostate Intervention. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1902-1911. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting S.E. Song, Queen's University, Sch Comp, Kingston, ON K7L 3N6, Canada. (2012 Aug 01)

## Technical University, Milan: Model reduction techniques for fast blood flow simulation in parametrized geometries

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Milan, Italy, by NewsRx correspondents, researchers stated “In this paper, we propose a new model reduction technique aimed at real-time blood flow simulations on a given family of geometrical shapes of arterial vessels. Our approach is based on the combination of a low-dimensional shape parametrization of the computational domain and the reduced basis method to solve the associated parametrized flow equations.”

Our news journalists obtained a quote from the research from Technical University, “We propose a preliminary analysis carried on a set of arterial vessel geometries, described by means of a radial basis functions parametrization. In order to account for patient-specific arterial configurations, we reconstruct the latter by solving a suitable parameter identification problem. Real-time simulation of blood flows are thus performed on each reconstructed parametrized geometry, by means of the reduced basis method. We focus on a family of parametrized carotid artery bifurcations, by modelling blood flows using NavierStokes equations and measuring distributed outputs such as viscous energy dissipation or vorticity. The latter are indexes that might be correlated with the assessment of pathological risks.”

According to the news editors, the researchers concluded: “The approach advocated here can be applied to a broad variety of (different) flow problems related with geometry/shape variation, for instance related with shape sensitivity analysis, parametric exploration and shape design.”

For more information on this research see: Model reduction techniques for fast blood flow simulation in parametrized geometries. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(6-7):604-625. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

The news correspondents report that additional information may be obtained from A. Manzoni, Politecn Milan, MOX Modellist & Calcolo Sci, Dipartimento Matemat F Brioschi, I-20133 Milan, Italy. (2012 Aug 01)

## Technical University, Munich: flexTMS-A Novel Repetitive Transcranial Magnetic Stimulation Device With Freely Programmable Stimulus Currents

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of Munich, Germany, by NewsRx editors, researchers stated “Transcranial magnetic stimulation (TMS) is able to noninvasively excite neuronal populations due to brief magnetic field pulses. The efficiency and the characteristics of stimulation pulse shapes influence the physiological effect of TMS.”

Our news journalists obtained a quote from the research from Technical University, “However, commercial devices allow only a minimum of control of different pulse shapes. Basically, just sinusoidal and monophasic pulse shapes with fixed pulse widths are available. Only few research groups work on TMS devices with controllable pulse parameters such as pulse shape or pulse width. We describe a novel TMS device with a full-bridge circuit topology incorporating four insulated-gate bipolar transistor (IGBT) modules and one energy storage capacitor to generate arbitrary waveforms. This flexible TMS (flexTMS) device can generate magnetic pulses which can be adjusted with respect to pulse width, polarity, and intensity. Furthermore, the equipment allows us to set paired pulses with a variable interstimulus interval (ISI) from 0 to 20 ms with a step size of 10  $\mu$ s. All user-defined pulses can be applied continually with repetition rates up to 30 pulses per second (pps) or, respectively, up to 100 pps in theta burst mode.”

According to the news editors, the researchers concluded: “Offering this variety of flexibility, flexTMS will allow the enhancement of existing TMS paradigms and novel research applications.”

For more information on this research see: flexTMS-A Novel Repetitive Transcranial Magnetic Stimulation Device With Freely Programmable Stimulus Currents. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1962-1970. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting N. Gattinger, Technical University of Munich, Zent Inst Med Technical IMETUM, D-85748 Munich, Germany. (2012 Aug 01)

## **Tsinghua University, Beijing: Curvelet processing of MRI for local image enhancement**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Bone Research. According to news originating from Beijing, People’s Republic of China, by NewsRx correspondents, researchers stated “Magnetic resonance imaging provides very good contrast between different soft tissues; however, in some cases, this technique is not so suitable to image calcified structures like bones. The quality of images is often degraded by blur edges or noises, which makes it difficult to accurately identify bone structures.”

Our news journalists obtained a quote from the research from Tsinghua University, “In this paper, we proposed a new curvelet preprocessing method for local image enhancement to especially improve the quality of spinal MRI. Our objective is to both sharpen boundaries and smoothen the intensity variation of the vertebra. In the first phase, we extract features through curvelet coefficients and the gradient of the original image, then we utilize fuzzy cluster method to classify the whole image scope into the edge region and the nonedge region. In the second phase, we locally sharpen or smoothen the image by adaptive adjustment of curvelet coefficients and Gaussian smoothing method in different subregions. To evaluate the effect of the preprocessing method, we examine the gradient of the image and its segmentation results as the assessments.”

According to the news editors, the researchers concluded: “The experiment results show that the feature extraction method is effective for classification and the vertebra performs higher contrast on boundaries and less noises after the enhancement, which indeed helps increase the accuracy of further segmentation.”

For more information on this research see: Curvelet processing of MRI for local image enhancement. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(6-7):661-677. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

The news correspondents report that additional information may be obtained from K. Tsai, Tsinghua Univ, Biomed Engn Res Center, Grad Sch Shenzhen, Beijing 518055, People’s Republic of China. (2012 Aug 01)

## **Tsinghua University, Beijing: Reconstruction of Fluorescence Molecular Tomography Using a Neighborhood Regularization**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating in Beijing, People's Republic of China, by NewsRx journalists, researchers stated “In fluorescence molecular tomography, the highly scattering property of biological tissues leads to an ill-posed inverse problem and reduces the accuracy of detection and localization of fluorescent targets. Regularization technique is usually utilized to obtain a stable solution.”

The news reporters obtained a quote from the research from Tsinghua University, “Conventional Tikhonov regularization is based on singular value decomposition (SVD) and L-curve strategy, which attempts to find a tradeoff between the residual norm and image norm. It is computationally demanding and may fail when there is no optimal turning point in the L-curve plot. In this letter, a neighborhood regularization method is presented. It achieves a reliable solution by computing the geometric mean of multiple regularized solutions. These solutions correspond to different regularization parameters with neighbor orders of magnitude. The main advantages lie in three aspects. First, it can produce comparable or better results in comparison with the conventional Tikhonov regularization with L-curve routine. Second, it replaces the time-consuming SVD computation with a trace-based pseudoinverse strategy, thus greatly reducing the computational cost. Third, it is robust and practical even when the L-curve technique fails.”

According to the news reporters, the researchers concluded: “Results from numerical and phantom experiments demonstrate that the proposed method is easy to implement and effective in improving the quality of reconstruction.”

For more information on this research see: Reconstruction of Fluorescence Molecular Tomography Using a Neighborhood Regularization. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1799-1803. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting M.Z. Li, Tsinghua Univ, Center Biomed Imaging Res, Beijing 100084, People's Republic of China. (2012 Aug 01)

**University College London: Multichannel near infrared spectroscopy indicates regional variations in cerebral autoregulation in infants supported on extracorporeal membrane oxygenation**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Respiratory Therapy have been presented. According to news reporting originating in London, United Kingdom, by NewsRx journalists, researchers stated “Assessing noninvasively cerebral autoregulation, the protective mechanism of the brain to maintain constant cerebral blood flow despite changes in blood pressure, is challenging. Infants on life support system (ECMO) for cardiorespiratory failure are at risk of cerebral autoregulation impairment and consequent neurological problems.”

The news reporters obtained a quote from the research from University College London, “We measured oxyhaemoglobin concentration (HbO(2)) by multichannel (12 channels) near-infrared spectroscopy (NIRS) in six infants during sequential changes in ECMO flow. Wavelet cross-correlation (WCC) between mean arterial pressure (MAP) and HbO(2) was used to construct a time-frequency representation of the concordance between the two signals to assess the nonstationary aspect of cerebral autoregulation and investigate regional variations. Group data showed that WCC increases with decreasing ECMO flow indicating higher concordance between MAP and HbO(2) and demonstrating loss of cerebral autoregulation at low ECMO flows. Statistically significant differences in WCC were observed between channels placed on the right and left scalp with channels on the right exhibiting higher values of WCC suggesting that the right hemisphere was more susceptible to disruption of cerebral autoregulation.”

According to the news reporters, the researchers concluded: “Multichannel NIRS in conjunction with wavelet analysis methods can be used to assess regional variations in dynamic cerebral autoregulation with important clinical application in the management of critically ill children on life support systems.”

For more information on this research see: Multichannel near infrared spectroscopy indicates regional variations in cerebral autoregulation in infants supported on extracorporeal membrane oxygenation. *Journal of Biomedical Optics*, 2012;17(6):569-577. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting M.D. Papademetriou, UCL, London WC1E 6BT, United Kingdom. (2012 Aug 01)



### **University of Central Oklahoma, Edmond: Determination of optical absorption coefficient with focusing photoacoustic imaging**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Edmond, Oklahoma, by NewsRx correspondents, researchers stated “Absorption coefficient of biological tissue is an important factor for photothermal therapy and photoacoustic imaging. However, its determination remains a challenge.”

Our news journalists obtained a quote from the research from the University of Central Oklahoma, “In this paper, we propose a method using focusing photoacoustic imaging technique to quantify the target optical absorption coefficient. It utilizes the ratio of the amplitude of the peak signal from the top boundary of the target to that from the bottom boundary based on wavelet transform. This method is self-calibrating. Factors, such as absolute optical fluence, ultrasound parameters, and Gruneisen parameter, can be canceled by dividing the amplitudes of the two peaks. To demonstrate this method, we quantified the optical absorption coefficient of a target with various concentrations of an absorbing dye.”

According to the news editors, the researchers concluded: “This method is particularly useful to provide accurate absorption coefficient for predicting the outcomes of photothermal interaction for cancer treatment with absorption enhancement.”

For more information on this research see: Determination of optical absorption coefficient with focusing photoacoustic imaging. *Journal of Biomedical Optics*, 2012;17(6):221-226. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from Z.F. Li, Univ Cent Oklahoma, Dept. of Engn & Phys, Edmond, OK 73034, United States. (2012 Aug 01)

### **University of Connecticut, Storrs: Application of laser pulse stretching scheme for efficiently delivering laser energy in photoacoustic imaging**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Storrs, Connecticut, by NewsRx correspondents, researchers stated “High-energy and short-duration laser pulses are desirable to improve the photoacoustic image quality when imaging deeply seated lesions. In many clinical applications, the high-energy pulses are coupled to tissue using optical fibers.”

Our news editors obtained a quote from the research from the University of Connecticut, “These pulses can damage fibers if the damage threshold is exceeded. While keeping the total energy under the Food and Drug Administration limit for avoiding tissue damage, it is necessary to reduce the peak intensity and increase the pulse duration for minimizing fiber damage and delivering sufficient light for imaging. We use laser-pulse-stretching to address this problem. An initial 17-ns pulse was stretched to 27 and 37 ns by a ring-cavity laser-pulse-stretching system. The peak power of the 37-ns stretched pulse reduced to 42% of the original, while the fiber damage threshold was increased by 1.5-fold. Three ultrasound transducers centered at 1.3-, 3.5-, and 6-MHz frequencies were simulated, and the results showed that the photoacoustic signal of a 0.5-mm-diameter target obtained with 37-ns pulse was about 98, 91, and 80%, respectively, using the same energy as the 17-ns pulse. Simulations were validated using a broadband hydrophone.”

According to the news editors, the researchers concluded: “Quantitative comparisons of photoacoustic images obtained with three corresponding transducers showed that the image quality was not affected by stretching the pulse.”

For more information on this research see: Application of laser pulse stretching scheme for efficiently delivering laser energy in photoacoustic imaging. *Journal of Biomedical Optics*, 2012;17(6):236-243. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting T.H. Wang, University of Connecticut, Dept. of Elect & Comp Engr, Storrs, CT 06269, United States. (2012 Aug 01)

### **University of Connecticut, Storrs: Investigation of a diffuse optical measurements-assisted quantitative photoacoustic tomographic method in reflection geometry**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Storrs, Connecticut, by NewsRx correspondents, researchers stated “Photoacoustic tomography provides the distribution of absorbed optical energy density, which is the product of optical absorption coefficient and optical fluence distribution. We report the experimental investigation of a novel fitting procedure that quantitatively determines the optical absorption coefficient of chromophores.”

Our news editors obtained a quote from the research from the University of Connecticut, “The experimental setup consisted of a hybrid

system of a 64-channel photoacoustic imaging system with a frequency-domain diffused optical measurement system. The fitting procedure included a complete photoacoustic forward model and an analytical solution of a target chromophore using the diffusion approximation. The fitting procedure combines the information from the photoacoustic image and the background information from the diffuse optical measurements to minimize the photoacoustic measurements and forward model data and recover the target absorption coefficient quantitatively. 1-cm-cube phantom absorbers of high and low contrasts were imaged at depths of up to 3.0 cm. The fitted absorption coefficient results were at least 80% of their true values. The sensitivities of this fitting procedure to target location, target radius, and background optical properties were also investigated. We found that this fitting procedure was most sensitive to the accurate determination of the target radius and depth. Blood sample in a thin tube of radius 0.58 mm, simulating a blood vessel, was also studied. The photoacoustic images and fitted absorption coefficients are presented.”

According to the news editors, the researchers concluded: “These results demonstrate the clinical potential of this fitting procedure to quantitatively characterize small lesions in breast imaging.”

For more information on this research see: Investigation of a diffuse optical measurements-assisted quantitative photoacoustic tomographic method in reflection geometry. *Journal of Biomedical Optics*, 2012;17(6):187-197. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting C. Xu, University of Connecticut, Dept. of Elect & Comp Engn, Storrs, CT 06269, United States. (2012 Aug 01)

### **University of Copenhagen: Fourier transform infrared photoacoustic spectroscopy study of physicochemical interaction between human dentin and etch-&-rinse adhesives in a simulated moist bond technique**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Copenhagen, Denmark, by NewsRx correspondents, researchers stated “The purpose of this study was to provide the physicochemical interactions at the interfaces between two commercial etch-&-rinse adhesives and human dentin in a simulated moist bond technique. Six dentin specimens were divided into two groups (n = 3) according to the use of two different adhesive systems: (a)

2-hydroxyethylmethacrylate (HEMA) and 4-methacryloxyethyl trimellitate anhydride (4-META), and (b) HEMA.”

Our news editors obtained a quote from the research from the University of Copenhagen, “The Fourier transform infrared photoacoustic spectroscopy was performed before and after dentin treatment with 37% phosphoric acid, with adhesive systems and also for the adhesive systems alone. Acid-conditioning resulted in a decalcification pattern. Adhesive treated spectra subtraction suggested the occurrence of chemical bonding to dentin expressed through modifications of the OH stretching peak (3340  $\text{cm}^{-1}$ ) and symmetric CH stretching (2900  $\text{cm}^{-1}$ ) for both adhesives spectra; a decrease of orthophosphate absorption band (1040 to 970  $\text{cm}^{-1}$ ) for adhesive A and a better resolved complex band formation (1270 to 970  $\text{cm}^{-1}$ ) for adhesive B were observed.”

According to the news editors, the researchers concluded: “These results suggested the occurrence of chemical bonding between sound human dentin and etch-&-rinse adhesives through a clinical typical condition.”

For more information on this research see: Fourier transform infrared photoacoustic spectroscopy study of physicochemical interaction between human dentin and etch-&-rinse adhesives in a simulated moist bond technique. *Journal of Biomedical Optics*, 2012;17(6):305-309. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting A.L.M. Ubaldini, University of Copenhagen, Dept. of Dental Mat, Sch Dental, DK-2200 Copenhagen N, Denmark. (2012 Aug 01)

### **University of Gottingen: Simultaneous and Proportional Force Estimation in Multiple Degrees of Freedom From Intramuscular EMG**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Gottingen, Germany, by NewsRx correspondents, researchers stated “This letter investigates simultaneous and proportional estimation of force in 2 degree-of-freedoms (DoFs) from intramuscular electromyography (EMG). Intramuscular EMG signals from three able-bodied subjects were recorded along with isometric forces in multiple DoF from the right arm.”

Our news journalists obtained a quote from the research from the University of Gottingen, “The association between five EMG features and force profiles was modeled using an artificial neural network. Correlation coefficients between the measured and the estimated forces

were  $0.85 \pm 0.056$  and  $0.88 \pm 0.05$  without and with post processing, respectively.”

According to the news editors, the researchers concluded: “The results showed that force can be estimated in 2 DoFs with high accuracy and that the degree of performance depended on the force function (task) to be estimated.”

For more information on this research see: Simultaneous and Proportional Force Estimation in Multiple Degrees of Freedom From Intramuscular EMG. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1804-1807. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from E.N. Kamavuako, University of Gottingen, Dept. of Neurorehabil Engn, Bernstein Center Computat Neurosci, Univ Med Center Gottingen, D-37073 Gottingen, Germany. (2012 Aug 01)

### **University of Lausanne: Quantifying Information Transfer Through a Head-Attached Vibrotactile Display: Principles for Design and Control**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Lausanne, Switzerland, by NewsRx journalists, researchers stated “Vibrotactile displays can extend the perception capabilities of visually impaired persons. Placing such devices on the head promises easy attachment and detachment without reducing other interaction abilities.”

The news correspondents obtained a quote from the research from the University of Lausanne, “However, the effectiveness of head-attached vibrotactile displays has never been thoroughly tested. This paper presents the results obtained from experiments with 22 subjects equipped with a display containing 12 coin-type motors equally spaced in a horizontal plane around the upper head region. Our display allowed single-as well as multimotor activation with up to six simultaneously active motors. We identified the minimum and comfort strength of vibrotactile stimulation, and measured the precision in perceiving the accurate number of active motors as well as the precision in localizing the stimuli on the head. While subjects identified the correct number of active motors in 94% of the cases when presented with only one active motor, this precision dropped to 40% for two and down to 5% for five

simultaneously active motors. This strongly suggests to avoid multi-point stimulation even though the precision of localizing a position of a stimulus on the head is barely affected by the number of simultaneously active motors.”

According to the news reporters, the researchers concluded: “Localization precision, however, varied significantly with the region of the head suggesting that the most front and back regions of the head should be avoided if high precision is required.”

For more information on this research see: Quantifying Information Transfer Through a Head-Attached Vibrotactile Display: Principles for Design and Control. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):2011-2018. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting M.K. Dobrzynski, University of Lausanne, Dept. of Ecol & Evolut, CH-1015 Lausanne, Switzerland. (2012 Aug 01)

### **University of London Imperial College: Modeling Individual Human Motor Behavior Through Model Reference Iterative Learning Control**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting out of London, United Kingdom, by NewsRx editors, researchers stated “A computational model is proposed in this paper to capture learning capacity of a human subject adapting his or her movements in novel dynamics. The model uses an iterative learning control algorithm to represent human learning through repetitive processes.”

Our news journalists obtained a quote from the research from the University of London Imperial College, “The control law performs adaptation using a model designed using experimental data captured from the natural behavior of the individual of interest. The control signals are used by a model of the body to produced motion without the need of inverse kinematics. The resulting motion behavior is validated against experimental data.”

According to the news editors, the researchers concluded: “This new technique yields the capability of subject-specific modeling of the motor function, with the potential to explain individual behavior in physical rehabilitation.”

For more information on this research see: Modeling Individual Human Motor Behavior Through Model Reference Iterative Learning Control. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1892-1901. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting S.H. Zhou, University of London Imperial College, Dept. of Bioengn, London W2 1NY, United Kingdom. (2012 Aug 01)

### **University of Louisville: A Numerical Simulation Approach to Studying Anterior Cruciate Ligament Strains and Internal Forces Among Young Recreational Women Performing Valgus Inducing Stop-Jump Activities**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Anterior Cruciate Ligament are discussed in a new report. According to news originating from Louisville, Kentucky, by NewsRx correspondents, researchers stated “Anterior cruciate ligament (ACL) injuries are commonly incurred by recreational and professional women athletes during non-contact jumping maneuvers in sports like basketball and volleyball, where incidences of ACL injury is more frequent to females compared to males. What remains a numerical challenge is in vivo calculation of ACL strain and internal force.”

Our news journalists obtained a quote from the research from the University of Louisville, “This study investigated effects of increasing stop-jump height on neuromuscular and bio-mechanical properties of knee and ACL, when performed by young female recreational athletes. The underlying hypothesis is increasing stop-jump (platform) height increases knee valgus angles and external moments which also increases ACL strain and internal force. Using numerical analysis tools comprised of Inverse Kinematics, Computed Muscle Control and Forward Dynamics, a novel approach is presented for computing ACL strain and internal force based on (1) knee joint kinematics and (2) optimization of muscle activation, with ACL insertion into musculoskeletal model. Results showed increases in knee valgus external moments and angles with increasing stop-jump height. Increase in stop-jump height from 30 to 50 cm lead to increase in average peak valgus external moment from 40.5 +/- A 3.2 to 43.2 +/- A 3.7 Nm which was co-incidental with increase in average peak ACL strain, from 9.3 +/- A 3.1 to 13.7 +/- A 1.1%, and

average peak ACL internal force, from 1056.1 +/- A 71.4 to 1165.4 +/- A 123.8 N for the right side with comparable increases in the left.”

According to the news editors, the researchers concluded: “In effect this study demonstrates a technique for estimating dynamic changes to knee and ACL variables by conducting musculoskeletal simulation on motion analysis data, collected from actual stop-jump tasks performed by young recreational women athletes.”

For more information on this research see: A Numerical Simulation Approach to Studying Anterior Cruciate Ligament Strains and Internal Forces Among Young Recreational Women Performing Valgus Inducing Stop-Jump Activities. *Annals of Biomedical Engineering*, 2012;40(8):1679-1691. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from J. Kar, University of Louisville, Speed Sch Engrn, Dept. of Mech Engrn, Louisville, KY 40292, United States. (2012 Aug 01)

### **University of Missouri, Columbia: Total internal reflection photoacoustic spectroscopy for the detection of beta-hematin**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting from Columbia, Missouri, by NewsRx journalists, researchers stated “Evanescent field sensing methods are currently used to detect many different types of disease markers and biologically important chemicals such as the HER2 breast cancer receptor. Hinoue et al. used Total Internal Reflection Photoacoustic Spectroscopy (TIRPAS) as a method of using the evanescent field to detect an optically opaque dye at a sample interface. Although their methods were successful at detecting dyes, the results at that time did not show a very practical spectroscopic technique, which was due to the less than typical sensitivity of TIRPAS as a spectroscopy modality given the low power (similar to 1 to 2 W) lasers being used.”

The news correspondents obtained a quote from the research from the University of Missouri, “Contrarily, we have used an Nd:YAG laser with a five nanosecond pulse that gives peak power of 1 MW coupled with the TIRPAS system to increase the sensitivity of this technique for biological material sensing. All efforts were focused on the eventual detection of the optically absorbing material, hemozoin, which is created as a byproduct of a malarial infection in blood. We used an optically analogous material, beta-hematin, to determine the potential for detection in the TIRPAS system.”



According to the news reporters, the researchers concluded: “In addition, four properties which control the sensitivity were investigated to increase understanding about the sensor’s function as a biosensing method.”

For more information on this research see: Total internal reflection photoacoustic spectroscopy for the detection of beta-hematin. *Journal of Biomedical Optics*, 2012;17(6):178-185. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting B.S. Goldschmidt, University of Missouri, Christopher S Bond Life Sci Center, Columbia, MO 65211, United States. (2012 Aug 01)

### **University of New Mexico, Albuquerque: Investigation of the hyper-reflective inner/outer segment band in optical coherence tomography of living frog retina**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Optical Coherence Tomography. According to news reporting originating in Albuquerque, New Mexico, by NewsRx journalists, researchers stated “This study is to test anatomic correlates, including connecting cilium (CC) and inner segment (IS) ellipsoid, to the hyper-reflective band visualized by optical coherence tomography (OCT) and commonly attributed to the photoreceptor inner/outer segment (IS/OS) junction.”

The news reporters obtained a quote from the research from the University of New Mexico, “Aline-scan OCT (LS-OCT) was constructed to achieve sub-cellular resolution (lateral: similar to 2  $\mu$  m; axial: similar to 4  $\mu$  m) of excised living frog retinas. An electro-optic phase modulator was employed for rapid and vibration-free phase modulation.”

According to the news reporters, the researchers concluded: “Comparison of normalized distance measurements between LS-OCT images and histological images revealed that the dominant source of the signal reported as the IS/OS OCT band actually originates from the IS.”

For more information on this research see: Investigation of the hyper-reflective inner/outer segment band in optical coherence tomography of living frog retina. *Journal of Biomedical Optics*, 2012;17(6):59-61. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting R.W. Lu, University of New Mexico, Dept. of Surg, Div Ophthalmol, Albuquerque, NM 87131, United States. (2012 Aug 01)

## **University of Pennsylvania, Philadelphia: Equation Environment Coupling and Interference on the Electric-Field Intrabody Communication Channel**

By a News Reporter-Staff News Editor at Journal of Engineering – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting out of Philadelphia, Pennsylvania, by VerticalNews editors, researchers stated “Wearable and implantable medical sensors have been investigated continuously in recent years to provide better diagnostics and monitoring for personal health care. Much attention has been drawn to the establishment of the ubiquitous body area network (BAN) to reliably connect the body sensors and collect the sensor data in real time.”

Our news journalists obtained a quote from the research from the University of Pennsylvania, “Electric-field intrabody communication (EF-IBC) is a promising physical link technology for the body area network. Compared to existing wireless technologies, EF-IBC fits the body characteristics better and is able to achieve higher data rate with less transmission power. EF-IBC relies on the parasitic capacitive coupling between the transmitter and the receiver to close the signal circuit loop. With this parasitic coupling, EF-IBC links can be influenced by the environment. However until now, there is lack of systematic research on various environment coupling effects to the EF-IBC channel. In this paper, environment effects on the EF-IBC channel are comprehensively studied. The interference from the nearby EF-IBC channel is investigated for the first time to gain useful insights into the establishment of the BAN with EF-IBC.”

According to the news editors, the researchers concluded: “The FEM model is also established to explain the mechanism of the capacitive return path.”

For more information on this research see: Equation Environment Coupling and Interference on the Electric-Field Intrabody Communication Channel. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):2051-2059. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting R.Y. Xu, University of Pennsylvania, Center Sensor Technol, Philadelphia, PA 19104, United States. (2012 Aug 01)

## University of Porto, Oporto: Registration of plantar pressure images

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Oporto, Portugal, by NewsRx journalists, researchers stated “In this work, five computational methodologies to register plantar pressure images are compared: (1) the first methodology is based on matching the external contours of the feet; (2) the second uses the phase correlation technique; (3) the third addresses the direct maximization of cross-correlation using the Fourier transform; (4) the fourth minimizes the sum of squared differences using the Fourier transform; and (5) the fifth methodology iteratively optimizes an intensity (dis)similarity measure based on Powell’s method. The accuracy and robustness of the five methodologies were assessed by using images from three common plantar pressure acquisition devices: a Footscan system, an EMED system, and a light reflection system.”

The news reporters obtained a quote from the research from the University of Porto, “Using the residual error as a measure of accuracy, all methodologies revealed to be very accurate even in the presence of noise. The most accurate was the methodology based on the iterative optimization, when the mean squared error was minimized. It achieved a residual error inferior to 0.01?mm and 0.6?mm for non-noisy and noisy images, respectively.”

According to the news reporters, the researchers concluded: “On the other hand, the methodology based on image contour matching was the fastest, but its accuracy was the lowest.”

For more information on this research see: Registration of plantar pressure images. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(6-7):589-603. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news correspondents report that additional information may be obtained by contacting F.P.M. Oliveira, University of Porto, Dept. of Engn Mecan, Fac Engn, Inst Engn Mecan & Gestao Ind INEGI, P-4200465 Oporto, Portugal. (2012 Aug 01)

### **University of Porto, Oporto: Segmentation of female pelvic cavity in axial T2-weighted MR images towards the 3D reconstruction**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting out of Oporto, Portugal, by NewsRx editors, researchers stated “The anatomies of pelvic structures are critical for the diagnosis of pelvic floor dysfunctions. However, because of the complex background, the imaging appearances of pelvic organs and muscles are frequently distorted by noise and partial volume effect.”

Our news journalists obtained a quote from the research from the University of Porto, “Magnetic resonance imaging with its clear imaging quality of the female pelvic cavity is preferred for many studies. As such, correct segmentations of the pelvic structures on MR images are required for accurate diagnoses. Effective algorithms for axial T2-weighted MR images have been proposed, which are based on the imaging features of different structures and various image clues.”

According to the news editors, the researchers concluded: “In this paper, we review these algorithms and evaluate their performance, and discuss implementation issues and aspects towards constructing the three-dimensional models.”

For more information on this research see: Segmentation of female pelvic cavity in axial T2-weighted MR images towards the 3D reconstruction. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(6-7):714-726. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news journalists report that additional information may be obtained by contacting Z. Ma, University of Porto, Fac Med, P-4200319 Oporto, Portugal. (2012 Aug 01)

### **University of Prince Edward Island, Charlottetown: Experimental spectro-angular mapping of light distribution in turbid media**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Charlottetown, Canada, by NewsRx correspondents, researchers stated “We present a new approach to the analysis of radiance in turbid media. The approach combines data

from spectral, angular and spatial domains in a form of spectro-angular maps.”

Our news editors obtained a quote from the research from the University of Prince Edward Island, “Mapping provides a unique way to visualize details of light distribution in turbid media and allows tracking changes with distance. Information content of experimental spectro-angular maps is verified by a direct comparison with simulated data when an analytical solution of the radiative transfer equation is used.”

According to the news editors, the researchers concluded: “The findings deepen our understanding of the light distribution in a homogenous turbid medium and provide a first step toward applying the spectro-angular mapping as a diagnostic tool for tissue characterization.”

For more information on this research see: Experimental spectro-angular mapping of light distribution in turbid media. *Journal of Biomedical Optics*, 2012;17(6):557-567. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting S. Grabtchak, University of Prince Edward Island, Atlantic Vet College, Dept. of Biomed Sci, Charlottetown, PE C1A 4P3, Canada. (2012 Aug 01)

### **University of Sao Paulo: Image Reconstruction Using Interval Simulated Annealing in Electrical Impedance Tomography**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting from Sao Paulo, Brazil, by NewsRx journalists, researchers stated “Electrical impedance tomography (EIT) is an imaging technique that attempts to reconstruct the impedance distribution inside an object from the impedance between electrodes placed on the object surface. The EIT reconstruction problem can be approached as a nonlinear nonconvex optimization problem in which one tries to maximize the matching between a simulated impedance problem and the observed data.”

The news correspondents obtained a quote from the research from the University of Sao Paulo, “This nonlinear optimization problem is often ill-posed, and not very suited to methods that evaluate derivatives of the objective function. It may be approached by simulated annealing (SA), but at a large computational cost due to the expensive evaluation process of the objective function, which involves a full simulation of the impedance problem at each iteration.”

According to the news reporters, the researchers concluded: “A variation of SA is proposed in which the objective function is evaluated only partially, while ensuring boundaries on the behavior of the modified algorithm.”

For more information on this research see: Image Reconstruction Using Interval Simulated Annealing in Electrical Impedance Tomography. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1861-1870. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting T.D. Martins, University of Sao Paulo, Resp Intens Care Unit, Div Pulm, Hosp ClinFac Med, BR-01246903 Sao Paulo, Brazil. (2012 Aug 01)

### **University of Wisconsin, Madison: Damage Mechanics of Porcine Flexor Tendon: Mechanical Evaluation and Modeling**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Madison, Wisconsin, by NewsRx correspondents, researchers stated “Porcine flexor tendons underwent cyclic and stress relaxation testing before and after strain exceeding elastic limit (‘overstretch’) to examine which mechanical parameters undergo changes following subfailure damage. From these data, we developed an ‘effective strain’ damage model (in which the tendon is modeled as if being pulled to a lower strain).”

Our news editors obtained a quote from the research from the University of Wisconsin, “Damage was induced at three strain levels to determine the extent to which post-damage parameter changes were affected by overstretch strain level. We found that diffuse damage induced by overstretch decreased elastic and viscoelastic parameters obtained during testing. The stress response of tendon to strain is therefore altered following damage. We next compared the strain-dependent parameter behavior to damage-dependent behavior to determine the effective strain for each parameter. Effects of damage became more pronounced as strain during overstretch increased; following overstretch to 6.5, 9, or 13% strain, effective strain was 2.43 +/- A 0.33, 1.98 +/- A 0.3, or 0.88 +/- A 0.43% strain, respectively. By determining the effective strain and using it to calculate predicted values of post-damage

mechanical parameters, it was possible to predict the stress relaxation behavior of tendons with Schapery's nonlinear viscoelastic model."

According to the news editors, the researchers concluded: "Using this approach, a single parameter predicts both elastic and viscoelastic compromise from known, strain-dependent behaviors."

For more information on this research see: Damage Mechanics of Porcine Flexor Tendon: Mechanical Evaluation and Modeling. *Annals of Biomedical Engineering*, 2012;40(8):1692-1707. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting S. Duenwald-Kuehl, Univ Wisconsin Madison, Dept. of Engn Phys, Madison, WI 53705, United States. (2012 Aug 01)

### **Washington University, St. Louis: Numerical investigation of the effects of shear waves in transcranial photoacoustic tomography with a planar geometry**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting out of St. Louis, Missouri, by NewsRx editors, researchers stated "Using a recently developed reconstruction method for photoacoustic tomography (PAT) valid for a planar measurement geometry parallel to a layered medium, we investigate the effects of shear wave propagation in the solid layer upon the ability to estimate Fourier components of the object."

Our news journalists obtained a quote from the research from Washington University, "We examine this ability as a function of the thickness of the layer supporting shear waves as well as of the incidence angle of the field in the planewave representation. Examples are used to demonstrate the importance of accounting for shear waves in transcranial PAT."

According to the news editors, the researchers concluded: "Error measures are introduced to quantify the error found when omitting shear waves from the forward model in PAT."

For more information on this research see: Numerical investigation of the effects of shear waves in transcranial photoacoustic tomography with a planar geometry. *Journal of Biomedical Optics*, 2012;17(6):209-219. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting R.W. Schoonover, Washington University, Dept. of Biomed Engn, St Louis, MO, United States. (2012 Aug 01)

### **Washington University, St. Louis: Spectrally encoded photoacoustic microscopy using a digital mirror device**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from St. Louis, Missouri, by NewsRx correspondents, researchers stated “We have developed spectrally encoded photoacoustic microscopy using a digital mirror device for multi-wavelength tomography, which enables fast spectral imaging of optical absorption. The optical illumination wavelengths are multiplexed at a laser pulse repetition rate of similar to 2 kHz.”

Our news journalists obtained a quote from the research from Washington University, “Liquid samples, whole blood, and blood vessels in mouse ears were imaged. Compared with internal wavelength tuning of a narrow-band laser, external wavelength tuning based on a digital mirror device improves the data acquisition speed of spectral photoacoustic microscopy.”

According to the news editors, the researchers concluded: “Compared with external wavelength scanning of a wide-band laser with the same pulse energy, spectral encoding improves the signal-to-noise ratio.”

For more information on this research see: Spectrally encoded photoacoustic microscopy using a digital mirror device. *Journal of Biomedical Optics*, 2012;17(6):478-482. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from Y. Wang, Washington University, Opt Imaging Lab, Dept. of Biomed Engn, St Louis, MO 63130, United States. (2012 Aug 01)



### **Washington University, St. Louis: Ultrasound-modulated optical tomography at new depth**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of St. Louis, Missouri, by NewsRx editors, researchers stated “Ultrasound-modulated optical tomography (UOT) has the potential to reveal optical contrast deep inside soft biological tissues at an ultrasonically determined spatial resolution. The optical imaging depth reported so far has, however, been limited, which prevents this technique from broader applications.”

Our news journalists obtained a quote from the research from Washington University, “Our latest experimental exploration has pushed UOT to an unprecedented imaging depth. We developed and optimized a UOT system employing a photorefractive crystal-based interferometer. A large aperture optical fiber bundle was used to enhance the efficiencies for diffuse light collection and photorefractive two-wave-mixing.”

According to the news editors, the researchers concluded: “Within the safety limits for both laser illumination and ultrasound modulation, the system has attained the ability to image through a tissue-mimicking phantom of 9.4 cm in thickness, which has never been reached previously by UOT.”

For more information on this research see: Ultrasound-modulated optical tomography at new depth. *Journal of Biomedical Optics*, 2012;17(6):353-358. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting P.X. Lai, Washington University, Dept. of Biomed Engn, Opt Imaging Lab, St Louis, MO 63130, United States. (2012 Aug 01)

### **Wayne State University, Detroit: Morphology-Based Automatic Seizure Detector for Intracerebral EEG Recordings**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Detroit, Michigan, by NewsRx correspondents, researchers stated “In this paper, a new seizure detection system aimed at assisting in a rapid review of prolonged intracerebral EEG recordings is described. It is based on quantifying the sharpness

of the waveform, one of the most important electrographic EEG features utilized by experts for an accurate and reliable identification of a seizure.”

Our news editors obtained a quote from the research from Wayne State University, “The waveform morphology is characterized by a measure of sharpness as defined by the slope of the half-waves. A train of abnormally sharp waves resulting from subsequent filtering are used to identify seizures. The method was optimized using 145 h of single-channel depth EEG from seven patients, and tested on another 158 h of single-channel depth EEG from another seven patients. Additionally, 725 h of depth EEG from 21 patients was utilized to assess the system performance in a multichannel configuration. Single-channel test data resulted in a sensitivity of 87% and a specificity of 71%. The multichannel test data reported a sensitivity of 81% and a specificity of 58.9%. The new system detected a wide range of seizure patterns that included rhythmic and nonrhythmic seizures of varying length, including those missed by the experts.”

According to the news editors, the researchers concluded: “We also compare the proposed system with a popular commercial system.”

For more information on this research see: Morphology-Based Automatic Seizure Detector for Intracerebral EEG Recordings. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1871-1881. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting R. Yadav, Wayne State University, Center Mol Med & Genet, Sch Med, Detroit, MI 48201, United States. (2012 Aug 01)

### **Wuhan University: Improvement in hemocompatibility of chitosan/soy protein composite membranes by heparinization**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Cardiovascular Diseases and Conditions have been presented. According to news reporting originating in Wuhan, People’s Republic of China, by NewsRx journalists, researchers stated “To improve the hemocompatibility of chitosan/soy protein isolate composite membranes by heparinization. Chitosan/soy protein isolate membranes (ChS-n, n=0, 10 and 30, corresponding to the soy protein isolate content in the membranes) and heparinized ChS-n membranes (HChS-n) were prepared by blending in dilute HAc/NaAc solution.”

The news reporters obtained a quote from the research from Wuhan University, “The hemocompatibility of ChS-n and HChS-n membranes were comparatively evaluated by measuring surface heparin density, blood platelet adhesion, plasma recalcification time (PRT), thrombus formation and hemolysis assay. The surface heparin density analysis showed that heparinized chitosan/SPI soy protein isolate membranes have been successfully prepared by blending. The density of heparin on the surface of HChS-n membranes was in the range of 0.67-1.29 g/cm<sup>2</sup>. The results of platelet adhesion measurement showed that the platelet adhesion numbers of HChS-n membranes were lower than those of the corresponding ChS-n membranes. The PRT of the HChS-0, HChS-10 and HChS-30 membranes were around 292, 306 and 295 s, respectively, which were longer than the corresponding ChS-0 (152 s), ChS-10 (204 s) and ChS-30 (273 s) membranes. The hemolysis rate of HChS-n membranes was lower than 1%. The hemocompatibility of ChS membranes could be improved by blending with heparin. Compared with ChS membranes, HChS membranes showed lower platelet adhesion, longer PRT, higher BCI, significant thromboresistivity and a lower hemolysis rate due to the heparinization.”

According to the news reporters, the researchers concluded: “This widens the application of chitosan and soy protein-based biomaterials that may come in contact with blood.”

For more information on this research see: Improvement in hemocompatibility of chitosan/soy protein composite membranes by heparinization. *Bio-medical Materials and Engineering*, 2012;22(1):143-50.

Our news correspondents report that additional information may be obtained by contacting X. Wang, Dept. of Biomedical Engineering, School of Basic Medical Science, Wuhan University, Wuhan, China Research Center for Medicine, Wuhan University, Wuhan, People’s Taiwan. (2012 Aug 01)

### **Butantan Institute, Sao Paulo: Characterization of two vasoactive peptides isolated from the plasma of the snake *Crotalus durissus terrificus***

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedical Engineering. According to news originating from Sao Paulo, Brazil, by NewsRx correspondents, researchers stated “Incubation of plasma from the snake *Crotalus durissus terrificus* (CDTP) with trypsin generated two hypotensive peptides.”

Our news journalists obtained a quote from the research from Butantan Institute, “The primary structure of the peptides was established for two sequences as: (Ser - Ile - Pro - Gln - Ala - Pro - Thr - Ser - Asn - Leu - Ile - Glu - Ala - Thr - Lys) and (Lys - Pro - Asp - Ala Asn

- Gln - Val - Leu - Ile - Gln - Val - Ile - Gly - Val). These peptides display homology with fragments of albumin from *Trimeresurus flavoviridis*.”

According to the news editors, the researchers concluded: “Bolus intra-arterial injection of the purified or the synthetic peptide produced a strong and sustained vasopressor response in the anaesthetized snake (CDT) and rats (Wistar); this hypotensive effect was also potentiated by captopril-an angiotensin-converting (0.1 mg/kg) enzyme inhibitor.”

For more information on this research see: Characterization of two vasoactive peptides isolated from the plasma of the snake *Crotalus durissus terrificus*. *Biomedicine & Pharmacotherapy*, 2012;66(4):256-265. *Biomedicine & Pharmacotherapy* can be contacted at: Elsevier France-Editions Scientifiques Medicales Elsevier, 23 Rue Linois, 75724 Paris, France. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedicine & Pharmacotherapy - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

The news correspondents report that additional information may be obtained from S.A. Barreto, Butantan Inst, Pharmacol Lab, BR-05503900 Sao Paulo, Brazil. (2012 Jul 31)

### **Chung Yuan Christian University, Chungli: Cell-based analysis of Chikungunya virus E1 protein in membrane fusion**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Amino Acids. According to news reporting originating in Chungli, Taiwan, by NewsRx journalists, researchers stated “Chikungunya fever is a pandemic disease caused by the mosquito-borne Chikungunya virus (CHIKV). E1 glycoprotein mediation of viral membrane fusion during CHIKV infection is a crucial step in the release of viral genome into the host cytoplasm for replication.”

The news reporters obtained a quote from the research from Chung Yuan Christian University, “How the E1 structure determines membrane fusion and whether other CHIKV structural proteins participate in E1 fusion activity remain largely unexplored. A bicistronic baculovirus expression system to produce recombinant baculoviruses for cell-based assay was used. Sf21 insect cells infected by recombinant baculoviruses bearing wild type or single-amino-acid substitution of CHIKV E1 and EGFP (enhanced green fluorescence protein) were employed to investigate the roles of four E1 amino acid residues (G91, V178, A226, and H230) in membrane fusion activity. Western blot analysis revealed that the E1 expression level and surface features in wild type and mutant substituted cells were similar. However, cell fusion

assay found that those cells infected by CHIKV E1-H230A mutant baculovirus showed little fusion activity, and those bearing CHIKV E1-G91D mutant completely lost the ability to induce cell-cell fusion. Cells infected by recombinant baculoviruses of CHIKV E1-A226V and E1-V178A mutants exhibited the same membrane fusion capability as wild type. Although the E1 expression level of cells bearing monomeric-E1-based constructs (expressing E1 only) was greater than that of cells bearing 26S-based constructs (expressing all structural proteins), the sizes of syncytial cells induced by infection of baculoviruses containing 26S-based constructs were larger than those from infections having monomeric-E1 constructs, suggesting that other viral structure proteins participate or regulate E1 fusion activity. Furthermore, membrane fusion in cells infected by baculovirus bearing the A226V mutation constructs exhibited increased cholesterol-dependences and lower pH thresholds. Cells bearing the V178A mutation exhibited a slight decrease in cholesterol-dependence and a higher-pH threshold for fusion. Cells expressing amino acid substitutions of conserved protein E1 residues of E1-G91 and E1-H230 lost most of the CHIKV E1-mediated membrane fusion activity.”

According to the news reporters, the researchers concluded: “Cells expressing mutations of less-conserved amino acids, E1-V178A and E1-A226V, retained membrane fusion activity to levels similar to those expressing wild type E1, but their fusion properties of pH threshold and cholesterol dependence were slightly altered.”

For more information on this research see: Cell-based analysis of Chikungunya virus E1 protein in membrane fusion. *Journal of Biomedical Science*, 2012;19():1-12. *Journal of Biomedical Science* can be contacted at: Biomed Central Ltd, 236 Grays Inn Rd, Floor 6, London WC1X 8HL, England. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Biomedical Science* - [www.jbiomedsci.com](http://www.jbiomedsci.com))

Our news correspondents report that additional information may be obtained by contacting S.C. Kuo, Chung Yuan Christian Univ, Dept. of Biosci Technol, Chungli, Taiwan. (2012 Jul 31)

### **Georgia Institute of Technology, Atlanta: Validation of an accelerometer-based method to measure the use of manual wheelchairs**

By a News Reporter-Staff News Editor at Journal of Mathematics – A new study on Rehabilitation is now available. According to news reporting from Atlanta, Georgia, by VerticalNews journalists, researchers stated “The goal of this project was to develop and validate a methodology for measuring manual wheelchair movement. The ability to study

wheelchair movement is necessary across a number of clinical and research topics in rehabilitation, including the outcomes of rehabilitation interventions, the long-term effects of wheelchair propulsion on shoulder health, and improved wheelchair prescription and design.”

The news correspondents obtained a quote from the research from the Georgia Institute of Technology, “This study used a wheel-mounted accelerometer to continuously measure distance wheeled, and to continuously determine if the wheelchair is moving. Validation of the system and algorithm was tested across typical mobility-related activities of daily living, which included short slow movements with frequent starts, stops, and turns, and straight, steady state propulsion. Accuracy was found to be greater than 90% across wheelchair and wheel types (spoke and mag), propulsion techniques (manual and foot), speeds, and everyday mobility-related activities of daily living. Although a number of approaches for wheelchair monitoring are currently present in the literature, many are limited in the data they provide.”

According to the news reporters, the researchers concluded: “The methodology presented in this paper can be applied to a variety of commercially available products that record bi-axial accelerations, and used to answer many research questions in wheeled mobility.”

For more information on this research see: Validation of an accelerometer-based method to measure the use of manual wheelchairs. *Medical Engineering & Physics*, 2012;34(6):781-6. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting S.E. Sonenblum, Rehabilitation Engineering and Applied Research Laboratory, Georgia Institute of Technology, Atlanta, GA, United States. (2012 Jul 31)

### **Ghent University: The upstream boundary condition influences the leaflet opening dynamics in the numerical FSI simulation of an aortic BMHV**

By a News Reporter-Staff News Editor at Journal of Mathematics – New research on Numerical Modeling is the subject of a report. According to news reporting originating from Ghent, Belgium, by VerticalNews correspondents, researchers stated “In this paper, the influence of the upstream boundary condition in the numerical simulation of an aortic bileaflet mechanical heart valve (BMHV) is studied. Three three-dimensional cases with different upstream boundary conditions are compared.”

Our news editors obtained a quote from the research from Ghent University, “The first case consists of a rigid straight tube with a velocity profile at its inlet. In the second case, the upstream geometry is

a contracting left ventricle (LV), positioned symmetrically with respect to the valve. In the last case, the LV is positioned asymmetrical with respect to the valve. The cases are used to simulate the same three-dimensional BMHV. The change in time of the LV volume is calculated such that the flow rate through the valve is identical in each case. The opening dynamics of the BMHV are modelled using fluidstructure interaction. The simulations show that differences occur in the leaflet movement of the three cases. In particular, with the asymmetric LV, one of the leaflets impacts the blocking mechanism at its open position with a 34% higher velocity than when using the velocity profile, and with an 88% higher velocity than in the symmetric LV case.”

According to the news editors, the researchers concluded: “Therefore, when simulating such an impact, the upstream boundary condition needs to be chosen carefully.”

For more information on this research see: The upstream boundary condition influences the leaflet opening dynamics in the numerical FSI simulation of an aortic BMHV. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(6-7):745-760. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

The news editors report that additional information may be obtained by contacting S. Annerel, University of Ghent, IBiTech BioMMeda, B-9000 Ghent, Belgium. (2012 Jul 31)

### **Harvard University, Boston: Improved Labeling of Subcortical Brain Structures in Atlas-Based Segmentation of Magnetic Resonance Images**

By a News Reporter-Staff News Editor at Ivy League Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Boston, Massachusetts, by NewsRx correspondents, researchers stated “Precise labeling of subcortical structures plays a key role in functional neurosurgical applications. Labels from an atlas image are propagated to a patient image using atlas-based segmentation.”

Our news editors obtained a quote from the research from Harvard University, “Atlas-based segmentation is highly dependent on the registration framework used to guide the atlas label propagation. This paper focuses on atlas-based segmentation of subcortical brain structures and the effect of different registration methods on the generated subcortical labels. A single-step and three two-step registration methods

appearing in the literature based on affine and deformable registration algorithms in the ANTS and FSL algorithms are considered. Experiments are carried out with two atlas databases of IBSR and LPBA40. Six segmentation metrics consisting of Dice overlap, relative volume error, false positive, false negative, surface distance, and spatial extent are used for evaluation. Segmentation results are reported individually and as averages for nine subcortical brain structures. Based on two statistical tests, the results are ranked. In general, among four different registration strategies investigated in this paper, a two-step registration consisting of an initial affine registration followed by a deformable registration applied to subcortical structures provides superior segmentation outcomes.”

According to the news editors, the researchers concluded: “This method can be used to provide an improved labeling of the subcortical brain structures in MRIs for different applications.”

For more information on this research see: Improved Labeling of Subcortical Brain Structures in Atlas-Based Segmentation of Magnetic Resonance Images. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1808-1817. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting S. Yousefi, Harvard University, Sch Med, Boston, MA 02115, United States. (2012 Jul 31)

### **Hebrew University, Jerusalem: Non-invasive skin biomarkers quantification of psoriasis and atopic dermatitis: Cytokines, antioxidants and psoriatic skin auto-fluorescence**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Papulosquamous Skin Diseases have been published. According to news reporting out of Jerusalem, Israel, by NewsRx editors, researchers stated “Psoriasis and atopic dermatitis (AD) are challenging to treat due to the absence of suitable monitoring procedure and their recurrences. Alteration of skin hydrophilic biomarkers (SHB) and structural elements occur in both disorders and may possess a distinct profile for each clinical condition.”

Our news journalists obtained a quote from the research from Hebrew University, “To quantify skin cytokines and antioxidants non-invasively in psoriatic and in AD patients and to evaluate skin auto-fluorescence in psoriatic patients. A skin wash sampling technique



was utilized to detect the expression of SHB on psoriatic and AD patients and healthy controls. Inflammatory cytokine (TNF alpha, IL-1 alpha and IL-6) levels, total antioxidant scavenging capacity and uric acid content were estimated. Additionally, measurement of the fluorescent emission spectra of tryptophan moieties, collagen cross-links and elastin cross-links were performed on psoriatic patients and healthy controls. Our findings demonstrate significant alterations of the SHB levels among psoriasis, AD and healthy skin. Differences were also observed between lesional and non-lesional areas in patients with psoriasis and AD. Ultra-structural changes were found in psoriatic patients both in lesional and non-lesional areas. Employing non-invasive measurements of skin wash sampling and skin auto-fluorescence might serve as complementary analysis for improved diagnosis and treatment of psoriasis and AD.”

According to the news editors, the researchers concluded: “Furthermore, they may serve as an additional monitoring tool for various diseases, in which skin dysfunction is involved.”

For more information on this research see: Non-invasive skin biomarkers quantification of psoriasis and atopic dermatitis: Cytokines, antioxidants and psoriatic skin auto-fluorescence. *Biomedicine & Pharmacotherapy*, 2012;66(4):293-299. *Biomedicine & Pharmacotherapy* can be contacted at: Elsevier France-Editions Scientifiques Medicales Elsevier, 23 Rue Linois, 75724 Paris, France. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedicine & Pharmacotherapy* - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

Our news journalists report that additional information may be obtained by contacting M. Portugal-Cohen, Hebrew University of Jerusalem, Dept. of Biol Chem, Silberman Inst Life Sci, IL-91120 Jerusalem, Israel. (2012 Jul 31)

### **Johns Hopkins University School of Medicine, Baltimore: Exploiting the tumor microenvironment for theranostic imaging**

By a News Reporter-Staff News Editor at Cancer Weekly – Researchers detail new data in *Biomedicine*. According to news reporting originating in Baltimore, Maryland, by NewsRx journalists, researchers stated “The integration of chemistry and molecular biology with imaging is providing some of the most exciting opportunities in the treatment of cancer. The field of theranostic imaging, where diagnosis is combined with therapy, is particularly suitable for a disease as complex as cancer, especially now that genomic and proteomic profiling can provide an extensive ‘fingerprint’ of each tumor.”

The news reporters obtained a quote from the research from the Johns Hopkins University School of Medicine, “Using this information,

theranostic agents can be shaped for personalized treatment to target specific compartments, such as the tumor microenvironment (TME), whilst minimizing damage to normal tissue. These theranostic agents can also be used to target multiple pathways or networks by incorporating multiple small interfering RNAs (siRNAs) within a single agent. A decade ago genetic alterations were the primary focus in cancer research. Now it is apparent that the tumor physiological microenvironment, interactions between cancer cells and stromal cells, such as endothelial cells, fibroblasts and macrophages, the extracellular matrix (ECM), and a host of secreted factors and cytokines, influence progression to metastatic disease, aggressiveness and the response of the disease to treatment.”

According to the news reporters, the researchers concluded: “In this review, we outline some of the characteristics of the TME, describe the theranostic agents currently available to target the TME and discuss the unique opportunities the TME provides for the design of novel theranostic agents for cancer therapy.”

For more information on this research see: Exploiting the tumor microenvironment for theranostic imaging. *Nmr In Biomedicine*, 2011;24(6):636-47. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news correspondents report that additional information may be obtained by contacting I. Stasinopoulos, JHU ICMIC Program, The Russell H Morgan Dept. of Radiology and Radiological Science, The Johns Hopkins University School of Medicine, Baltimore, MD, United States. (2012 Jul 31)

### **Oregon Health and Science University, Portland: Tri-modal confocal mosaics detect residual invasive squamous cell carcinoma in Mohs surgical excisions**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Squamous Cell Carcinoma have been published. According to news reporting originating in Portland, Oregon, by NewsRx journalists, researchers stated “For rapid, intra-operative pathological margin assessment to guide staged cancer excisions, multimodal confocal mosaic scan image wide surgical margins (approximately 1 cm) with sub-cellular resolution and mimic the appearance of conventional hematoxylin and eosin histopathology (H&E). The goal of this work is to combine three confocal imaging modes: acridine orange fluorescence (AO) for labeling nuclei, eosin fluorescence (Eo) for labeling cytoplasm, and endogenous reflectance &#174; for marking collagen and keratin.”

The news reporters obtained a quote from the research from Oregon Health and Science University, “Absorption contrast is achieved by alternating the excitation wavelength: 488 nm (AO fluorescence) and 532 nm (Eo fluorescence). Superposition and false-coloring of these modes mimics H&E, enabling detection of cutaneous squamous cell carcinomas (SCC). The sum of mosaic Eo + R is false-colored pink to mimic the appearance of eosin, while the AO mosaic is false-colored purple to mimic the appearance of hematoxylin in H&E. In this study, mosaics of 10 Mohs surgical excisions containing invasive SCC, and five containing only normal tissue were subdivided for digital presentation equivalent to 4x histology. Of the total 50 SCC and 25 normal sub-mosaics presented, two reviewers made two and three type-2 errors (false positives), respectively. Limitations to precisely mimic H&E included occasional elastin staining by AO.”

According to the news reporters, the researchers concluded: “These results suggest that confocal mosaics may effectively guide staged SCC excisions in skin and other tissues.”

For more information on this research see: Tri-modal confocal mosaics detect residual invasive squamous cell carcinoma in Mohs surgical excisions. *Journal of Biomedical Optics*, 2012;17(6):460-464. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting D. Gareau, Oregon Health Sciences University, Dept. of Biomed Engr, Portland, OR 97239, United States. (2012 Jul 31)

### **University of Akron: Matrix decomposition based feature extraction for murmur classification**

By a News Reporter-Staff News Editor at Journal of Mathematics – Investigators publish new report on Medical Engineering and Physics. According to news reporting originating in Akron, Ohio, by VerticalNews journalists, researchers stated “Heart murmurs often indicate heart valvular disorders. However, not all heart murmurs are organic.”

The news reporters obtained a quote from the research from the University of Akron, “For example, musical murmurs detected in children are mostly innocent. Because of the challenges of mastering auscultation skills and reducing healthcare expenses, this study aims to discover new features for distinguishing innocent murmurs from organic murmurs, with the ultimate objective of designing an intelligent diagnostic system that could be used at home. Phonocardiographic signals that were recorded in an auscultation training CD were used for analysis. Instead of the discrete wavelet transform that has been used often in

previous work, a continuous wavelet transform was applied on the heart sound data. The matrix that was derived from the continuous wavelet transform was then processed via singular value decomposition and QR decomposition, for feature extraction. Shannon entropy and the Gini index were adopted to generate features. To reduce the number of features that were extracted, the feature selection algorithm of sequential forward floating selection (SFFS) was utilized to select the most significant features, with the selection criterion being the maximization of the average accuracy from a 10-fold cross-validation of a classification algorithm called classification and regression trees (CART). An average sensitivity of 94%, a specificity of 83%, and a classification accuracy of 90% were achieved.”

According to the news reporters, the researchers concluded: “These favorable results substantiate the effectiveness of the feature extraction methods based on the proposed matrix decomposition method.”

For more information on this research see: Matrix decomposition based feature extraction for murmur classification. *Medical Engineering & Physics*, 2012;34(6):756-61. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting Y. Chen, Dept. of Mechanical Engineering, The University of Akron, Akron, OH 44325-3903, United States. (2012 Jul 31)

### **University of Florida, Gainesville: Comparative evaluation of differential laser-induced perturbation spectroscopy as a technique to discriminate emerging skin pathology**

By a News Reporter-Staff News Editor at Life Science Weekly – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Gainesville, Florida, by NewsRx correspondents, researchers stated “Fluorescence spectroscopy has been widely investigated as a technique for identifying pathological tissue; however, unrelated subject-to-subject variations in spectra complicate data analysis and interpretation. We describe and evaluate a new biosensing technique, differential laser-induced perturbation spectroscopy (DLIPS), based on deep ultraviolet (UV) photochemical perturbation in combination with difference spectroscopy.”

Our news journalists obtained a quote from the research from the University of Florida, “This technique combines sequential fluorescence probing (pre- and post-perturbation) with sub-ablative UV perturbation and difference spectroscopy to provide a new spectral dimension, facilitating two improvements over fluorescence spectroscopy. First, the

differential technique eliminates significant variations in absolute fluorescence response within subject populations. Second, UV perturbations alter the extracellular matrix (ECM), directly coupling the DLIPS response to the biological structure. Improved biosensing with DLIPS is demonstrated in vivo in a murine model of chemically induced skin lesion development. Component loading analysis of the data indicates that the DLIPS technique couples to structural proteins in the ECM. Analysis of variance shows that DLIPS has a significant response to emerging pathology as opposed to other population differences. An optimal likelihood ratio classifier for the DLIPS dataset shows that this technique holds promise for improved diagnosis of epithelial pathology.”

According to the news editors, the researchers concluded: “Results further indicate that DLIPS may improve diagnosis of tissue by augmenting fluorescence spectra (i.e. orthogonal sensing).”

For more information on this research see: Comparative evaluation of differential laser-induced perturbation spectroscopy as a technique to discriminate emerging skin pathology. *Journal of Biomedical Optics*, 2012;17(6):511-521. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from R.T. Kozikowski, University of Florida, Dept. of Infect Dis & Pathol, Gainesville, FL 32611, United States. (2012 Jul 31)

### **University of Glasgow: Application of terahertz spectroscopy to the characterization of biological samples using birefringence silicon grating**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Silicon. According to news reporting from Glasgow, United Kingdom, by NewsRx journalists, researchers stated “We present a device and method for performing vector transmission spectroscopy on biological specimens at terahertz (THz) frequencies. The device consists of artificial dielectric birefringence obtained from silicon microfluidic grating structures.”

The news correspondents obtained a quote from the research from the University of Glasgow, “The device can measure the complex dielectric function of a liquid, across a wide THz band of 2 to 5.5 THz, using a Fourier transform infrared spectrometer. Measurement data from a range of liquid specimens, including sucrose, salmon deoxyribonucleic acid (DNA), herring DNA, and bovine serum albumin protein solution in water are presented. The specimen handling is simple, using a microfluidic channel.”

According to the news reporters, the researchers concluded: “The transmission through the device is improved significantly and thus the measurement accuracy and bandwidth are increased.”

For more information on this research see: Application of terahertz spectroscopy to the characterization of biological samples using birefringence silicon grating. *Journal of Biomedical Optics*, 2012;17(6):551-555. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting S.C. Saha, University of Glasgow, Glasgow G12 8LT, Lanark, United Kingdom. (2012 Jul 31)

### **University of Liege: Generating smooth surface meshes from multi-region medical images**

By a News Reporter-Staff News Editor at Telemedicine Week – A new study on Biomedical Engineering is now available. According to news reporting from Liege, Belgium, by NewsRx journalists, researchers stated “Thanks to advances in medical imaging technologies and numerical methods, patient-specific modelling is more and more used to improve diagnosis and to estimate the outcome of surgical interventions. It requires the extraction of the domain of interest from the medical scans of the patient, as well as the discretisation of this geometry.”

The news correspondents obtained a quote from the research from the University of Liege, “However, extracting smooth multi-material meshes that conform to the tissue boundaries described in the segmented image is still an active field of research. We propose to solve this issue by combining an implicit surface reconstruction method with a multi-region mesh extraction scheme. The surface reconstruction algorithm is based on multi-level partition of unity implicit surfaces, which we extended to the multi-material case. The mesh generation algorithm consists in a novel multi-domain version of the marching tetrahedra. It generates multi-region meshes as a set of triangular surface patches consistently joining each other at material junctions. This paper presents this original meshing strategy, starting from boundary points extraction from the segmented data to heterogeneous implicit surface definition, multi-region surface triangulation and mesh adaptation. Results indicate that the proposed approach produces smooth and high-quality triangular meshes with a reasonable geometric accuracy.”

According to the news reporters, the researchers concluded: “Hence, the proposed method is well suited for subsequent volume mesh generation and finite element simulations.”

For more information on this research see: Generating smooth surface meshes from multi-region medical images. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(6-7):642-660. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2040-7947](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2040-7947))

Our news journalists report that additional information may be obtained by contacting V. d'Otreppe, University of Liege, Dept. of Aerosp & Mech Engn, Mech Inst B52 3, B-4000 Liege, Belgium. (2012 Jul 31)

### **University of Missouri, Columbia: Capture of circulating tumor cells using photoacoustic flowmetry and two phase flow**

By a News Reporter-Staff News Editor at Cancer Weekly – Investigators discuss new findings in Melanomas. According to news reporting from Columbia, Missouri, by NewsRx journalists, researchers stated “Melanoma is the deadliest form of skin cancer, yet current diagnostic methods are unable to detect early onset of metastatic disease. Patients must wait until macroscopic secondary tumors form before malignancy can be diagnosed and treatment prescribed.”

The news correspondents obtained a quote from the research from the University of Missouri, “Detection of cells that have broken off the original tumor and travel through the blood or lymph system can provide data for diagnosing and monitoring metastatic disease. By irradiating enriched blood samples spiked with cultured melanoma cells with nanosecond duration laser light, we induced photoacoustic responses in the pigmented cells. Thus, we can detect and enumerate melanoma cells in blood samples to demonstrate a paradigm for a photoacoustic flow cytometer. Furthermore, we capture the melanoma cells using microfluidic two phase flow, a technique that separates a continuous flow into alternating microslugs of air and blood cell suspension. Each slug of blood cells is tested for the presence of melanoma. Slugs that are positive for melanoma, indicated by photoacoustic waves, are separated from the cytometer for further purification and isolation of the melanoma cell.”

According to the news reporters, the researchers concluded: “In this paper, we evaluate the two phase photoacoustic flow cytometer for its ability to detect and capture metastatic melanoma cells in blood.”

For more information on this research see: Capture of circulating tumor cells using photoacoustic flowmetry and two phase flow. *Journal*

*of Biomedical Optics*, 2012;17(6):265-273. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting C.M. O'Brien, University of Missouri, Dept. of Dermatology, Columbia, MO 65211, United States. (2012 Jul 31)

### **University of Pittsburgh: Investigation of nuclear nano-morphology marker as a biomarker for cancer risk assessment using a mouse model**

By a News Reporter-Staff News Editor at Cancer Weekly – Current study results on Nanotechnology have been published. According to news reporting originating from Pittsburgh, Pennsylvania, by NewsRx correspondents, researchers stated “The development of accurate and clinically applicable tools to assess cancer risk is essential to define candidates to undergo screening for early-stage cancers at a curable stage or provide a novel method to monitor chemoprevention treatments. With the use of our recently developed optical technology-spatial-domain low-coherence quantitative phase microscopy (SL-QPM), we have derived a novel optical biomarker characterized by structure-derived optical path length (OPL) properties from the cell nucleus on the standard histology and cytology specimens, which quantifies the nano-structural alterations within the cell nucleus at the nanoscale sensitivity, referred to as nano-morphology marker.”

Our news editors obtained a quote from the research from the University of Pittsburgh, “The aim of this study is to evaluate the feasibility of the nuclear nano-morphology marker from histologically normal cells, extracted directly from the standard histology specimens, to detect early-stage carcinogenesis, assess cancer risk, and monitor the effect of chemopreventive treatment. We used a well-established mouse model of spontaneous carcinogenesis-Apc(Min) mice, which develop multiple intestinal adenomas (Min) due to a germline mutation in the adenomatous polyposis coli (Apc) gene. We found that the nuclear nano-morphology marker quantified by OPL detects the development of carcinogenesis from histologically normal intestinal epithelial cells, even at an early pre-adenomatous stage (six weeks). It also exhibits a good temporal correlation with the small intestine that parallels the development of carcinogenesis and cancer risk. To further assess its ability to monitor the efficacy of chemopreventive agents, we used an established chemopreventive agent, sulindac. The nuclear nano-morphology marker is reversed toward normal after a prolonged treatment.”

According to the news editors, the researchers concluded: “Therefore, our proof-of-concept study establishes the feasibility of the SL-QPM derived nuclear nano-morphology marker OPL as a promising,



simple and clinically applicable biomarker for cancer risk assessment and evaluation of chemopreventive treatment.”

For more information on this research see: Investigation of nuclear nano-morphology marker as a biomarker for cancer risk assessment using a mouse model. *Journal of Biomedical Optics*, 2012;17(6):421-427. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting R.K. Bista, University of Pittsburgh, Dept. of Med, Div Gastroenterol Hepatol & Nutr, Pittsburgh, PA 15232, United States. (2012 Jul 31)

### **Washington University, St. Louis: Quantitative photoacoustic microscopy of optical absorption coefficients from acoustic spectra in the optical diffusive regime**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Engineering are presented in a new report. According to news originating from St. Louis, Missouri, by NewsRx correspondents, researchers stated “Photoacoustic (PA) microscopy (PAM) can image optical absorption contrast with ultrasonic spatial resolution in the optical diffusive regime. Conventionally, accurate quantification in PAM requires knowledge of the optical fluence attenuation, acoustic pressure attenuation, and detection bandwidth.”

Our news journalists obtained a quote from the research from Washington University, “We circumvent this requirement by quantifying the optical absorption coefficients from the acoustic spectra of PA signals acquired at multiple optical wavelengths. With the acoustic spectral method, the absorption coefficients of an oxygenated bovine blood phantom at 560, 565, 570, and 575 nm were quantified with errors of  $\leq 3\%$ . We also quantified the total hemoglobin concentration and hemoglobin oxygen saturation in a live mouse. Compared with the conventional amplitude method, the acoustic spectral method provides greater quantification accuracy in the optical diffusive regime.”

According to the news editors, the researchers concluded: “The limitations of the acoustic spectral method was also discussed.”

For more information on this research see: Quantitative photoacoustic microscopy of optical absorption coefficients from acoustic spectra in the optical diffusive regime. *Journal of Biomedical Optics*, 2012;17(6):398-403. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from Z.J. Guo, Washington University, Dept. of Biomed Engrn, Opt Imaging Lab, St Louis, MO 63130, United States. (2012 Jul 31)

### **Aarhus University: Fusion of Magnetometer and Gradiometer Sensors of MEG in the Presence of Multiplicative Error**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Aarhus, Denmark, by NewsRx journalists, researchers stated “Novel neuroimaging techniques have provided unprecedented information on the structure and function of the living human brain. Multimodal fusion of data from different sensors promises to radically improve this understanding, yet optimal methods have not been developed.”

The news correspondents obtained a quote from the research from Aarhus University, “Here, we demonstrate a novel method for combining multichannel signals. We show how this method can be used to fuse signals from the magnetometer and gradiometer sensors used in magnetoencephalography (MEG), and through extensive experiments using simulation, head phantom and real MEG data, show that it is both robust and accurate. This new approach works by assuming that the lead fields have multiplicative error. The criterion to estimate the error is given within a spatial filter framework such that the estimated power is minimized in the worst case scenario. The method is compared to, and found better than, existing approaches. The closed-form solution and the conditions under which the multiplicative error can be optimally estimated are provided. This novel approach can also be employed for multimodal fusion of other multichannel signals such as MEG and EEG.”

According to the news reporters, the researchers concluded: “Although the multiplicative error is estimated based on beamforming, other methods for source analysis can equally be used after the lead-field modification.”

For more information on this research see: Fusion of Magnetometer and Gradiometer Sensors of MEG in the Presence of Multiplicative Error. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):1951-1961. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting H.R. Mohseni, Aarhus University, CFIN MindLab, DK-8000 Aarhus, Denmark. (2012 Jul 30)

**Erasmus University Medical Center, Rotterdam: In vivo quantification of photosensitizer concentration using fluorescence differential path-length spectroscopy: influence of photosensitizer formulation and tissue location**

By a News Reporter-Staff News Editor at Biotech Business Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of Rotterdam, Netherlands, by NewsRx editors, researchers stated “In vivo measurement of photosensitizer concentrations may optimize clinical photodynamic therapy (PDT). Fluorescence differential path-length spectroscopy (FDPS) is a non-invasive optical technique that has been shown to accurately quantify the concentration of Foscan &#174; in rat liver.”

Our news journalists obtained a quote from the research from Erasmus University Medical Center, “As a next step towards clinical translation, the effect of two liposomal formulations of mTHPC, Fospeg &#174; and Foslip &#174;, on FDPS response was investigated. Furthermore, FDPS was evaluated in target organs for head-and-neck PDT. Fifty-four healthy rats were intravenously injected with one of the three formulations of mTHPC at 0.15 mg/kg(-1). FDPS was performed on liver, tongue, and lip. The mTHPC concentrations estimated using FDPS were correlated with the results of the subsequent harvested and chemically extracted organs. An excellent goodness of fit ( $R^2$ ) between FDPS and extraction was found for all formulations in the liver ( $R^2 = 0.79$ ). A much lower  $R^2$  between FDPS and extraction was found in lip ( $R^2 = 0.46$ ) and tongue ( $R^2 = 0.10$ ).”

According to the news editors, the researchers concluded: “The lower performance in lip and in particular tongue was mainly attributed to the more layered anatomical structure, which influences scattering properties and photosensitizer distribution.”

For more information on this research see: In vivo quantification of photosensitizer concentration using fluorescence differential path-length spectroscopy: influence of photosensitizer formulation and tissue location. *Journal of Biomedical Optics*, 2012;17(6):501-509. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting S. de Visscher, Erasmus MC, Center Opt Diagnost & Therapy, Dept. of Radiat Oncol, Rotterdam, Netherlands. (2012 Jul 30)

## **Hallym University, Gangwon Do: A Flexible Depth Probe Using Liquid Crystal Polymer**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – A new study on Biomedical Engineering is now available. According to news reporting originating from Gangwon Do, South Korea, by NewsRx correspondents, researchers stated “We proposed a method of making a flexible depth-type neural probe using liquid crystal polymer. Conventional depth neural probes made of metal or silicon have the limitations of a single recording site per shank or the brittleness of the silicon substrate.”

Our news editors obtained a quote from the research from Hallym University, “To avoid these drawbacks, polymer-based depth neural probes have been developed with biocompatible polymers such as polyimides or parylenes. However, those have suffered from the difficulty of inserting the probes into brain tissues due to their high flexibility, requiring mechanical reinforcements. Herein, we report the first attempt to use a flexible material, liquid crystal polymer (LCP), as a substrate for a depth-type neural probe. The LCP-based probe offers a controllable stiffness vs. flexibility and compatibility with thin-film processes in addition to its inherent characteristics such as high reliability and biocompatibility. In the present study, an LCP neural probe was fabricated to have enough stiffness to penetrate the dura mater of rodent brains without a guide tool or additional reinforcement structures. A simultaneous multichannel neural recording was successfully achieved from the somatosensory motor cortex of the rodents.”

According to the news editors, the researchers concluded: “Immunohistochemistry showed that the electrodes could be inserted into the desired regions in the brain.”

For more information on this research see: A Flexible Depth Probe Using Liquid Crystal Polymer. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):2085-2094. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting S.E. Lee, Hallym University, Dept. of Physiol, Chunchon 200702, Gangwon Do, South Korea. (2012 Jul 30)

## Kidney Center, Osaka: Poor muscle quality as a predictor of high mortality independent of diabetes in hemodialysis patients

By a News Reporter-Staff News Editor at Diabetes Week – New research on Diabetes is the subject of a report. According to news reporting originating from Osaka, Japan, by NewsRx correspondents, researchers stated “Poor muscle quality provides a clinically relevant measure for mortality in general population, particularly in the elderly people. Our previous reports indicating poorer muscle quality in diabetes mellitus (DM) hemodialysis patients than in non-DM counterparts prompted us to examine the association between two parameters in hemodialysis patients, independent of DM prevalence.”

Our news editors obtained a quote from the research from Kidney Center, “The study was performed from 1997 to 2005. Grip dynamometry and dual-energy X-ray absorptiometry (DXA) were used to measure handgrip strength (HGS) and arm lean mass (ALM), respectively, with the muscle quality defined as the ratio of HGS to ALM. During the mean follow-up period of 77 months, 90 out of 272 patients died. The patients were divided into higher and lower groups based on the values of muscle quality. In Kaplan-Meier analysis, the higher group revealed lower mortality than the lower group. Cox regression hazards analysis identified higher muscle quality as a significant independent predictor for better survival in hemodialysis patients (HR; 0.889, 95% CI 0.814-0.971;  $P < 0.05$ ), after adjustment for age, sex and the prevalence of DM. Since DM prevalence is a major factor for poorer muscle quality, another analysis was performed after restriction of the subjects to non-DM patients. The result also indicated that muscle quality provides a relevant measure independent of the presence of DM to predict the mortality in hemodialysis patients (HR; 0.849, 95% CI 0.759-0.950;  $P < 0.05$ ).”

According to the news editors, the researchers concluded: “The study suggested that muscle quality provides a good marker for survival in hemodialysis patients, independently of the presence DM, age and serum albumin.”

For more information on this research see: Poor muscle quality as a predictor of high mortality independent of diabetes in hemodialysis patients. *Biomedicine & Pharmacotherapy*, 2012;66(4):266-270. *Biomedicine & Pharmacotherapy* can be contacted at: Elsevier France- Editions Scientifiques Medicales Elsevier, 23 Rue Linois, 75724 Paris, France. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedicine & Pharmacotherapy* - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

The news editors report that additional information may be obtained by contacting M. Yoda, Shirasagi Hosp, Kidney Center, Osaka, Japan. (2012 Jul 30)

### **Massachusetts General Hospital, Boston: Improved tumor contrast achieved by single time point dual-reporter fluorescence imaging**

By a News Reporter-Staff News Editor at Biotech Business Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Boston, Massachusetts, by NewsRx journalists, researchers stated “In this study, we demonstrate a method to quantify biomarker expression that uses an exogenous dual-reporter imaging approach to improve tumor signal detection.”

The news correspondents obtained a quote from the research from Massachusetts General Hospital, “The uptake of two fluorophores, one nonspecific and one targeted to the epidermal growth factor receptor (EGFR), were imaged at 1 h in three types of xenograft tumors spanning a range of EGFR expression levels ( $n = 6$  in each group). Using this dual-reporter imaging methodology, tumor contrast-to-noise ratio was amplified by  $\approx 6$  times at 1 h postinjection and  $\approx 2$  times at 24 h. Furthermore, by as early as 20 min postinjection, the dual-reporter imaging signal in the tumor correlated significantly with a validated marker of receptor density ( $P < 0.05$ ,  $r = 0.93$ ).”

According to the news reporters, the researchers concluded: “Dual-reporter imaging can improve sensitivity and specificity over conventional fluorescence imaging in applications such as fluorescence-guided surgery and directly approximates the receptor status of the tumor, a measure that could be used to inform choices of biological therapies.”

For more information on this research see: Improved tumor contrast achieved by single time point dual-reporter fluorescence imaging. *Journal of Biomedical Optics*, 2012;17(6):311-320. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting K.M. Tichauer, Massachusetts General Hospital, Wellman Center Photomed, Boston, MA 02114, United States. (2012 Jul 30)

### **Technical University, Milan: Orthotropic active strain models for the numerical simulation of cardiac biomechanics**

By a News Reporter-Staff News Editor at Cardiovascular Week – Fresh data on Cardiology are presented in a new report. According to news reporting originating in Milan, Italy, by NewsRx journalists, researchers stated “A model for the active deformation of cardiac tissue considering orthotropic constitutive laws is introduced and studied. In particular, the passive mechanical properties of the myocardium are described by

the Holzapfel-Ogden relation, whereas the activation model is based on the concept of active strain.”

The news reporters obtained a quote from the research from Technical University, “There, an incompatible intermediate configuration is considered, which entails a multiplicative decomposition between active and passive deformation gradients. The underlying EulerLagrange equations for minimizing the total energy are written in terms of these deformation factors, where the active part is assumed to depend, at the cell level, on the electrodynamics and on the specific orientation of the cardiomyocytes. The active strain formulation is compared with the classical active stress model from both numerical and modeling perspectives. The well-posedness of the linear system derived from a generic Newton iteration of the original problem is analyzed, and different mechanical activation functions are considered. TaylorHood and MINI finite elements are used in the discretization of the overall mechanical problem.”

According to the news reporters, the researchers concluded: “The results of several numerical experiments show that the proposed formulation is mathematically consistent and is able to represent the main features of the phenomenon, while allowing savings in computational costs.”

For more information on this research see: Orthotropic active strain models for the numerical simulation of cardiac biomechanics. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(6-7):761-788. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news correspondents report that additional information may be obtained by contacting S. Rossi, Politecn Milan, MOX Modellist & Calcolo Sci, Dipartimento Matemat F Brioschi, I-20133 Milan, Italy. (2012 Jul 30)

### **University of Melbourne, Parkville: A simple, versatile valve model for use in lumped parameter and one-dimensional cardiovascular models**

By a News Reporter-Staff News Editor at Cardiovascular Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Parkville, Australia, by NewsRx journalists, researchers stated “Lumped parameter and one-dimensional models of the cardiovascular system generally employ ideal cardiac and/or venous valves that open and close instantaneously.”

The news reporters obtained a quote from the research from the University of Melbourne, “However, under normal or pathological conditions, valves can exhibit complex motions that are mainly determined by the instantaneous difference between upstream and downstream pressures.”

According to the news reporters, the researchers concluded: “We present a simple valve model that predicts valve motion on the basis of this pressure difference, and can be used to investigate not only valve pathology, but a wide range of cardiac and vascular factors that are likely to influence valve motion.”

For more information on this research see: A simple, versatile valve model for use in lumped parameter and one-dimensional cardiovascular models. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(6-7):626-641. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2040-7947](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2040-7947))

Our news correspondents report that additional information may be obtained by contacting J.P. Mynard, University of Melbourne, Dept. of Chem & Biomol Engn, Parkville, Vic 3052, Australia. (2012 Jul 30)

### **University of Paris: Reduced-order modeling for cardiac electrophysiology. Application to parameter identification**

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators publish new report on Cardiology. According to news reporting from Paris, France, by NewsRx journalists, researchers stated “A reduced-order model based on proper orthogonal decomposition (POD) is proposed for the bidomain equations of cardiac electrophysiology. Its accuracy is assessed through electrocardiograms in various configurations, including myocardium infarctions and long-time simulations.”

The news correspondents obtained a quote from the research from the University of Paris, “We show in particular that a restitution curve can efficiently be approximated by this approach. The reduced-order model is then used in an inverse problem solved by an evolutionary algorithm.”

According to the news reporters, the researchers concluded: “Some attempts are presented to identify ionic parameters and infarction locations from synthetic electrocardiograms.”

For more information on this research see: Reduced-order modeling for cardiac electrophysiology. Application to parameter identification.



*International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(6-7):727-744. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2040-7947](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2040-7947))

Our news journalists report that additional information may be obtained by contacting M. Boulakia, University of Paris, Jacques Louis Lions Lab UMR 7598, F-75005 Paris, France. (2012 Jul 30)

## **University of Rochester: Aggregate Input-Output Models of Neuronal Populations**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Rochester, New York, by NewsRx journalists, researchers stated “An extraordinary amount of electrophysiological data has been collected from various brain nuclei to help us understand how neural activity in one region influences another region. In this paper, we exploit the point process modeling (PPM) framework and describe a method for constructing aggregate input-output (IO) stochastic models that predict spiking activity of a population of neurons in the ‘output’ region as a function of the spiking activity of a population of neurons in the ‘input’ region.”

The news correspondents obtained a quote from the research from the University of Rochester, “We first build PPMs of each output neuron as a function of all input neurons, and then cluster the output neurons using the model parameters. Output neurons that lie within the same cluster have the same functional dependence on the input neurons. We first applied our method to simulated data, and successfully uncovered the predetermined relationship between the two regions. We then applied our method to experimental data to understand the input-output relationship between motor cortical neurons and 1) somatosensory and 2) premotor cortical neurons during a behavioral task.”

According to the news reporters, the researchers concluded: “Our aggregate IO models highlighted interesting physiological dependences including relative effects of inhibition/excitation from input neurons and extrinsic factors on output neurons.”

For more information on this research see: Aggregate Input-Output Models of Neuronal Populations. *IEEE Transactions on Biomedical Engineering*, 2012;59(7):2030-2039. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.>

ieee.org/; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting S. Saxena, University of Rochester, Rochester, NY 14642, United States. (2012 Jul 30)

### **Washington University, St. Louis: Functional photoacoustic microscopy of diabetic vasculature**

By a News Reporter-Staff News Editor at Diabetes Week – A new study on Diabetes is now available. According to news reporting from St. Louis, Missouri, by NewsRx journalists, researchers stated “We used functional photoacoustic microscopy to image diabetes-induced damage to the microvasculature. To produce an animal model for Type 1 diabetes, we used streptozotocin (STZ), which is particularly toxic to the insulin-producing beta cells of the pancreas in mammals.”

The news correspondents obtained a quote from the research from Washington University, “A set number of ND4 Swiss Webster mice received intraperitoneal injections of STZ for five consecutive days at 50 mg/kg. Most mice developed a significant rise in blood glucose level (similar to 400mg/dL) within three weeks of the first injection. Changes in vasculature and hemodynamics were monitored for six weeks. The mouse ear was imaged with an optical-resolution photoacoustic microscope at a main blood vessel branch from the root of the ear. There are noticeable and measurable changes associated with the disease, including decreased vessel diameter and possible occlusion due to vessel damage and polyurea. We also observed an increase in the blood flow speed in the vein and a decrease in the artery, which could be due to compensation for the dehydration and vessel diameter changes.”

According to the news reporters, the researchers concluded: “Functional and metabolic parameters such as hemoglobin oxygen saturation, oxygen extraction fraction, and oxygen consumption rate were also measured, but showed no significant change.”

For more information on this research see: Functional photoacoustic microscopy of diabetic vasculature. *Journal of Biomedical Optics*, 2012;17(6):52-54. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting A. Krumholz, Washington University, Opt Imaging Lab, Dept. of Biomed Engn, St Louis, MO 63130, United States. (2012 Jul 30)

### **Washington University, St. Louis: Label-free photoacoustic microscopy of myocardial sheet architecture**

By a News Reporter-Staff News Editor at Cardiovascular Week – Data detailed on Cardiology have been presented. According to news originating from St. Louis, Missouri, by NewsRx correspondents, researchers stated “Cardiac myofibers are organized into sheet architectures, which contribute to up to 40% of the heart wall thickening for ejection of blood for circulation. It is important to delineate the sheet architecture for a better understanding of cardiac mechanisms.”

Our news journalists obtained a quote from the research from Washington University, “However, current sheet imaging technologies are limited by fixation-induced dehydration/deformation and low spatial resolution. Here we implemented high-resolution label-free photoacoustic microscopy (PAM) of the myocardial sheet architecture. With high endogenous optical-absorption contrast originating mainly from cytochrome, myoglobin, and melanin, PAM can image the unfixed, unstained and unsliced heart without introducing deformation artifacts. A fresh blood-free mouse heart was imaged by PAM ex vivo. The three-dimensional branching sheets were clearly identified within 150  $\mu\text{m}$  depth. Various morphological parameters were derived from the PAM image. The sheet thickness (80  $\pm$  10  $\mu\text{m}$ ) and the cleavage height (11  $\pm$  1  $\mu\text{m}$ ) were derived from an undehydrated heart for the first time.”

According to the news editors, the researchers concluded: “Therefore, PAM has the potential for the functional imaging of sheet architecture in ex vivo perfused and viable hearts.”

For more information on this research see: Label-free photoacoustic microscopy of myocardial sheet architecture. *Journal of Biomedical Optics*, 2012;17(6):67-69. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from C. Zhang, Washington University, Sch Med, Div Cardiovasc, St Louis, MO 63108, United States. (2012 Jul 30)

### **Biomedical Sciences Institute, Singapore: Toward real-time virtual biopsy of oral lesions using confocal laser endomicroscopy interfaced with embedded computing**

By a News Reporter-Staff News Editor at Chemicals & Chemistry – Investigators discuss new findings in Mergers and Acquisitions. According to news reporting originating in Singapore, Singapore, by Vertical-News journalists, researchers stated “Oral lesions are conventionally diagnosed using white light endoscopy and histopathology. This can

pose a challenge because the lesions may be difficult to visualise under white light illumination.”

The news reporters obtained a quote from the research by the authors from Biomedical Sciences Institute, “Confocal laser endomicroscopy can be used for confocal fluorescence imaging of surface and subsurface cellular and tissue structures. To move toward real-time ‘virtual’ biopsy of oral lesions, we interfaced an embedded computing system to a confocal laser endomicroscope to achieve a prototype three-dimensional (3-D) fluorescence imaging system. A field-programmable gated array computing platform was programmed to enable synchronization of cross-sectional image grabbing and Z-depth scanning, automate the acquisition of confocal image stacks and perform volume rendering. Fluorescence imaging of the human and murine oral cavities was carried out using the fluorescent dyes fluorescein sodium and hypericin. Volume rendering of cellular and tissue structures from the oral cavity demonstrate the potential of the system for 3-D fluorescence visualization of the oral cavity in real-time.”

According to the news reporters, the researchers concluded: “We aim toward achieving a real-time virtual biopsy technique that can complement current diagnostic techniques and aid in targeted biopsy for better clinical outcomes.”

For more information on this research see: Toward real-time virtual biopsy of oral lesions using confocal laser endomicroscopy interfaced with embedded computing. *Journal of Biomedical Optics*, 2012;17(5):139-148. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting P.S.P. Thong, Singapore Bioimaging Consortium, Biomed Sci Inst, Singapore, Singapore. (2012 Jul 27)

### **University Hospital, Erlangen: A method for characterizing stapes prostheses by their mechanical transfer function**

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Prostheses is the subject of a report. According to news reporting originating from Erlangen, Germany, by NewsRx correspondents, researchers stated “In this contribution, we present and evaluate a method for characterizing stapes prostheses by their mechanical transfer function. The measurements were carried out after a stapedotomy surgery was performed in three human temporal bones conserved in 4% formaldehyde.”

Our news editors obtained a quote from the research by the authors from University Hospital, “The inner ear was drained of fluid. Successively, one of three different stapes prostheses was inserted. After such preparation, the prosthesis piston movement compared to the incus movement is measured with laser vibrometry. The magnitude transfer function considered is defined as the amplitude of the prosthesis piston movement compared to the amplitude of the incus movement. Measurements were made in a frequency range from 500 Hz to 4 kHz. The measured amplitudes roughly ranged between 10 nm and 100 nm. A great advantage of the presented method is the fact that only a small portion of the ossicular chain influences the measurement, mainly the joint between the prosthesis and the incus. Furthermore, the usage of cadaver temporal bones allows for an automated measurement setup, long term experiments and the access of measurement positions inapproachable during in vivo measurements.”

According to the news editors, the researchers concluded: “With this method, the different kinds of prostheses could be evaluated on incuses of different diameters.”

For more information on this research see: A method for characterizing stapes prostheses by their mechanical transfer function. *Medical Engineering & Physics*, 2012;34(5):659-663. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting A. Sutor, University Hospital Erlangen, Sch Med, Dept. of Phoniater & Pediat Audiol, Erlangen, Germany. (2012 Jul 27)

### **University of London Imperial College: Validation of FE Micromotions and Strains Around a Press-Fit Cup: Introducing a New Micromotion Measuring Technique**

By a News Reporter-Staff News Editor at Health & Medicine Week – Fresh data on Bone Research are presented in a new report. According to news reporting originating from London, United Kingdom, by NewsRx correspondents, researchers stated “Finite element (FE) analysis provides an useful tool with which to analyze the potential performance of implantations in a variety of surgical, patient and design scenarios. To enable the use of FE analysis in the investigation of such implants, models must be experimentally validated.”

Our news editors obtained a quote from the research by the authors from the University of London Imperial College, “Validation of a pelvic model with an implanted press-fit cup in terms of micromotion and

strain is presented here. A new method of micromotion has been introduced to better describe the overall movement of the cup within the pelvis. The method uses a digitizing arm to monitor the relative movement between markers on the cup and the surrounding acetabulum. FE analysis was used to replicate an experimental set up using a synthetic hemi-pelvis with a press-fitted all-metal cup, subject to the maximum loading observed during normal walking. The work presented here has confirmed the ability of FE models to accurately describe the mechanical performance of the press-fitted acetabulum and surrounding bone under typical loading conditions in terms of micromotion and strain distribution, but has demonstrated limitations in its ability to predict numerical micromotion values.”

According to the news editors, the researchers concluded: “A promising digitizing technique for measuring acetabular micromotions has also been introduced.”

For more information on this research see: Validation of FE Micromotions and Strains Around a Press-Fit Cup: Introducing a New Micromotion Measuring Technique. *Annals of Biomedical Engineering*, 2012;40(7):1586-1596. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting S.G. Clarke, University of London Imperial College, Dept. of Bioengn, London SW7 2AZ, United Kingdom. (2012 Jul 27)

### **Concordia University, Montreal: Optimized off-axis cylindrical mirror-focused line-scanning system for optical coherence tomography imaging applications**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Montreal, Canada, by NewsRx journalists, researchers stated “The parameters of an off-axis cylindrical mirror-focused line-scanning system were studied to optimize the flatness of the 2 mm scan field. The scanning system parameters included the beam size, the distance between the scanning and the focusing mirror, the angle between the incident beam and the reflected beam, the optical scan angle, and the effective focal length of the cylindrical mirror.”

The news reporters obtained a quote from the research by the authors from Concordia University, “Because of the off-axis line-scanning system configuration, the scanning could be carried out either in the tangential (Y-scan) or in the sagittal (X-scan) plane. A 53 nm spectral bandwidth light source was used to evaluate the imaging performance

of the scanning system. Since reflective optics is employed in this work for focusing, the scanning system could be used with a higher spectral bandwidth light source for optical coherence tomography applications. The effect of the angle between of the incident and reflected beams, the distance between the mirrors, the focal length of the cylindrical mirror and the scanning directions, on the flatness of the scan field were studied.”

According to the news reporters, the researchers concluded: “It was proved that the sagittal scanning is least sensitive to variations in scanning system parameters and thus provides maximum flexibility in design.”

For more information on this research see: Optimized off-axis cylindrical mirror-focused line-scanning system for optical coherence tomography imaging applications. *Journal of Biomedical Optics*, 2012;17(5):117-125. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting M. Kamal, Concordia University, Dept. of Mech Engn, Montreal, PQ H3G 1M8, Canada. (2012 Jul 25)

### **Cornell University, Ithaca: Modeling Life**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating from Ithaca, New York, by NewsRx editors, the researcher stated “We seek to construct physical and mathematical models of life. Such models allow us to test our understanding of how living systems function and how they respond to human imposed stimuli.”

Our news editors obtained a quote from the research by the author from Cornell University, “One system is a genomically and chemically complete model of a minimal cell. This cell is a hypothetical bacterium with the fewest number of genes possible. Such a minimal cell provides a platform to ask about the essential features of a living cell and forms a platform to investigate ‘synthetic biology.’ A second system is ‘Body-on-a-Chip’ which is a microfabricated microfluidic system with cells or tissue constructs representing various organs in the body. It can be constructed from human or animal cells and used in drug discovery development. That model is a physical representation of a physiologically based pharmacokinetic model.”

According to the news editors, the researchers concluded: “Both the computer and the physical models provide insight into the underlying biology and provide new tools to make use of that understanding to provide benefits to society.”

For more information on this research see: Modeling Life. *Annals of Biomedical Engineering*, 2012;40(7):1399-1407. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting M.L. Shuler, Cornell University, Ithaca, NY 14853, United States. (2012 Jul 25)

### **Dankook University, Cheonan: Effect of low-level laser treatment on cochlea hair-cell recovery after acute acoustic trauma**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news originating from Cheonan, South Korea, by NewsRx correspondents, researchers stated “We investigated the effect of low-level laser radiation on rescuing hair cells of the cochlea after acute acoustic trauma and hearing loss. Nine rats were exposed to noise.”

Our news journalists obtained a quote from the research by the authors from Dankook University, “Starting the following day, the left ears (NL ears) of the rats were irradiated at an energy output of 100 to 165??mW/cm(2) for 60 min for 12 days in a row. The right ears (N ears) were considered as the control group. Frequency-specific hearing levels were measured before the noise exposure and also after the 1st, 3rd to 5th, 8th to 10th and 12th irradiations. After the 12th treatment, hair cells were observed using a scanning electron microscope. Compared to initial hearing levels at all frequencies, thresholds increased markedly after noise exposure. After the 12th irradiation, hearing threshold was significantly lower for the NL ears compared to the N ears. When observed using an electron microscope, the number of hair cells in the middle turn of the NL ears was significantly larger than that of the N ears.”

According to the news editors, the researchers concluded: “Our findings suggest that low-level laser irradiation promotes recovery of hearing thresholds after acute acoustic trauma.”

For more information on this research see: Effect of low-level laser treatment on cochlea hair-cell recovery after acute acoustic trauma. *Journal of Biomedical Optics*, 2012;17(6):068002.

The news correspondents report that additional information may be obtained from C.K. Rhee, Dankook University, Medical Laser Research Center, Cheonan, South Korea. (2012 Jul 25)



## **Harvard University, Boston: Digital simulation of staining in histopathology multispectral images: enhancement and linear transformation of spectral transmittance**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Boston, Massachusetts, by NewsRx correspondents, researchers stated “Hematoxylin and eosin (H&E) stain is currently the most popular for routine histopathology staining. Special and/or immuno-histochemical (IHC) staining is often requested to further corroborate the initial diagnosis on H&E stained tissue sections.”

Our news editors obtained a quote from the research by the authors from Harvard University, “Digital simulation of staining (or digital staining) can be a very valuable tool to produce the desired stained images from the H&E stained tissue sections instantaneously. We present an approach to digital staining of histopathology multispectral images by combining the effects of spectral enhancement and spectral transformation. Spectral enhancement is accomplished by shifting the N-band original spectrum of the multispectral pixel with the weighted difference between the pixel’s original and estimated spectrum; the spectrum is estimated using M&lt; N principal component (PC) vectors. The pixel’s enhanced spectrum is transformed to the spectral configuration associated to its reaction to a specific stain by utilizing an  $N \times N$  transformation matrix, which is derived through application of least mean squares method to the enhanced and target spectral transmittance samples of the different tissue components found in the image.”

According to the news editors, the researchers concluded: “Results of our experiments on the digital conversion of an H&E stained multispectral image to its Masson’s trichrome stained equivalent show the viability of the method.”

For more information on this research see: Digital simulation of staining in histopathology multispectral images: enhancement and linear transformation of spectral transmittance. *Journal of Biomedical Optics*, 2012;17(5):173-182. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting P.A. Bautista, Harvard University, Massachusetts General Hospital, Sch Med, Dept. of Pathol, Boston, MA 02114, United States. (2012 Jul 25)

**M.V. Lomonosov Moscow State University: Temperature dependence of the optoacoustic transformation efficiency in ex vivo tissues for application in monitoring thermal therapies**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Optics are presented in a new report. According to news originating from Moscow, Russia, by NewsRx correspondents, researchers stated “The calibration dependencies of the optoacoustic (OA) transformation efficiency on tissue temperature are obtained for the application in OA temperature monitoring during thermal therapies. Accurate measurement of the OA signal amplitude versus temperature is performed in different ex vivo tissues in the temperature range 25&#176;C to 80&#176;C.”

Our news journalists obtained a quote from the research by the authors from M.V. Lomonosov Moscow State University, “The investigated tissues were selected to represent different structural components: chicken breast (skeletal muscle), porcine lard (fatty tissue), and porcine liver (richly perfused tissue). Backward mode of the OA signal detection and a narrow probe laser beam were used in the experiments to avoid the influence of changes in light scattering with tissue coagulation on the OA signal amplitude. Measurements were performed in heating and cooling regimes. Characteristic behavior of the OA signal amplitude temperature dependences in different temperature ranges were described in terms of changes in different structural components of the tissue samples.”

According to the news editors, the researchers concluded: “The accuracy of temperature reconstruction from the obtained calibration dependencies for the investigated tissue types is evaluated.”

For more information on this research see: Temperature dependence of the optoacoustic transformation efficiency in ex vivo tissues for application in monitoring thermal therapies. *Journal of Biomedical Optics*, 2012;17(6):061214.

The news correspondents report that additional information may be obtained from S.M. Nikitin, International Laser Center, MV Lomonosov Moscow State University, Moscow, Russia. (2012 Jul 25)

### **National Tsing Hua University, Hsinchu: Gold-nanorod contrast-enhanced photoacoustic micro-imaging of focused-ultrasound induced blood-brain-barrier opening in a rat model**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Central Nervous System are discussed in a new report. According to news reporting out of Hsinchu, Taiwan, by NewsRx editors, researchers stated “In this study, we develop a novel photoacoustic imaging technique based on gold nanorods (AuNRs) for quantitatively monitoring focused-ultrasound (FUS) induced blood-brain barrier (BBB) opening in a rat model in vivo. This study takes advantage of the strong near-infrared absorption (peak at ~800nm) of AuNRs and the extravasation tendency from BBB opening foci due to their nano-scale size to passively label the BBB disruption area.”

Our news journalists obtained a quote from the research by the authors from National Tsing Hua University, “Experimental results show that AuNR contrast-enhanced photoacoustic microscopy (PAM) successfully reveals the spatial distribution and temporal response of BBB disruption area in the rat brains. The quantitative measurement of contrast enhancement has potential to estimate the local concentration of AuNRs and even the dosage of therapeutic molecules when AuNRs are further used as nano-carrier for drug delivery or photothermal therapy.”

According to the news editors, the researchers concluded: “The photoacoustic results also provide complementary information to MRI, being helpful to discover more details about FUS induced BBB opening in small animal models.”

For more information on this research see: Gold-nanorod contrast-enhanced photoacoustic micro-imaging of focused-ultrasound induced blood-brain-barrier opening in a rat model. *Journal of Biomedical Optics*, 2012;17(6):061222.

Our news journalists report that additional information may be obtained by contacting P.H. Wang, National Tsing Hua University, Dept. of Electrical Engineering, Hsinchu 30013, Taiwan. (2012 Jul 25)

### **Portland State University: Optical vortex behavior in dynamic speckle fields**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting from Portland, Oregon, by NewsRx journalists, researchers stated “The dynamic behavior of phase singularities, or optical vortices, in

the pseudo-phase representation of dynamic speckle patterns is investigated. Sequences of band-limited, dynamic speckle patterns with pre-determined Gaussian decorrelation behavior were generated, and the pseudo-phase realizations of the individual speckle patterns were calculated via a two-dimensional Hilbert transform algorithm.”

The news correspondents obtained a quote from the research by the authors from Portland State University, “Singular points in the pseudo-phase representation are identified by calculating the local topological charge as determined by convolution of the pseudo-phase representations with a series of  $2 \times 2$  nabla filters. The spatial locations of the phase singularities are tracked over all frames of the speckle sequences, and recorded in three-dimensional space ( $x$ ;  $y$ ;  $f$ ), where  $f$  is frame number in the sequence. The behavior of the phase singularities traces ‘vortex trails’ which are representative of the speckle dynamics. Slowly decorrelating speckle patterns results in long, relatively straight vortex trails, while rapidly decorrelating speckle patterns results in tortuous, relatively short vortex trails.”

According to the news reporters, the researchers concluded: “Optical vortex analysis such as described herein can be used as a descriptor of biological activity, flow, and motion.”

For more information on this research see: Optical vortex behavior in dynamic speckle fields. *Journal of Biomedical Optics*, 2012;17(5):41-43. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting S.J. Kirkpatrick, Portland State Univ, Dept. of Elect & Comp Engr, Portland, OR 97201, United States. (2012 Jul 25)

### **Princeton University: Simultaneous imaging of multiple focal planes for three-dimensional microscopy using ultra-high-speed adaptive optics**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting originating from Princeton, New Jersey, by NewsRx correspondents, researchers stated “Traditional white-light and fluorescent imaging techniques provide powerful methods to extract high-resolution information from two-dimensional (2-D) sections, but to retrieve information from a three-dimensional (3-D) volume they require relatively slow scanning methods that result in increased acquisition time.”

Our news editors obtained a quote from the research by the authors from Princeton University, “Using an ultra-high speed liquid lens, we circumvent this problem by simultaneously acquiring images from multiple focal planes.”

According to the news editors, the researchers concluded: “We demonstrate this method by imaging microparticles and cells flowing in 3-D microfluidic channels.”

For more information on this research see: Simultaneous imaging of multiple focal planes for three-dimensional microscopy using ultra-high-speed adaptive optics. *Journal of Biomedical Optics*, 2012;17(5):45-47. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting M. Duocastella, Princeton University, Dept. of Mech & Aerosp Engn, Princeton, NJ 08544, United States. (2012 Jul 25)

### **Sichuan University, Chengdu: Performance characterization of an integrated ultrasound, photoacoustic, and thermoacoustic imaging system**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Chengdu, People’s Republic of China, by NewsRx correspondents, researchers stated “We developed a novel trimodality system for human breast imaging by integrating photoacoustic (PA) and thermoacoustic (TA) imaging techniques into a modified commercial ultrasound scanner. Because light was delivered with an optical assembly placed within the microwave antenna, no mechanical switching between the microwave and laser sources was needed.”

Our news journalists obtained a quote from the research by the authors from Sichuan University, “Laser and microwave excitation pulses were interleaved to enable PA and TA data acquisition in parallel at a rate of 10 frames per second. A tube (7 mm inner diameter) filled with oxygenated bovine blood or 30 mM methylene blue dye was successfully detected in PA images in chicken breast tissue at depths of 6.6 and 8.4 cm, respectively, for the first time. The SNRs at these depths reached similar to 24 and similar to 15 dB, respectively, by averaging 200 signal acquisitions. Similarly, a tube (13 mm inner diameter) filled with saline solution (0.9%) at a depth of 4.4 cm in porcine fat tissue was successfully detected in TA images. The PA axial, lateral, and elevational resolutions were 640  $\mu\text{m}$ , 720  $\mu\text{m}$ , and 3.5 mm, respectively, suitable for breast cancer imaging.”

According to the news editors, the researchers concluded: “A PA noise-equivalent sensitivity to methylene blue solution of 260 nM was achieved in chicken tissue at a depth of 3.4 cm.”

For more information on this research see: Performance characterization of an integrated ultrasound, photoacoustic, and thermoacoustic imaging system. *Journal of Biomedical Optics*, 2012;17(5):150-155. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from H.X. Ke, Sichuan University, Sch Elect & Informat Engn, Chengdu 610064, People's Republic of China. (2012 Jul 25)

### **Tianjin University: Joint derivation method for determining optical properties based on steady-state spatially resolved diffuse reflectance measurement at small source-detector separations and large reduced albedo range: theory and simulation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting originating in Tianjin, People's Republic of China, by NewsRx journalists, researchers stated "Accurate determination of the optical properties (the absorption coefficient ( $a$ ) and the reduced scattering coefficient ( $s$ ) ( $'$ ) of tissues is very important in a variety of diagnostic and therapeutic procedures. Optical diffusion theory is frequently used as the forward model for describing the photon transfer in media with large reduced albedos ( $a(')$ ) and in large source-detector separations (SDS)."

The news reporters obtained a quote from the research by the authors from Tianjin University, "Several other methods (PN approximation, hybrid diffusion-P3 approximation) have also been published that describe photon transfer in media with low  $a(')$  or small SDSs. We studied the theoretical models for the steady-state spatially resolved diffuse reflectance measurement to accurately determine ( $a$ ) and ( $s$ ) ( $'$ ) at large  $a(')$  range but small SDSs. Instead of using a single model, a joint derivation method is proposed. The developed method uses one of the best aforementioned theoretical methods separately in five ranges of  $a(')$  determined from several forward models. In the region of small SDSs (the range between 0.4 and 8 mm) and large  $a(')$  range (between 0.5 and 0.99), the best theoretical derivation model was determined."

According to the news reporters, the researchers concluded: "The results indicate that the joint derivation method can improve the derivation accuracy and that  $a(')$  range can be determined by the steady-state spatially resolved diffuse reflectance measurement."

For more information on this research see: Joint derivation method for determining optical properties based on steady-state spatially resolved diffuse reflectance measurement at small source-detector separations and large reduced albedo range: theory and simulation. *Journal of Biomedical Optics*, 2012;17(6):067004.

Our news correspondents report that additional information may be obtained by contacting Z. Shi, Tianjin University, College of Precision Instrument and Optoelectronics Engineering, Tianjin 300072, People's Taiwan. (2012 Jul 25)

### **Tsinghua University, Beijing: Stream-based Hebbian eigenfilter for real-time neuronal spike discrimination**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Beijing, People's Republic of China, by NewsRx correspondents, researchers stated “Principal component analysis (PCA) has been widely employed for automatic neuronal spike sorting. Calculating principal components (PCs) is computationally expensive, and requires complex numerical operations and large memory resources.”

Our news editors obtained a quote from the research by the authors from Tsinghua University, “Substantial hardware resources are therefore needed for hardware implementations of PCA. General Hebbian algorithm (GHA) has been proposed for calculating PCs of neuronal spikes in our previous work, which eliminates the needs of computationally expensive covariance analysis and eigenvalue decomposition in conventional PCA algorithms. However, large memory resources are still inherently required for storing a large volume of aligned spikes for training PCs.”

According to the news editors, the researchers concluded: “The large size memory will consume large hardware resources and contribute significant power dissipation, which make GHA difficult to be implemented in portable or implantable multi-channel recording microsystems.”

For more information on this research see: Stream-based Hebbian eigenfilter for real-time neuronal spike discrimination. *Biomedical Engineering Online*, 2012;11():18. (BioMed Central - <http://www.biomedcentral.com/>; Biomedical Engineering Online - [www.biomedical-engineering-online.com](http://www.biomedical-engineering-online.com))

The news editors report that additional information may be obtained by contacting B. Yu, Tsinghua National Laboratory for Information Science and Technology, Institute of Microelectronics, Tsinghua University, Beijing 100084, People's Taiwan. (2012 Jul 25)

### **University College London: Spectroscopic photoacoustic imaging of lipid-rich plaques in the human aorta in the 740 to 1400 nm wavelength range**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting originating in London, United Kingdom, by NewsRx journalists, researchers stated “Spectroscopic photoacoustic imaging has the potential to discriminate between normal and lipid-rich atheromatous areas of arterial tissue by exploiting the differences in the absorption spectra of lipids and normal arterial tissue in the 740 to 1400 nm wavelength range. Identification of regions of high lipid concentration would be useful to identify plaques that are likely to rupture (vulnerable plaques).”

The news reporters obtained a quote from the research by the authors from University College London, “To demonstrate the feasibility of visualizing lipid-rich plaques, samples of human aortas were imaged in forward mode, at wavelengths of 970 and 1210 nm. It was shown that the structure of the arterial wall and the boundaries of lipid-rich plaques obtained from the photoacoustic images were in good agreement with histology. The presence of lipids was also confirmed by comparing the photoacoustic spectra (740 to 1400 nm) obtained in a region within the plaque to the spectral signature of lipids.”

According to the news reporters, the researchers concluded: “Furthermore, a lipid-rich plaque was successfully imaged while illuminating the sample through 2.8 mm of blood demonstrating the possibility of implementing the photoacoustic technique in vivo.”

For more information on this research see: Spectroscopic photoacoustic imaging of lipid-rich plaques in the human aorta in the 740 to 1400 nm wavelength range. *Journal of Biomedical Optics*, 2012;17(6):061209.

Our news correspondents report that additional information may be obtained by contacting T.J. Allen, University College London, Dept. of Medical Physics and Bioengineering, Gower Street, WC1E 6BT London, UK. (2012 Jul 25)

### **University of Alberta, Edmonton: Distribution of Internal Pressure around Bony Prominences: Implications to Deep Tissue Injury and Effectiveness of Intermittent Electrical Stimulation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting from Edmonton, Canada, by NewsRx journalists, researchers stated “The overall goal of this project is to develop interventions for the prevention of deep tissue injury (DTI), a form of pressure ulcers



that originates in deep tissue around bony prominences. The present study focused on: (1) obtaining detailed measures of the distribution of pressure experienced by tissue around the ischial tuberosities, and (2) investigating the effectiveness of intermittent electrical stimulation (IES), a novel strategy for the prevention of DTI, in alleviating pressure in regions at risk of breakdown due to sustained loading.”

The news correspondents obtained a quote from the research by the authors from the University of Alberta, “The experiments were conducted in adult pigs. Five animals had intact spinal cords and healthy muscles and one had a spinal cord injury that led to substantial muscle atrophy at the time of the experiment. A force-controlled servomotor was used to load the region of the buttocks to levels corresponding to 25%, 50% or 75% of each animal’s body weight. A pressure transducer embedded in a catheter was advanced into the tissue to measure pressure along a three dimensional grid around the ischial tuberosity of one hind leg. For all levels of external loading in intact animals, average peak internal pressure was 2.01  $\pm$  0.08 times larger than the maximal interfacial pressure measured at the level of the skin. In the animal with spinal cord injury, similar absolute values of internal pressure as that in intact animals were recorded, but the substantial muscle atrophy produced larger maximal interfacial pressures. Average peak internal pressure in this animal was 1.43  $\pm$  0.055 times larger than the maximal interfacial pressure. Peak internal pressure was localized within a  $\pm$  2 cm region medio-laterally and dorso-ventrally from the bone in intact animals and  $\pm$  1 cm in the animal with spinal cord injury. IES significantly redistributed internal pressure, shifting the peak values away from the bone in spinally intact and injured animals. These findings provide critical information regarding the relationship between internal and interfacial pressure around the ischial tuberosities during loading levels equivalent to those experienced while sitting. The information could guide future computer models investigating the etiology of DTI, as well as inform the design and prescription of seating cushions for people with reduced mobility.”

According to the news reporters, the researchers concluded: “The findings also suggest that IES may be an effective strategy for the prevention of DTI.”

For more information on this research see: Distribution of Internal Pressure around Bony Prominences: Implications to Deep Tissue Injury and Effectiveness of Intermittent Electrical Stimulation. *Annals of Biomedical Engineering*, 2012;40(8):1740-59. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting L.R. Solis, Rehabilitation Science Program, Faculty of Rehabilitation Medicine, University of Alberta, Edmonton, AB, Canada. (2012 Jul 25)

### **University of Alberta, Edmonton: Distribution of internal strains around bony prominences in pigs**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating in Edmonton, Canada, by NewsRx journalists, researchers stated “Deep tissue injury (DTI) is a type of pressure ulcer in which tissue breakdown initiates at the bone-muscle interface under intact skin. Excessive deformation in the soft tissue, particularly around bony prominences, is believed to be one of the causes leading to the development of DTI.”

The news reporters obtained a quote from the research by the authors from the University of Alberta, “The main goal of this study was to measure the magnitude and distribution of strains within muscles surrounding the ischial tuberosities, induced by levels of external loading that encompass the range of loading experienced by the soft tissue in seated individuals. The experiments were conducted in adult pigs with intact spinal cords ( $n = 5$ ) and pigs with partial spinal cord injury (SCI) ( $n = 2$ ), one of which also had a DTI. A secondary goal was to obtain a preliminary assessment regarding the capacity of intermittent electrical stimulation (IES), an intervention for preventing the formation of DTI, to counteract the muscle compression caused by external loading. In intact animals, muscles subjected to external loads equivalent to 25% of body weight experienced maximal principal strains, minimal principal strains, and shear strains of 0.68, -0.3, and 0.4, respectively. These magnitudes increased by 91.9, 17.6, and 87.5%, respectively, when external loading increased to 50% body weight. Minimal to no further increases in strain magnitudes were seen with the 75% body weight loading level. In one animal with SCI and no DTI, strain magnitudes were on average 9.7% higher than those in the intact animals at the corresponding loading levels. The presence of a DTI in another animal with SCI reduced strain magnitudes by 28% compared to intact animals. The regions in the muscle that underwent the largest deformations were those between the ischial tuberosity and the external surface, and up to 2 cm ventral to the ischial tuberosity (furthest measured). Muscle contractions produced by IES increased the thickness of the tissue between the ischial tuberosities and skin during the period of stimulation by 10-20% for loading levels up to 75% of body weight in both intact and spinal cord injured pigs.”

According to the news reporters, the researchers concluded: “This study provides the first measurements of strain around the ischial tuberosities in an animal model that resembles humans.”

For more information on this research see: Distribution of internal strains around bony prominences in pigs. *Annals of Biomedical Engineering*, 2012;40(8):1721-39. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting L.R. Solis, Rehabilitation Science Program, Faculty of Rehabilitation Medicine, University of Alberta, Edmonton, AB, Canada. (2012 Jul 25)

### **University of British Columbia, Kelowna: On-chip digital microfluidic architectures for enhanced actuation and sensing**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Optics is the subject of a report. According to news originating from Kelowna, Canada, by NewsRx correspondents, researchers stated “An on-chip system is presented with integrated architectures for digital microfluidic actuation and sensing. Localized actuation is brought about by a digital microfluidic multiplexer layout that overcomes the challenges of multi-microdrop interference, and complete two-dimensional motion is shown for microdrops on a 14 x 14 grid with minimized complexity by way of 14+14 inputs.”

Our news journalists obtained a quote from the research by the authors from the University of British Columbia, “At the same time, microdrop sensing is demonstrated in a folded-cavity design for enhanced optical intensity probing of internal fluid refractive indices. The heightened intensities from this on-chip refractometer are shown to have a linear response to the underlying fluid refractive index. An electro-dispensing technique is used to fabricate the folded-cavity optical architecture in a format that is tuned for the desired refractive index range and sensitivity.”

According to the news editors, the researchers concluded: “The overall lab-on-a-chip system is successful in integrating localized microdrop actuation and sensing.”

For more information on this research see: On-chip digital microfluidic architectures for enhanced actuation and sensing. *Journal of Biomedical Optics*, 2012;17(6):067005.

The news correspondents report that additional information may be obtained from J. Nichols, University of British Columbia, 3333 University Way, Kelowna, British Columbia, V1V1V7, Canada. (2012 Jul 25)

## **University of Eastern Finland, Kuopio: Heart rate variability dynamics during low-dose propofol and dexmedetomidine anesthesia**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Anesthesia. According to news reporting originating in Kuopio, Finland, by NewsRx journalists, researchers stated “Heart rate variability (HRV) has been observed to decrease during anesthesia, but changes in HRV during loss and recovery of consciousness have not been studied in detail. In this study, HRV dynamics during low-dose propofol (N = 10) and dexmedetomidine (N = 9) anesthesia were estimated by using time-varying methods.”

The news reporters obtained a quote from the research by the authors from the University of Eastern Finland, “Standard time-domain and frequency-domain measures of HRV were included in the analysis. Frequency-domain parameters like low frequency (LF) and high frequency (HF) component powers were extracted from time-varying spectrum estimates obtained with a Kalman smoother algorithm. The Kalman smoother is a parametric spectrum estimation approach based on time-varying autoregressive (AR) modeling. Prior to loss of consciousness, an increase in HF component power indicating increase in vagal control of heart rate (HR) was observed for both anesthetics. The relative increase of vagal control over sympathetic control of HR was overall larger for dexmedetomidine which is in line with the known sympatholytic effect of this anesthetic.”

According to the news reporters, the researchers concluded: “Even though the inter-individual variability in the HRV parameters was substantial, the results suggest the usefulness of HRV analysis in monitoring dexmedetomidine anesthesia.”

For more information on this research see: Heart rate variability dynamics during low-dose propofol and dexmedetomidine anesthesia. *Annals of Biomedical Engineering*, 2012;40(8):1802-13. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting M.P. Tarvainen, Dept. of Applied Physics, University of Eastern Finland PO Box 1627, 70211, Kuopio, Finland. (2012 Jul 25)

## **Warsaw University of Technology: Automatic recognition of surface landmarks of anatomical structures of back and posture**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Warsaw, Poland, by NewsRx journalists, researchers stated “Faulty postures, scoliosis and sagittal plane deformities should be detected as early as possible to apply preventive and treatment measures against major clinical consequences. To support documentation of the severity of deformity and diminish x-ray exposures, several solutions utilizing analysis of back surface topography data were introduced.”

The news correspondents obtained a quote from the research by the authors from the Warsaw University of Technology, “A novel approach to automatic recognition and localization of anatomical landmarks of the human back is presented that may provide more repeatable results and speed up the whole procedure. The algorithm was designed as a two-step process involving a statistical model built upon expert knowledge and analysis of three-dimensional back surface shape data. Voronoi diagram is used to connect mean geometric relations, which provide a first approximation of the positions, with surface curvature distribution, which further guides the recognition process and gives final locations of landmarks. Positions obtained using the developed algorithms are validated with respect to accuracy of manual landmark indication by experts. Preliminary validation proved that the landmarks were localized correctly, with accuracy depending mostly on the characteristics of a given structure.”

According to the news reporters, the researchers concluded: “It was concluded that recognition should mainly take into account the shape of the back surface, putting as little emphasis on the statistical approximation as possible.”

For more information on this research see: Automatic recognition of surface landmarks of anatomical structures of back and posture. *Journal of Biomedical Optics*, 2012;17(5):194-207. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting J. Michonski, Warsaw University of Technology, Inst Micromech & Photon, PL-02525 Warsaw, Poland. (2012 Jul 25)

**Yamagata University: Real time processing of Fourier domain optical coherence tomography with fixed-pattern noise removal by partial median subtraction using a graphics processing unit**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Yamagata, Japan, by NewsRx editors, the researcher stated “The author presents a graphics processing unit (GPU) programming for real-time Fourier domain optical coherence tomography (FD-OCT) with fixed-pattern noise removal by subtracting mean and median. In general, the fixed-pattern noise can be removed by the averaged spectrum from the many spectra of an actual measurement.”

Our news editors obtained a quote from the research by the author from Yamagata University, “However, a mean-spectrum results in artifacts as residual lateral lines caused by a small number of high-reflective points on a sample surface. These artifacts can be eliminated from OCT images by using medians instead of means. However, median calculations that are based on a sorting algorithm can generate a large amount of computation time. With the developed GPU programming, highly reflective surface regions were obtained by calculating the standard deviation of the Fourier transformed data in the lateral direction. The medians and means were then subtracted at the observed regions and other regions, such as backgrounds. When the median calculation was less than 256 positions out of a total 512 depths in an OCT image with 1024 A-lines, the GPU processing rate was faster than that of the line scan camera (46.9 kHz).”

According to the news editors, the researchers concluded: “Therefore, processed OCT images can be displayed in real-time using partial medians.”

For more information on this research see: Real time processing of Fourier domain optical coherence tomography with fixed-pattern noise removal by partial median subtraction using a graphics processing unit. *Journal of Biomedical Optics*, 2012;17(5):37-39. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting Y. Watanabe, Yamagata University, Grad Sch Sci & Engrn, Yonezawa, Yamagata 9928510, Japan. (2012 Jul 25)

## **Brigham Young University, Provo: Using Tendon Inherent Electric Properties to Consistently Track Induced Mechanical Strain**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Provo, Utah, by NewsRx journalists, researchers stated “The present work explores the possibility that the inherent electrical properties of a tendon might allow it to act as its own strain gauge. Tendon has been shown to exhibit piezoelectric effects as well as streaming potentials when subjected to a mechanical stress.”

The news reporters obtained a quote from the research by the authors from Brigham Young University, “To assess the feasibility of using these properties to repeatably measure in situ strain, bovine Achilles tendon test specimens were connected in series with a control resistor in a direct current circuit. Longitudinal (along the collagen fiber direction) and transverse test specimens were subjected to sinusoidal tension while electrical resistance data for the specimens was collected. Change in resistance per unit strain and gauge factors (GFs) revealed a repeatable and significantly different correlation between resistance and strain for the longitudinal and transverse specimens ( $p < 0.001$ ). Change in resistance per unit strain values for longitudinal and transverse specimens were 0.85 and 1.76 M  $\Omega/\epsilon$ , respectively while corresponding GFs were 0.52 and 0.74, respectively.”

According to the news reporters, the researchers concluded: “Others have reported piezoelectric mechanisms and streaming potential mechanisms in hydrated collagen, however the present work is unique in presenting an accurate and repeatable model of anisotropic tendon behavior that could be used to develop an in situ strain sensor.”

For more information on this research see: Using Tendon Inherent Electric Properties to Consistently Track Induced Mechanical Strain. *Annals of Biomedical Engineering*, 2012;40(7):1568-1574. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news correspondents report that additional information may be obtained by contacting C.R. West, 435B CTB Brigham Young Univ, Dept. of Mech Engn, BYU Appl Biomech Engn Lab, Provo, UT 84602, United States. (2012 Jul 24)

**National Chiao Tung University, Hsinchu: Investigation of the cerebral hemodynamic response function in single blood vessels by functional photoacoustic microscopy**

By a News Reporter-Staff News Editor at Life Science Weekly – New research on Biomedical Optics is the subject of a report. According to news reporting originating from Hsinchu, Taiwan, by NewsRx correspondents, researchers stated “The specificity of the hemodynamic response function (HRF) is determined spatially by the vascular architecture and temporally by the evolution of hemodynamic changes. Here, we used functional photoacoustic microscopy (fPAM) to investigate single cerebral blood vessels of rats after left forepaw stimulation.”

Our news editors obtained a quote from the research by the authors from National Chiao Tung University, “In this system, we analyzed the spatiotemporal evolution of the HRFs of the total hemoglobin concentration (HbT), cerebral blood volume (CBV), and hemoglobin oxygen saturation (SO(2)). Changes in specific cerebral vessels corresponding to various electrical stimulation intensities and durations were bilaterally imaged with 36 x 65- $\mu$ m(2) spatial resolution. Stimulation intensities of 1, 2, 6, and 10 mA were applied for periods of 5 or 15 s. Our results show that the relative functional changes in HbT, CBV, and SO(2) are highly dependent not only on the intensity of the stimulation, but also on its duration. Additionally, the duration of the stimulation has a strong influence on the spatiotemporal characteristics of the HRF as shorter stimuli elicit responses only in the local vasculature (smaller arterioles), whereas longer stimuli lead to greater vascular supply and drainage.”

According to the news editors, the researchers concluded: “This study suggests that the current fPAM system is reliable for studying relative cerebral hemodynamic changes, as well as for offering new insights into the dynamics of functional cerebral hemodynamic changes in small animals.”

For more information on this research see: Investigation of the cerebral hemodynamic response function in single blood vessels by functional photoacoustic microscopy. *Journal of Biomedical Optics*, 2012;17(6):061210.

The news editors report that additional information may be obtained by contacting L.D. Liao, National Chiao Tung University, Dept. of Electrical Engineering, Hsinchu, Taiwan. (2012 Jul 24)



### **National University, Buenos Aires: Discrimination of motile bacteria from filamentous fungi using dynamic speckle**

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Buenos Aires, Argentina, by NewsRx journalists, researchers stated “We present a dynamic laser speckle method to easily discriminate filamentous fungi from motile bacteria in soft surfaces, such as agar plate.”

The news reporters obtained a quote from the research by the authors from National University, “The method allows the detection and discrimination between fungi and bacteria faster than with conventional techniques.”

According to the news reporters, the researchers concluded: “The new procedure could be straightforwardly extended to different microorganisms, as well as applied to biological and biomedical research, infected tissues analysis, and hospital water and wastewaters studies.”

For more information on this research see: Discrimination of motile bacteria from filamentous fungi using dynamic speckle. *Journal of Biomedical Optics*, 2012;17(5):157-161. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting S.E. Murialdo, Univ Nacl la Plata, Dept. of Ciencias Basicas, Fac Ingn, Center Invest OptCONICET La PlataCICUID Optimo, RA-1897 La Plata, Buenos Aires, Argentina. (2012 Jul 24)

### **University of Central Oklahoma, Edmond: Potential clinical impact of three-dimensional visualization for fluorescent in situ hybridization image analysis**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedical Engineering. According to news reporting out of Edmond, Oklahoma, by NewsRx editors, researchers stated “Chromosomal translocation is strong indication of cancers. Fluorescent in situ hybridization (FISH) can effectively detect this translocation and achieve high accuracy in disease diagnosis and prognosis assessment.”

Our news journalists obtained a quote from the research by the authors from the University of Central Oklahoma, “For this purpose, whole chromosome paint probes are utilized to image the configuration of DNA fragments. Although two-dimensional (2-D) microscopic images are typically used in FISH signal analysis, we present a case where the

translocation occurs in the depth direction where two probed FISH signals are overlapped in the projected image plane. Thus, the translocation cannot be identified. However, when imaging the whole specimen with a confocal microscope at 27 focal planes with 0.5- $\mu\text{m}$  step interval, the translocation can be clearly identified due to the free rotation capability by the three-dimensional (3-D) visualization. Such a translocation detection error of using 2-D images might be critical in detecting and diagnosing early or subtle disease cases where detecting a small number of abnormal cells can make diagnostic difference. Hence, the underlying implication of this report suggests that utilizing 3-D visualization may improve the overall accuracy of FISH analysis for some clinical cases.”

According to the news editors, the researchers concluded: “However, the clinical efficiency and cost of using 3-D versus 2-D imaging methods are also to be assessed carefully.”

For more information on this research see: Potential clinical impact of three-dimensional visualization for fluorescent in situ hybridization image analysis. *Journal of Biomedical Optics*, 2012;17(5):29-31. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting Z. Li, Univ Cent Oklahoma, Edmond, OK 73034, United States. (2012 Jul 24)

### **University of Texas, Austin: Performance of a lookup table-based approach for measuring tissue optical properties with diffuse optical spectroscopy**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Biomedical Engineering have been published. According to news reporting originating in Austin, Texas, by NewsRx journalists, researchers stated “Diffuse optical spectroscopy (DOS) provides a powerful tool for fast and noninvasive disease diagnosis. The ability to leverage DOS to accurately quantify tissue optical parameters hinges on the model used to estimate light-tissue interaction.”

The news reporters obtained a quote from the research by the authors from the University of Texas, “We describe the accuracy of a lookup table (LUT)-based inverse model for measuring optical properties under different conditions relevant to biological tissue. The LUT is a matrix of reflectance values acquired experimentally from calibration standards of varying scattering and absorption properties. Because it is based on experimental values, the LUT inherently accounts for system response and probe geometry. We tested our approach in tissue phantoms containing multiple absorbers, different sizes of scatterers, and

varying oxygen saturation of hemoglobin. The LUT-based model was able to extract scattering and absorption properties under most conditions with errors of less than 5 percent. We demonstrate the validity of the lookup table over a range of source-detector separations from 0.25 to 1.48 mm. Finally, we describe the rapid fabrication of a lookup table using only six calibration standards.”

According to the news reporters, the researchers concluded: “This optimized LUT was able to extract scattering and absorption properties with average RMS errors of 2.5 and 4 percent, respectively.”

For more information on this research see: Performance of a lookup table-based approach for measuring tissue optical properties with diffuse optical spectroscopy. *Journal of Biomedical Optics*, 2012;17(5):218-225. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting B.S. Nichols, Univ Texas Austin, Dept. of Biomed Engn, Austin, TX 78712, United States. (2012 Jul 24)

### **University of Wurzburg: Bleaching of plasmon-resonance absorption of gold nanorods decreases efficiency of cell destruction**

By a News Reporter-Staff News Editor at Life Science Weekly – Research findings on Nanorods are discussed in a new report. According to news originating from Wurzburg, Germany, by NewsRx correspondents, researchers stated “When irradiated with nanosecond laser pulses, gold nanoparticles allow for manipulation or destruction of cells and proteins with high spatial and temporal precision. Gold nanorods are especially attractive, because they have an up-to-20-fold stronger absorption than a sphere of equal volume, which is shifted to the optical window of tissue.”

Our news journalists obtained a quote from the research by the authors from the University of Wurzburg, “Thus, an increased efficiency of cell killing is expected with laser pulses tuned to the near infrared absorption peak of the nanorods. In contrast to the higher-absorption, experiments showed a reduced efficacy of cell killing. In order to explain this discrepancy, transient absorption of irradiated nanorods was measured and the observed change of particle absorption was theoretically analyzed. During pulsed irradiation a strong transient and permanent bleaching of the near-infrared absorption band occurred. Both effects limit the ability of nanorods to destroy cells by nanocavitation.”

According to the news editors, the researchers concluded: “The existence of nanocavitation and transient bleaching was corroborated by optoacoustic measurements.”

For more information on this research see: Bleaching of plasmon-resonance absorption of gold nanorods decreases efficiency of cell destruction. *Journal of Biomedical Optics*, 2012;17(5):309-321. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from F. Rudnitzki, University of Wurzburg, Sch Med, Dept. of Funct Mat Med & Dental, D-97070 Wurzburg, Germany. (2012 Jul 24)

### **Huazhong University of Science and Technology, Wuhan: Early monitoring of cerebral hypoperfusion in rats by laser speckle imaging and functional photoacoustic microscopy**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Data detailed on Angiology have been presented. According to news originating from Wuhan, People's Republic of China, by NewsRx correspondents, researchers stated "Because cerebral hypoperfusion brings damage to the brain, prevention of cerebrovascular diseases correlative to hypoperfusion by studying animal models makes great sense. Since complicated cerebrovascular adaptive changes in hypoperfusion could not be revealed only by cerebral blood flow (CBF) velocity imaging, we performed multi-parameter imaging by combining laser speckle imaging and functional photoacoustic microscopy."

Our news journalists obtained a quote from the research by the authors from the Huazhong University of Science and Technology, "The changes in CBF, hemoglobin oxygen saturation (SO(2)), and total hemoglobin concentration (HbT) in single blood vessels of ipsilateral cortex were observed during transient cerebral hypoperfusion by ligating the unilateral common carotid artery in rats. CBF, SO(2), and HbT, respectively, decreased to 37%±3%, 71%±7.5%, and 92%±1.3% of baseline in 6 s immediately after occlusion, and then recovered to 77%±4.8%, 84%±8%, and 96%±2% of baseline in 60 s. These parameters presented the decrease with different degree and the following recovery over time after ligation, the recovery of SO(2) lagged behind those of CBF and HbT, which had the similar response."

According to the news editors, the researchers concluded: "The results demonstrated that complete monitoring of both cerebral hemodynamic response and oxygen metabolic changes occurred at the earliest period of cerebral hypoperfusion was possible by using the two image modalities with high temporal and spatial resolution."

For more information on this research see: Early monitoring of cerebral hypoperfusion in rats by laser speckle imaging and functional photoacoustic microscopy. *Journal of Biomedical Optics*, 2012;17(6):061207.

The news correspondents report that additional information may be obtained from H. Wang, Huazhong University of Science and Technology, Britton Chance Center for Biomedical Photonics, Wuhan National Laboratory for Optoelectronics, 1037 Luoyu Road, Wuhan 430074, People's Taiwan. (2012 Jul 23)

### **Institute of Cancer, Surrey: Deformation-compensated averaging for clutter reduction in epiphotoacoustic imaging in vivo**

By a News Reporter-Staff News Editor at Clinical Oncology Week – Researchers detail new data in Biomedical Optics. According to news reporting from Surrey, United Kingdom, by NewsRx journalists, researchers stated “Photoacoustic imaging, based on ultrasound detected after laser irradiation, is an extension to diagnostic ultrasound for imaging the vasculature, blood oxygenation and the uptake of optical contrast media with promise for cancer diagnosis. For versatile scanning, the irradiation optics is preferably combined with the acoustic probe in an epi-style arrangement avoiding acoustically dense tissue in the acoustic propagation path from tissue irradiation to acoustic detection.”

The news correspondents obtained a quote from the research by the authors from the Institute of Cancer, “Unfortunately epiphotoacoustic imaging suffers from strong clutter, arising from optical absorption in tissue outside the image plane, and from acoustic backscattering. This limits the imaging depth for useful photoacoustic image contrast to typically less than one centimeter. Deformation-compensated averaging (DCA), which takes advantage of clutter decorrelation induced by palpating the tissue with the imaging probe, has previously been proposed for clutter reduction. We demonstrate for the first time that DCA results in reduced clutter in real-time freehand clinical epiphotoacoustic imaging. For this purpose, combined photoacoustic and pulse-echo imaging at 10-Hz frame rate was implemented on a commercial scanner, allowing for ultrasound-based motion tracking inherently coregistered with photoacoustic frames.”

According to the news reporters, the researchers concluded: “Results from the forearm and the neck confirm that contrast is improved and imaging depth increased by DCA.”

For more information on this research see: Deformation-compensated averaging for clutter reduction in epiphotoacoustic imaging in vivo. *Journal of Biomedical Optics*, 2012;17(6):066007.

Our news journalists report that additional information may be obtained by contacting M. Jaeger, Institute of Cancer Research and Royal Marsden NHS Foundation Trust, Joint Dept. of Physics, Sutton, Surrey, SM2 5PT, UK. (2012 Jul 23)

## **Maxima Medical Center, Veldhoven: A mathematical model for simulation of early decelerations in the cardiotocogram during labor**

By a News Reporter-Staff News Editor at Cardiovascular Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting out of Veldhoven, Netherlands, by NewsRx editors, researchers stated “Fetal welfare during labor and delivery is commonly monitored through the cardiotocogram (CTG), the combined registration of uterus contractions and fetal heart rate (FHR). The CTG gives an indication of the main determinant of the acute fetal condition, namely its oxygen state.”

Our news journalists obtained a quote from the research by the authors from Maxima Medical Center, “However, interpretation is complicated by the complex relationship between the two. Mathematical models can be used to assist with the interpretation of the CTG, since they enable quantitative modeling of the cascade of events through which uterine contractions affect fetal oxygenation and FHR. We developed a mathematical model to simulate ‘early decelerations’, i.e. variations in FHR originating from caput compression during uterine contractions, as mediated by cerebral flow reduction, cerebral hypoxia and a vagal nerve response to hypoxia. Simulation results show a realistic response, both for fetal and maternal hemodynamics at term, as for FHR variation during early decelerations. The model is intended to be used as a training tool for gynaecologists. Therefore 6 clinical experts were asked to rate 5 real and 5 model-generated CTG tracings on overall realism and realism of selected aspects.”

According to the news editors, the researchers concluded: “Results show no significant differences between real and computer-generated CTG tracings.”

For more information on this research see: A mathematical model for simulation of early decelerations in the cardiotocogram during labor. *Medical Engineering & Physics*, 2012;34(5):579-589. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting M.B. van der Hout-van der Jagt, Maxima Med Center, Veldhoven, Netherlands. (2012 Jul 23)

## Montreal Heart Institute, Quebec City: Changes in diffusion path length with old age in diffuse optical tomography

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – New research on Biomedical Engineering is the subject of a report. According to news originating from Quebec City, Canada, by NewsRx correspondents, researchers stated “Diffuse, optical near infrared imaging is increasingly being used in various neurocognitive contexts where changes in optical signals are interpreted through activation maps. Statistical population comparison of different age or clinical groups rely on the relative homogeneous distribution of measurements across subjects in order to infer changes in brain function.”

Our news journalists obtained a quote from the research by the authors from Montreal Heart Institute, “In the context of an increasing use of diffuse optical imaging with older adult populations, changes in tissue properties and anatomy with age adds additional confounds. Few studies investigated these changes with age. Duncan et al. measured the so-called diffusion path length factor (DPF) in a large population but did not explore beyond the age of 51 after which physiological and anatomical changes are expected to occur [Pediatr. Res. 39(5), 889-894 (1996)]. With increasing interest in studying the geriatric population with optical imaging, we studied changes in tissue properties in young and old subjects using both magnetic resonance imaging (MRI)-guided Monte-Carlo simulations and time-domain diffuse optical imaging. Our results, measured in the frontal cortex, show changes in DPF that are smaller than previously measured by Duncan et al. in a younger population.”

According to the news editors, the researchers concluded: “The origin of these changes are studied using simulations and experimental measures.”

For more information on this research see: Changes in diffusion path length with old age in diffuse optical tomography. *Journal of Biomedical Optics*, 2012;17(5):81-88. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from C. Bonnery, Montreal Heart Inst, Res Center, Quebec City, PQ, Canada. (2012 Jul 23)

### **University College London: In vivo photoacoustic imaging of mouse embryos**

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators publish new report on Biomedical Optics. According to news reporting originating from London, United Kingdom, by NewsRx correspondents, researchers stated “The ability to noninvasively image embryonic vascular anatomy in mouse models is an important requirement for characterizing the development of the normal cardiovascular system and malformations in the heart and vascular supply. Photoacoustic imaging, which can provide high resolution non invasive images of the vasculature based upon optical absorption by endogenous hemoglobin, is well suited to this application.”

Our news editors obtained a quote from the research by the authors from University College London, “In this study, photoacoustic images of mouse embryos were obtained ex vivo and in vivo. The images show intricate details of the embryonic vascular system to depths of up to 10 mm, which allowed whole embryos to be imaged in situ. To achieve this, an all-optical photoacoustic scanner and a novel time reversal image reconstruction algorithm, which provide deep tissue imaging capability while maintaining high spatial resolution and contrast were employed.”

According to the news editors, the researchers concluded: “This technology may find application as an imaging tool for preclinical embryo studies in developmental biology as well as more generally in preclinical and clinical medicine for studying pathologies characterized by changes in the vasculature.”

For more information on this research see: In vivo photoacoustic imaging of mouse embryos. *Journal of Biomedical Optics*, 2012;17(6):061220.

The news editors report that additional information may be obtained by contacting J. Laufer, University College London, Dept. of Medical Physics and Bioengineering, Gower Street, London WC1E 6BT, UK. (2012 Jul 23)

### **University of Florence: Describing the highly three dimensional right ventricle flow**

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Florence, Italy, by NewsRx correspondents, researchers stated “Visualization of the three-dimensional flow within the Right Ventricle (RV) is a challenging issue due to the fully three-dimensional geometry of the ventricular cavity. To date proper characterization and quantification of the RV flow still remains



incomplete, and techniques that can be easily applied to current medical imaging are scarce.”

Our news editors obtained a quote from the research by the authors from the University of Florence, “A method for simulating the highly complex, multi directional flow within the RV is presented by coupling 4D echocardiography imaging with numerical simulations based on the Immersed Boundaries Method (IBM). A novel formulation for accurately computing the space-time distribution of the blood residence time inside the cavity is introduced. Results showed an initial compact vortex forming past the tricuspid orifice at early diastole that quickly breaks into a weakly turbulent flow pattern and rearranges, during systole, into a peculiar stream-wise vortex spinning out towards the pulmonary orifice. This arrangement is maintained when the Ejection Fraction (EF) is reduced from 58 to 32%. The average blood transit time is found to scale almost inversely proportional to the EF.”

According to the news editors, the researchers concluded: “A careful analysis of the residence time permitted to assess the relative significance of the different flow components (from the direct flow, with a residence time less than one heartbeat, to the residual volume, that stagnates in the ventricle) and their distribution in space.”

For more information on this research see: Describing the highly three dimensional right ventricle flow. *Annals of Biomedical Engineering*, 2012;40(8):1790-801. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting J.O. Mangual, Dipartimento di Ingegneria Civile e Ambientale, Università di Firenze, Via S Marta 3, 50139, Florence, Italy. (2012 Jul 23)

### **Worcester Polytechnic Institute: Eccentric rheometry for viscoelastic characterization of small, soft, anisotropic, and irregularly shaped biopolymer gels and tissue biopsies**

By a News Reporter-Staff News Editor at Hematology Week – Current study results on Biomedical Engineering have been published. According to news originating from Worcester, Massachusetts, by NewsRx correspondents, researchers stated “Quantification of the physical properties of tissue biopsies and cell-remodeled hydrogels is critical for understanding tissue development and pathophysiological tissue remodeling. However, due to the low modulus, small size, irregular shape, and anisotropy of samples from these materials, accurate viscoelastic characterization using standard rheometric methods is problematic.”

Our news journalists obtained a quote from the research by the authors from Worcester Polytechnic Institute, “The goal of this work is to

utilize image analysis to extend rotational rheometry to these samples. In this method, the sample is offset to increase the torque generated; a custom clear glass geometry, right angle prism, and camera are used to determine the exact shape and location of the sample relative to the axis of rotation for calculation of the sample shear modulus,  $G'$ . Values of  $G'$  for standard polydimethylsiloxane gels tested in centered and eccentric configurations were not statistically different (respectively 137 &#177; 37 kPa and 126 &#177; 8 kPa,  $p = 0.58$ ), indicating accuracy of the method. Additionally,  $G'$  values from circular and irregularly shaped collagen gels yielded equivalent results (31 &#177; 1.8 Pa and 31 &#177; 5.1 Pa,  $p = 0.29$ )."

According to the news editors, the researchers concluded: "A blood clot and a lipid plaque sample recovered from human patients ( $G' \sim 4$  kPa) were successfully tested with this method demonstrating applicability to clinical diagnostics."

For more information on this research see: Eccentric rheometry for viscoelastic characterization of small, soft, anisotropic, and irregularly shaped biopolymer gels and tissue biopsies. *Annals of Biomedical Engineering*, 2012;40(8):1654-65. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from H.A. Cirka, Biomedical Engineering Department, Worcester Polytechnic Institute, 100 Institute Road, Worcester, MA, 01609, United States. (2012 Jul 23)

### **Hong Kong Polytechnic University: Relationships Between Femoral Strength Evaluated by Nonlinear Finite Element Analysis and BMD, Material Distribution and Geometric Morphology**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Bone Research have been published. According to news originating from Hong Kong, People's Republic of China, by NewsRx correspondents, researchers stated "Precise quantification of femur strength and accurate assessment of hip fracture risk would help physicians to identify individuals with high risk and encourage them to take preventive interventions. A major contributing factor of hip fracture is the reduction of hip strength, determined by the bone quality."

Our news journalists obtained a quote from the research by the authors from Hong Kong Polytechnic University, "Bone mineral density

(BMD) alone cannot determine bone strength accurately. In this paper, subject-specific quantitative computer tomography (QCT) image-based finite element analyses were conducted to identify the quantitative relationships between femoral strength and BMD, material distribution and geometric morphology. Sixty-six subjects with QCT data of hip region were selected from the MrOS cohorts in Hong Kong. Subject-specific nonlinear finite element models were developed to predict strengths of proximal femurs. The models took non-linear elastoplasticity and heterogeneity of bone tissues into consideration and derived bone strengths with proper bone failure criteria. From finite element analysis (FEA), relationships between femoral strength and BMD, material distribution, and geometric parameters were determined. FEA-predicted femoral strength was highly correlated with BMD, material distribution, height, weight, diameters of femoral head (HD), and femoral neck (ND), as well as the moment arm for femoral neck bending-offset (OFF). Through principal components analysis, three independent principal components (PCs) were extracted. PC1 was the component of bone material quality. PC2 included height, weight, HD, and ND. PC3 mainly represented OFF. Multivariate linear regression showed that the PCs were strongly predictive of the FEA-predicted strength.”

According to the news editors, the researchers concluded: “This study provided quantitative information regarding the contributing factors of proximal femur strength and showed that such a biomechanical approach may have clinical potential in noninvasive assessment of hip fracture risk.”

For more information on this research see: Relationships Between Femoral Strength Evaluated by Nonlinear Finite Element Analysis and BMD, Material Distribution and Geometric Morphology. *Annals of Biomedical Engineering*, 2012;40(7):1575-85. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from H. Gong, Dept. of Health Technology and Informatics, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, People's Taiwan. (2012 Jul 20)

## **Institute of Clinical Physiology, Pisa: Itraconazole inhibits HMEC-1 angiogenesis**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Angiogenesis. According to news reporting from Pisa, Italy, by NewsRx journalists, researchers stated “Abnormal angiogenesis is implicated in a number of human diseases and endothelial growth inhibition represents a common approach in tumor therapy.

Recently itraconazole, frequently used in humans as antifungal drug, which blocks the biosynthesis of cholesterol, has been found to be antiangiogenic in primary umbilical vein endothelial cells.”

The news correspondents obtained a quote from the research by the authors from the Institute of Clinical Physiology, “However, the exact antiangiogenic mechanisms remain largely unknown. In this paper, we studied the effect of itraconazole in human dermal microvascular endothelial cells (HMEC-1), an immortalized cell line to study adult angiogenesis. A 50% reduction of microtubule formation was observed after itraconazole treatment which was partially rescued by cholesterol addition. We found that itraconazole inhibits angiogenesis markers such as VEGF, AAMP and e-NOS. mTOR and ERK1/2 phosphorylation as well as the expression of Gli1, one of the main controllers of the Shh pathway, were also inhibited by itraconazole. Cholesterol addition did not completely rescue inhibition of these pathways, suggesting that the itraconazole antiangiogenic activity could be due to multiple mechanisms.”

According to the news reporters, the researchers concluded: “Our results may contribute to novel approaches to block angiogenesis with therapeutic application.”

For more information on this research see: Itraconazole inhibits HMEC-1 angiogenesis. *Biomedicine & Pharmacotherapy*, 2012;66(4):312-7. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedicine & Pharmacotherapy - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

Our news journalists report that additional information may be obtained by contacting R. Del Carratore, Institute of Clinical Physiology, National Research Council (CNR), via Moruzzi 1, Pisa 56124, Italy. (2012 Jul 18)

### **Lerner Research Institute, Cleveland: Adaptive surrogate modeling for expedited estimation of nonlinear tissue properties through inverse finite element analysis**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Cleveland, Ohio, by NewsRx journalists, researchers stated “Simulation-based prediction of specimen-specific biomechanical behavior commonly requires inverse analysis using geometrically consistent finite element (FE) models. Optimization drives such analyses but previous studies have highlighted a large computational cost dictated by iterative use of nonlinear FE models.”

The news correspondents obtained a quote from the research by the authors from Lerner Research Institute, “The goal of this study was to evaluate the performance of a local regression-based adaptive surrogate modeling approach to decrease computational cost for both global and

local optimization approaches using an inverse FE application. Non-linear elastic material parameters for patient-specific heel-pad tissue were found, both with and without the surrogate model. Surrogate prediction replaced a FE simulation using local regression of previous simulations when the corresponding error estimate was less than a given tolerance. Performance depended on optimization type and tolerance value. The surrogate reduced local optimization expense up to 68%, but achieved accurate results for only 1 of 20 initial conditions. Conversely, up to a tolerance value of 20 N(2), global optimization with the surrogate yielded consistent parameter predictions with a concurrent decrease in computational cost (up to 77%). However, the local optimization method without the surrogate, although sensitive to the initial conditions, was still on average seven times faster than the global approach. Our results help establish guidelines for setting acceptable tolerance values while using an adaptive surrogate model for inverse FE analysis.”

According to the news reporters, the researchers concluded: “Most important, the study demonstrates the benefits of a surrogate modeling approach for intensive FE-based iterative analysis.”

For more information on this research see: Adaptive surrogate modeling for expedited estimation of nonlinear tissue properties through inverse finite element analysis. *Annals of Biomedical Engineering*, 2011;39(9):2388-97. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting J.P. Halloran, Computational Biomodeling Core and Dept. of Biomedical Engineering, Lerner Research Institute, Cleveland Clinic, Cleveland OH 44195, United States. (2012 Jul 18)

### **Research Center, Cincinnati: Applying Simulated In Vivo Motions to Measure Human Knee and ACL Kinetics**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting out of Cincinnati, Ohio, by NewsRx editors, researchers stated “Patients frequently experience anterior cruciate ligament (ACL) injuries but current ACL reconstruction strategies do not restore the native biomechanics of the knee, which can contribute to the early onset of osteoarthritis in the long term. To design more effective treatments, investigators must first understand normal in vivo knee function for multiple activities of daily living (ADLs).”

Our news journalists obtained a quote from the research by the authors from Research Center, “While the 3D kinematics of the human knee have been measured for various ADLs, the 3D kinetics cannot be

directly measured in vivo. Alternatively, the 3D kinetics of the knee and its structures can be measured in an animal model by simulating and applying subject-specific in vivo joint motions to a joint using robotics. However, a suitable biomechanical surrogate should first be established. This study was designed to apply a simulated human in vivo motion to human knees to measure the kinetics of the human knee and ACL. In pursuit of establishing a viable biomechanical surrogate, a simulated in vivo ovine motion was also applied to human knees to compare the loads produced by the human and ovine motions. The motions from the two species produced similar kinetics in the human knee and ACL.”

According to the news editors, the researchers concluded: “The only significant difference was the intact knee compression force produced by the two input motions.”

For more information on this research see: Applying Simulated In Vivo Motions to Measure Human Knee and ACL Kinetics. *Annals of Biomedical Engineering*, 2012;40(7):1545-53. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting S.T. Herfat, Dept. of Biomedical Engineering, Tissue Engineering and Biomechanics Laboratories, 2901 Campus Drive, 852 Engineering Research Center, Cincinnati, OH, 45221-0012, United States. (2012 Jul 18)

### **Stony Brook University: Microcalcifications Increase Coronary Vulnerable Plaque Rupture Potential: A Patient-Based Micro-CT Fluid-Structure Interaction Study**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in *Biomedical Engineering*. According to news originating from Stony Brook, New York, by NewsRx correspondents, researchers stated “Asymptomatic vulnerable plaques (VP) in coronary arteries accounts for significant level of morbidity. Their main risk is associated with their rupture which may prompt fatal heart attacks and strokes.”

Our news journalists obtained a quote from the research by the authors from Stony Brook University, “The role of microcalcifications (micro-Ca), embedded in the VP fibrous cap, in the plaque rupture mechanics has been recently established. However, their diminutive size offers a major challenge for studying the VP rupture biomechanics on a patient specific basis. In this study, a highly detailed model was reconstructed from a post-mortem coronary specimen of a patient with

observed VP, using high resolution micro-CT which captured the microcalcifications embedded in the fibrous cap. Fluid-structure interaction (FSI) simulations were conducted in the reconstructed model to examine the combined effects of micro-Ca, flow phase lag and plaque material properties on plaque burden and vulnerability. This dynamic fibrous cap stress mapping elucidates the contribution of micro-Ca and flow phase lag VP vulnerability independently. Micro-Ca embedded in the fibrous cap produced increased stresses predicted by previously published analytical model, and corroborated our previous studies.”

According to the news editors, the researchers concluded: “The ‘micro-CT to FSI’ methodology may offer better diagnostic tools for clinicians, while reducing morbidity and mortality rates for patients with vulnerable plaques and ameliorating the ensuing healthcare costs.”

For more information on this research see: Microcalcifications Increase Coronary Vulnerable Plaque Rupture Potential: A Patient-Based Micro-CT Fluid-Structure Interaction Study. *Annals of Biomedical Engineering*, 2012;40(7):1443-54. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from S.H. Rambhia, Dept. of Biomedical Engineering, Stony Brook University, Stony Brook, NY, United States. (2012 Jul 18)

### **Technical University of Denmark, Kongens Lyngby: Advanced microtechnologies for detection of chromosome abnormalities by fluorescent in situ hybridization**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Microdevices. According to news reporting from Kongens Lyngby, Denmark, by NewsRx journalists, researchers stated “Cytogenetic and molecular cytogenetic analyses, which aim to detect chromosome abnormalities, are routinely performed in cytogenetic laboratories all over the world. Traditional cytogenetic studies are performed by analyzing the banding pattern of chromosomes, and are complemented by molecular cytogenetic techniques such as fluorescent in situ hybridization (FISH).”

The news correspondents obtained a quote from the research by the authors from the Technical University of Denmark, “To improve FISH application in cytogenetic analysis the issues with long experimental time, high volumes of expensive reagents and requirement for trained technicians need to be addressed. The protocol has recently evolved towards on chip detection of chromosome abnormalities with the development of microsystems for FISH analysis. The challenges addressed by the developed microsystems are mainly the automation of the assay

performance, reduction in probe volume, as well as reduction of assay time.”

According to the news reporters, the researchers concluded: “The recent focus on the development of automated systems for performing FISH on chip is summarized in this review.”

For more information on this research see: Advanced microtechnologies for detection of chromosome abnormalities by fluorescent in situ hybridization. *Biomedical Microdevices*, 2012;14(3):453-60. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting D. Kwasny, Dept. of Micro- and Nanotechnology, Technical University of Denmark, Ørstedes Plads, 2800, Kgs Lyngby, Denmark.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Jul 18)

### **Temple University, Philadelphia: Characterization of Changes to the Mechanical Properties of Arteries due to Cold Storage Using Nanoindentation Tests**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting out of Philadelphia, Pennsylvania, by NewsRx editors, researchers stated “Understanding the effect of cold storage on arterial tissues is essential in various clinical and experimental practices. Cold storage techniques could significantly affect the post-cryosurgical or post-cryopreservation mechanical behavior of arteries.”

Our news journalists obtained a quote from the research by the authors from Temple University, “Previously, arteries were considered homogenous and elastic and the changes in material properties due to cold storage were inconclusive. In this study, using a custom-made nanoindentation device, changes to the local viscoelastic properties of porcine thoracic aorta wall due to three common storage temperatures (+4, -20, and -80 °C) within 24 h, 48 h, 1 week, and 3 weeks were characterized. The changes to both elastic and relaxation behaviors were investigated considering the multilayer, heterogeneous nature of the aortic wall. The results showed that the average instantaneous Young’s modulus (E) of +4 °C storage samples decreased while their permanent average relaxation amplitude (G (8)) increased and after 48 h



these changes became significant (10 and 13% for E and G (8), respectively). Generally, in freezer storage, E increased and G (8) showed no significant change.”

According to the news editors, the researchers concluded: “In prolonged preservation (>1 week), the results of -20 °C showed significant increase in E (20% after 3 weeks) while this increase for -80 °C was not significant, making it a better choice for tissue cold storage applications.”

For more information on this research see: Characterization of Changes to the Mechanical Properties of Arteries due to Cold Storage Using Nanoindentation Tests. *Annals of Biomedical Engineering*, 2012;40(7):1434-42. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting A. Hemmasizadeh, Dept. of Mechanical Engineering, College of Engineering, Temple University, 1947 N 12th Street, Philadelphia, PA, 19122, United States. (2012 Jul 18)

### **University of California, Irvine: Major trends in mobility technology research and development: overview of the results of the NSF-WTEC European study**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from Irvine, California, by NewsRx journalists, researchers stated “Mobility technologies, including wheelchairs, prostheses, joint replacements, assistive devices, and therapeutic exercise equipment help millions of people participate in desired life activities. Yet, these technologies are not yet fully transformative because many desired activities cannot be pursued or are difficult to pursue for the millions of individuals with mobility related impairments.”

The news correspondents obtained a quote from the research by the authors from the University of California, “This WTEC study, initiated and funded by the National Science Foundation, was designed to gather information on European innovations and trends in technology that might lead to greater mobility for a wider range of people. What might these transformative technologies be and how might they arise? Based on visits to leading mobility technology research labs in western Europe, the WTEC panel identified eight major trends in mobility technology research.”

According to the news reporters, the researchers concluded: “This commentary summarizes these trends, which are then described in detail in companion papers appearing in this special issue.”

For more information on this research see: Major trends in mobility technology research and development: overview of the results of the NSF-WTEC European study. *Journal of Neuroengineering and Rehabilitation*, 2012;9():22. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Neuroengineering and Rehabilitation* - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

Our news journalists report that additional information may be obtained by contacting D.J. Reinkensmeyer, Dept. of Mechanical & Aerospace Engineering, University of California, Irvine, CA 92697-3875, United States. (2012 Jul 18)

### **University of Colorado, Aurora: Development of a minimally invasive, injectable, shape memory suture and delivery system**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of Aurora, Colorado, by NewsRx editors, researchers stated “Suturing in space-confined surgical settings encountered during microsurgical procedures can be technically complex and time intensive. This paper presents the development of a new injector and new shape-memory alloy clip that can replace conventional suture.”

Our news journalists obtained a quote from the research by the authors from the University of Colorado, “Engineering and surgical assessments of the injector and clips were performed. A prototype of the delivery system was tested in simulated surgical settings and compared to conventional suturing techniques for surgical time and wound strength. In various micro-surgical scenarios, the new injectable system proved to be 5 to 20-times more efficient and to have wound strengths over three-times that of conventional suturing. Further, the wounds closed by the shape-memory alloy clips could be forced to open and then recover to a watertight state, unlike conventional sutures which break upon failure. This new injector and shape-memory alloy clips proved to be quicker, stronger, and technically easier than conventional suturing.”

According to the news editors, the researchers concluded: “Future work is underway to test the injectable delivery system and the shape-memory alloy clips using a real-time, in vivo porcine model.”

For more information on this research see: Development of a minimally invasive, injectable, shape memory suture and delivery system. *Annals of Biomedical Engineering*, 2012;40(7):1520-9. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting J.L. Olson, Dept. of Ophthalmology, School of

Medicine, University of Colorado Denver, 1675 Aurora Ct, Mail Stop 731, Aurora, CO, 80045, United States. (2012 Jul 18)

### **University of Pisa: How the signal-to-noise ratio influences hyperpolarized $^{13}\text{C}$ dynamic MRS data fitting and parameter estimation**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating in Pisa, Italy, by NewsRx journalists, researchers stated “MRS of hyperpolarized  $^{13}\text{C}$ -labeled compounds represents a promising technique for in vivo metabolic studies. However, robust quantification and metabolic modeling are still important areas of investigation.”

The news reporters obtained a quote from the research by the authors from the University of Pisa, “In particular, time and spatial resolution constraints may lead to the analysis of MRS signals with low signal-to-noise ratio (SNR). The relationship between SNR and the precision of quantitative analysis for the evaluation of the in vivo kinetic behavior of metabolites is unknown. In this article, this topic is addressed by Monte Carlo simulations, covering the problem of MRS signal model parameter estimation, with strong emphasis on the peak amplitude and kinetic model parameters. The results of Monte Carlo simulation were confirmed by in vivo experiments on medium-sized animals injected with hyperpolarized  $[1-^{13}\text{C}]\text{pyruvate}$ .”

According to the news reporters, the researchers concluded: “The results of this study may be useful for the establishment of experimental planning and for the optimization of kinetic model estimation as a function of the SNR value.”

For more information on this research see: How the signal-to-noise ratio influences hyperpolarized  $^{13}\text{C}$  dynamic MRS data fitting and parameter estimation. *NMR in Biomedicine*, 2012;25(7):925-934. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news correspondents report that additional information may be obtained by contacting M.F. Santarelli, University of Pisa, Dept. of Informat Engn EIT, Pisa, Italy. (2012 Jul 18)

**University of Sao Paulo, Sao Carlos: Influence of effective number of pulses on the morphological structure of teeth and bovine femur after femtosecond laser ablation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Dentistry. According to news reporting out of Sao Carlos, Brazil, by NewsRx editors, researchers stated “Femtosecond lasers have been widely used in laser surgery as an instrument for contact-free tissue removal of hard dental, restorative materials, and osseous tissues, complementing conventional drilling or cutting tools. In order to obtain a laser system that provides an ablation efficiency comparable to mechanical instruments, the laser pulse rate must be maximal without causing thermal damage.”

Our news journalists obtained a quote from the research by the authors from the University of Sao Paulo, “The aim of this study was to compare the different morphological characteristics of the hard tissue after exposure to lasers operating in the femtosecond pulse regime. Two different kinds of samples were irradiated: dentin from human extracted teeth and bovine femur samples. Different procedures were applied, while paying special care to preserving the structures. The incubation factor  $S$  was calculated to be  $0.788 \pm 0.004$  for the bovine femur bone. These results indicate that the incubation effect is still substantial during the femtosecond laser ablation of hard tissues. The plasma-induced ablation has reduced side effects, i.e., we observe less thermal and mechanical damage when using a superficial femtosecond laser irradiation close to the threshold conditions.”

According to the news editors, the researchers concluded: “In the femtosecond regime, the morphology characteristics of the cavity were strongly influenced by the change of the effective number of pulses.”

For more information on this research see: Influence of effective number of pulses on the morphological structure of teeth and bovine femur after femtosecond laser ablation. *Journal of Biomedical Optics*, 2012;17(4):048001.

Our news journalists report that additional information may be obtained by contacting G. Nicolodelli, University of Sao Paulo, Physics Institute of Sao Carlos, Sao Carlos, USP, Grupo de Optica, Brazil. (2012 Jul 18)

## **Linköping University: Inverse Monte Carlo method in a multilayered tissue model for diffuse reflectance spectroscopy**

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on Biomedical Optics have been presented. According to news reporting from Linköping, Sweden, by NewsRx journalists, researchers stated “Model based data analysis of diffuse reflectance spectroscopy data enables the estimation of optical and structural tissue parameters. The aim of this study was to present an inverse Monte Carlo method based on spectra from two source-detector distances (0.4 and 1.2 mm), using a multilayered tissue model.”

The news correspondents obtained a quote from the research by the authors from Linköping University, “The tissue model variables include geometrical properties, light scattering properties, tissue chromophores such as melanin and hemoglobin, oxygen saturation and average vessel diameter. The method utilizes a small set of presimulated Monte Carlo data for combinations of different levels of epidermal thickness and tissue scattering. The path length distributions in the different layers are stored and the effect of the other parameters is added in the post-processing. The accuracy of the method was evaluated using Monte Carlo simulations of tissue-like models containing discrete blood vessels, evaluating blood tissue fraction and oxygenation. It was also compared to a homogeneous model. The multilayer model performed better than the homogeneous model and all tissue parameters significantly improved spectral fitting. Recorded in vivo spectra were fitted well at both distances, which we previously found was not possible with a homogeneous model.”

According to the news reporters, the researchers concluded: “No absolute intensity calibration is needed and the algorithm is fast enough for real-time processing.”

For more information on this research see: Inverse Monte Carlo method in a multilayered tissue model for diffuse reflectance spectroscopy. *Journal of Biomedical Optics*, 2012;17(4):047004.

Our news journalists report that additional information may be obtained by contacting I. Fredriksson, Linköping University, Dept. of Biomedical Engineering, University Hospital, 581 85 Linköping, Sweden. (2012 Jul 17)

## University of Pittsburgh: On the in vivo deformation of the mitral valve anterior leaflet: effects of annular geometry and referential configuration

By a News Reporter-Staff News Editor at Cardiovascular Week – Current study results on Cardiology have been published. According to news reporting out of Pittsburgh, Pennsylvania, by NewsRx editors, researchers stated “Alteration of the native mitral valve (MV) shape has been hypothesized to have a profound effect on the local tissue stress distribution, and is potentially linked to limitations in repair durability. The present study was undertaken to elucidate the relation between MV annular shape and central mitral valve anterior leaflet (MVAL) strain history, using flat annuloplasty in an ovine model.”

Our news journalists obtained a quote from the research by the authors from the University of Pittsburgh, “In addition, we report for the first time the presence of residual in vivo leaflet strains. In vivo leaflet deformations were measured using sonocrystal transducers sutured to the MVAL ( $n = 10$ ), with the 3D positions acquired over the full cardiac cycle. In six animals a flat ring was sutured to the annulus and the transducer positions recorded, while in the remaining four the MV was excised from the exsanguinated heart and the stress-free transducer positions obtained. In the central region of the MVAL the peak stretch values, referenced to the minimum left ventricular pressure (LVP), were  $1.10 \pm 0.01$  and  $1.31 \pm 0.03$  (mean  $\pm$  standard error) in the circumferential and radial directions, respectively. Following flat ring annuloplasty, the central MVAL contracted 28% circumferentially and elongated 16% radially at minimum LVP, and the circumferential direction was under a negative strain state during the entire cardiac cycle. After valve excision from the exsanguinated heart, the MVAL contracted significantly (18 and 30% in the circumferential and radial directions, respectively), indicating the presence of substantial in vivo residual strains. While the physiological function of the residual strains (and their associated stresses) are at present unknown, accounting for their presence is clearly necessary for accurate computational simulations of MV function. Moreover, we demonstrated that changes in annular geometry dramatically alter valvular functional strains in vivo.”

According to the news editors, the researchers concluded: “As levels of homeostatic strains are related to tissue remodeling and homeostasis, our results suggest that surgically introduced alterations in MV shape could lead to the long term MV mechanobiological and microstructural alterations that could ultimately affect MV repair durability.”

For more information on this research see: On the in vivo deformation of the mitral valve anterior leaflet: effects of annular

geometry and referential configuration. *Annals of Biomedical Engineering*, 2012;40(7):1455-67. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting R. Amini, Dept. of Bioengineering, University of Pittsburgh, Pittsburgh, PA, United States. (2012 Jul 16)

### **China Pharmaceutical University, Nanjing: Analysis of saikosaponins in rat plasma by anionic adducts-based liquid chromatography tandem mass spectrometry method**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Nanjing, People's Republic of China, by NewsRx journalists, researchers stated “Saikosaponins (SSs) are a class of triterpene saponins with a wide spectrum of bioactivities. A sensitive liquid chromatography tandem mass spectrometry (LC-MS/MS) method was developed for simultaneous determination of saikosaponin a, saikosaponin c, saikosaponin d and saikosaponin b2 in rat plasma.”

The news reporters obtained a quote from the research by the authors from China Pharmaceutical University, “Plasma samples were prepared by liquidliquid extraction. The analytes and the internal standard (IS) digoxin were well separated on an octadecyl column using gradient elution and analyzed by monitoring the fragmentation transition pair of anionic adducts to deprotonated molecules in negative-mode electrospray. By neutral loss of HCOOH, the transition pairs of  $m/z$  825 -&gt; 779 for SSa, SSd, SSb2 and the IS, and  $m/z$  971 -&gt; 925 for SSc were sensitive for MS/MS detection with the lower limits of quantification in the range of 0.200.40?ng/mL. Method validation experiments were performed, including selectivity, precision, accuracy, linearity, matrix effect, recovery and stability.”

According to the news reporters, the researchers concluded: “The validated method was further applied to determine the pharmacokinetics parameters of SSa, c and d in rats following a single oral administration of the extract of chaihu (the dried roots of *Bupleurum chinense* DC).”

For more information on this research see: Analysis of saikosaponins in rat plasma by anionic adducts-based liquid chromatography tandem mass spectrometry method. *Biomedical Chromatography*, 2012;26(7):808-815. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN 1099-0801)

Our news correspondents report that additional information may be obtained by contacting L. Xu, China Pharmaceutical University, State Key Lab Nat Med, Nanjing 210009, People's Republic of China. (2012 Jul 11)

### **Clemson University: Real-time detection of workload changes using heart rate variability**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Clemson, South Carolina, by NewsRx editors, researchers stated “This work presents a novel approach to detecting real-time changes in workload using heart rate variability (HRV). We propose that for a given workload state, the values of HRV vary in a sub-range of a Gaussian distribution.”

Our news journalists obtained a quote from the research by the authors from Clemson University, “We describe methods to monitor a HRV signal in real-time for change points based upon sub-Gaussian fitting. We tested our method on subjects sitting at a computer performing a low workload surveillance task and a high workload video game task.”

According to the news editors, the researchers concluded: “The proposed algorithm showed superior performance compared to the classic CUSUM method for detecting task changes.”

For more information on this research see: Real-time detection of workload changes using heart rate variability. *Biomedical Signal Processing and Control*, 2012;7(4):333-341. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting A. Hoover, Clemson University, Dept. of Psychol, Clemson, SC 29634, United States. (2012 Jul 11)



## **Dartmouth College, Hanover: Remote positioning optical breast magnetic resonance coil for slice-selection during image-guided near-infrared spectroscopy of breast cancer**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Optics have been published. According to news reporting from Hanover, New Hampshire, by NewsRx journalists, researchers stated “The design and testing of a pneumatic optical positioning interface produced with the goal of improving fiber positioning in magnetic resonance (MR)-guided diffuse spectral imaging of breast cancer is presented. The system was created for vertical positioning of optical fibers inside the MR bore during a patient exam to target suspicious lesions with MR scans for reference and collect multiple planes of optical data.”

The news correspondents obtained a quote from the research by the authors from Dartmouth College, “The interface includes new fiber plates for mechanical and optical coupling to the breast, and was tested in phantoms and human imaging. Reconstructions with data taken in the new interface show acceptable linearity over different absorber concentrations (residual norm=0.067), and exhibit good contrast recovery at different imaging planes, which is consistent with previous work. An example of human breast imaging through the new interface is shown and a discussion of how it compares to other patient interfaces for breast imaging is presented. Design goals of increasing the available degrees of freedom for fiber positioning while maintaining good patient-fiber contact and comfort were accomplished.”

According to the news reporters, the researchers concluded: “This interface allows improved volumetric imaging with interactive and accurate slice selection to quantify targeted suspicious lesions.”

For more information on this research see: Remote positioning optical breast magnetic resonance coil for slice-selection during image-guided near-infrared spectroscopy of breast cancer. *Journal of Biomedical Optics*, 2011;16(6):066001.

Our news journalists report that additional information may be obtained by contacting M.A. Mastanduno, Dartmouth College, Thayer School of Engineering, Hanover, New Hampshire 03755, United States. (2012 Jul 11)

## **Federal University, Goiania: Quantitation of glucosamine sulfate in plasma by HPLC-MS/MS after administration of powder for oral solution formulation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of Goiania, Brazil, by NewsRx editors, researchers stated “A rapid method for the quantification of glucosamine in human plasma using high-performance liquid chromatography coupled to tandem mass spectrometry was developed and validated. The sample preparation includes a simple deproteinization step, using d-[1-13C] glucosamine hydrochloride as an internal standard.”

Our news journalists obtained a quote from the research by the authors from Federal University, “Chromatographic separation was performed on an ACE Ciano column using isocratic elution with acetonitrile and aqueous 27mm ammonium acetate containing 0.025% formic acid (80:20). Selected reaction monitoring was performed using the transitions  $m/z$  180.1  $\rightarrow$   $m/z$  72.1 and  $m/z$  181.0  $\rightarrow$   $m/z$  74.6 to quantify glucosamine and internal standard, respectively. The method was validated and proved to be linear, accurate and precise over the range 50-5000 ng/mL of glucosamine. Recovery rates higher than 90% were obtained for both glucosamine and internal standard. No matrix effect was detected in the samples.”

According to the news editors, the researchers concluded: “The validated method was successfully applied to a pharmacokinetic study after oral administration of a powder for oral solution formulation containing glucosamine sulfate.”

For more information on this research see: Quantitation of glucosamine sulfate in plasma by HPLC-MS/MS after administration of powder for oral solution formulation. *Biomedical Chromatography*, 2012;26(7):851-856. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news journalists report that additional information may be obtained by contacting I.C. Cesar, Univ Fed Goias, Fac Farm, BR-74605220 Goiania, GO, Brazil. (2012 Jul 11)

## Harbin University of Commerce: Characterization of multiple absorbed constituents in rats after oral administration of *Paederia scandens* decoction

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news originating from Harbin, People's Republic of China, by NewsRx correspondents, researchers stated “*Paederia scandens* (Lour.) Merri. (Jishiteng in Chinese) is a Chinese traditional medicine widely used in treating various diseases. However, its active components have remained unknown.”

Our news journalists obtained a quote from the research by the authors from the Harbin University of Commerce, “In the present study, a rapid and sensitive method by high-performance liquid chromatography coupled with electrospray ionization mass spectrometry (HPLC-MSn) techniques was employed to investigate the absorbed constituents in rats after oral administration of *Paederia scandens* decoction. By comparing their MS data with those of authentic compounds and published data, a total of six compounds (paederosid, 1; paederosidic acid, 2; paederosidic acid methyl ester, 3; 6-hydroxy geniposide, 4; asperuloside, 5; and deacetyl asperuloside, 6) were identified in the *P. scandens* decoction samples. In addition, a total of seven compounds, including three iridoid glucosides and four of their metabolites, were identified in rat urine samples after administration. In addition, six compounds, including four iridoid glucosides and two of their metabolites, were identified in rat serum samples after administration.”

According to the news editors, the researchers concluded: “Our results significantly narrow the range of potentially active compounds in *P. scandens* decoction, and build a solid foundation for future research on its mechanism.”

For more information on this research see: Characterization of multiple absorbed constituents in rats after oral administration of *Paederia scandens* decoction. *Biomedical Chromatography*, 2012;26(7):863-868. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

The news correspondents report that additional information may be obtained from W.X. Jiang, Harbin Univ Commerce, Harbin 150076, People's Republic of China. (2012 Jul 11)

### **Neurology Service, Nancy: Blind source separation, wavelet denoising and discriminant analysis for EEG artefacts and noise cancelling**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating in Nancy, France, by NewsRx journalists, researchers stated “This paper proposes an automatic method for artefact removal and noise elimination from scalp electroencephalogram recordings (EEG). The method is based on blind source separation (BSS) and supervised classification and proposes a combination of classical and news features and classes to improve artefact elimination (ocular, high frequency muscle and ECG artefacts).”

The news reporters obtained a quote from the research by the authors from Neurology Service, “The role of a supplementary step of wavelet denoising (WD) is explored and the interactions between BSS, denoising and classification are analyzed. The results are validated on simulated signals by quantitative evaluation criteria and on real EEG by medical expertise. The proposed methodology successfully rejected a good percentage of artefacts and noise, while preserving almost all the cerebral activity.”

According to the news reporters, the researchers concluded: “The ‘denoised artefact-free’ EEG presents a very good improvement compared with recorded raw EEG: 96% of the EEGs are easier to interpret.”

For more information on this research see: Blind source separation, wavelet denoising and discriminant analysis for EEG artefacts and noise cancelling. *Biomedical Signal Processing and Control*, 2012;7(4):389-400. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news correspondents report that additional information may be obtained by contacting R.R. Vazquez, Center Hosp Univ Nancy CHU, Neurol Serv, F-54000 Nancy, France. (2012 Jul 11)

### **Sogang University, Seoul: Adaptive dynamic quadrature demodulation with autoregressive spectral estimation in ultrasound imaging**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting originating from Seoul, South Korea, by NewsRx correspondents, researchers stated “In medical ultrasound imaging, the frequency-dependent attenuation causes a downshift of the center frequency of

transmitted ultrasound as it propagates through the body. The down-shifting results in a considerable loss of signal-to-noise ratio (SNR) after quadrature demodulation (QDM) in which down-mixing and low pass filtering are involved.”

Our news editors obtained a quote from the research by the authors from Sogang University, “To overcome the problem, dynamic QDMs have been proposed, in which the change in the center frequency along the axial direction is obtained using autocorrelation-based spectral estimation and compensated in the QDM block. As an alternative, this paper proposes an adaptive dynamic QDM using the 2nd-order autoregressive model. The main advantage over the conventional dynamic QDMs is to use real radio-frequency (RF) data in the spectral estimation, while its counterparts require additional steps to obtain either complex RF signals or complex baseband signals. This allows the proposed method to be used with a minimal modification of signal processing blocks. The performances of the proposed method were evaluated through in vitro and in vivo experiments. The performances were also compared with those of the conventional dynamic QDM. From the experiments, it was learned that the proposed method improved SNR by maximally 7.8 dB in the near field compared with the conventional dynamic QDM. In the far field, however, its SNR improvement is similar to its counterpart. This may be explained by the fact that the signal loss mainly results from the amplitude attenuation and the diffraction rather than the frequency downshift in the far field. In addition, the proposed method improved contrast resolution (CR) by at least 6.8%, compared with that of the conventional dynamic QDM.”

According to the news editors, the researchers concluded: “The experimental results demonstrated that the proposed method can be used to improve SNR and CR of ultrasound images in an effective manner.”

For more information on this research see: Adaptive dynamic quadrature demodulation with autoregressive spectral estimation in ultrasound imaging. *Biomedical Signal Processing and Control*, 2012;7(4):371-378. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news editors report that additional information may be obtained by contacting D.Y. Lee, Sogang Univ, Sogang Inst Adv Technol, Seoul 121742, South Korea. (2012 Jul 11)

## University of Rochester: Is T-wave alternans T-wave amplitude dependent?

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting out of Rochester, New York, by NewsRx editors, researchers stated “The possible dependence of T-wave alternans (TWA) on T-wave amplitude was investigated in 3 orthogonal leads (X, Y, Z) 20-min resting ECG recordings and in the derived vector magnitude (VM) from 176 healthy (H) subjects and 200 coronary-artery-disease (CAD) patients. After application of our adaptive-match-filter based method for parameterization of TWA in terms of its amplitude (TWA\_A) and product-magnitude (TWA\_PM, defined as the product of TWA\_A times TWA duration), and once a TWA parameter was defined for T-wave amplitude quantification, the existence of intra- and inter-subjects relationships of TWA\_A and TWA\_PM vs. TWA was tested.”

Our news journalists obtained a quote from the research by the authors from the University of Rochester, “Compared to the H-population, the CAD-population showed a significant ( $P < 0.05$ ) increase of TWA\_A ( $62 \pm 38 \mu V$  vs.  $54 \pm 25 \mu V$ ) and TWA\_PM ( $4029 \pm 2974 \text{ beat } \mu V$  vs.  $3107 \pm 1976 \text{ beat } \mu V$ ) and a significant decrease of TWA\_A ( $298 \pm 194 \mu V$  vs.  $467 \pm 246 \mu V$ ). These repolarization changes, however, occurred with no significant intra- or inter-subjects relationships of TWA\_A and TWA\_PM vs. TWA.”

According to the news editors, the researchers concluded: “Thus, in our CAD and H populations there was no evidence of TWA dependence on T-wave amplitude.”

For more information on this research see: Is T-wave alternans T-wave amplitude dependent? *Biomedical Signal Processing and Control*, 2012;7(4):358-364. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting L. Burattini, University of Rochester, Dept. of Biomed Engrn, Rochester, NY, United States. (2012 Jul 11)

## **University of Utrecht: Perturbation measurements in highly irregular voice signals: Performances/validity of analysis software tools**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news originating from Utrecht, Netherlands, by NewsRx correspondents, researchers stated “In this paper we present results concerning validity of jitter measurement in strongly irregular voice signals (sustained vowels) moderately corrupted by noise. The performance of four tools for voice analysis is compared on synthetic signals as far as fundamental period and jitter estimation are concerned.”

Our news journalists obtained a quote from the research by the authors from the University of Utrecht, “Synthesised vowels offer the advantage of a perfect control of the amount of jitter put in. Though implementing the same formula for jitter estimation, the results obtained with these approaches become quite different for increasing jitter. The reason could be searched in the different methods used for the separation of voiced and unvoiced frames as well as for fundamental period estimation. Results show that all the tools give reliable results up to a jitter level  $J = 15\%$ , that encompasses the maximum value  $J = 12\%$  as obtained by expert raters by visual inspection. Hence, up to this limit, the tools presented here for jitter estimation can give a valid support to clinicians also in term of reproducibility of results and time saving. For jitter values larger than  $15\%$  all programs tend to underestimate the true jitter value, but with large differences among them.”

According to the news editors, the researchers concluded: “Just two methods succeed in estimating jitter values up to and larger than  $20\%$  and could thus be better suited for perturbation measure in strongly irregular voice signals.”

For more information on this research see: Perturbation measurements in highly irregular voice signals: Performances/validity of analysis software tools. *Biomedical Signal Processing and Control*, 2012;7(4):409-416. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from C. Manfredi, University of Utrecht, UMC, Utrecht, Netherlands. (2012 Jul 11)

### **Urmia University, Orumiyeh: Application of hollow fiber-supported liquid-phase microextraction coupled with HPLC for the determination of guaifenesin enantiomer-protein binding**

By a News Reporter-Staff News Editor at Biotech Week – New research on Guaiaicol is the subject of a report. According to news reporting originating from Orumiyeh, Iran, by NewsRx correspondents, researchers stated “A hollow fiber liquid-phase microextraction technique coupled with high-performance liquid chromatography with fluorescence detection was employed for determination and evaluation of the binding characteristics of drugs to bovine serum albumin (BSA).”

Our news editors obtained a quote from the research by the authors from Urmia University, “Enantiomers of guaifenesin (an expectorant drug) were investigated as a model system. After optimization of some influencing parameters on microextraction, the proposed method was used for calculation of the target drug distribution coefficient between n-octanol and the buffer solution as well as study of drugBSA binding in physiological conditions.”

According to the news editors, the researchers concluded: “The developed method shows a new, improved and simple procedure for determination of free drug concentration in biological fluids and the extent of drugprotein binding.”

For more information on this research see: Application of hollow fiber-supported liquid-phase microextraction coupled with HPLC for the determination of guaifenesin enantiomer-protein binding. *Biomedical Chromatography*, 2012;26(7):875-880. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

The news editors report that additional information may be obtained by contacting M. Hatami, Urmia Univ, Fac Sci, Dept. of Chem, Orumiyeh, Iran. (2012 Jul 11)

### **University of Foggia: Altered expression of the clock gene machinery in kidney cancer patients**

By a News Reporter-Staff News Editor at Cancer Weekly – Current study results on Kidney Cancer have been published. According to news reporting out of Foggia, Italy, by NewsRx editors, researchers stated “Kidney cancer is associated with alteration in the pathways regulated



by von Hippel-Lindau protein and hypoxia inducible factor  $\alpha$ . Tight interrelationships have been evidenced between hypoxia response pathways and circadian pathways. The dysregulation of the circadian clock circuitry is involved in carcinogenesis.”

Our news journalists obtained a quote from the research by the authors from the University of Foggia, “The aim of our study was to evaluate the clock gene machinery in kidney cancer. mRNA expression levels of the clock genes ARNTL1, ARNTL2, CLOCK, PER1, PER2, PER3, CRY1, CRY2, TIMELESS, TIPIN and CSNK1E and of the clock controlled gene SERPINE1 were evaluated by DNA microarray assays and by qRT-PCR in primary tumor and matched nontumorous tissue collected from a cohort of 11 consecutive kidney cancer patients. In kidney tumor tissue, we found down-regulation of PER2 (median = 0.658, Q1-Q3 = 0.562-0.744,  $P < 0.01$ ), TIMELESS (median = 0.705, Q1-Q3 = 0.299-1.330,  $P = 0.04$ ) and TIPIN (median = 0.556, Q1-Q3 = 0.385-1.945,  $P = 0.01$ ), up-regulation of SERPINE1 (median = 1.628, Q1-Q3 = 0.339-4.071,  $P = 0.04$ ), whereas the expression of ARNTL2 (median = 0.605, Q1-Q3 = 0.318-1.738,  $P = 0.74$ ) and CSNK1E (median = 0.927, Q1-Q3 = 0.612-2.321,  $P = 0.33$ ) did not differ. A statistically significant correlation was evidenced between mRNA levels of PER2 and CSNK1E ( $r = 0.791$ ,  $P < 0.01$ ), PER2 and TIPIN ( $r = 0.729$ ,  $P = 0.01$ ), PER2 and SERPINE1 ( $r = 0.704$ ,  $P = 0.01$ ), TIMELESS and TIPIN ( $r = 0.605$ ,  $P = 0.04$ ), TIMELESS and CSNK1E ( $r = 0.637$ ,  $P = 0.03$ ), TIPIN and CSNK1E ( $r = 0.940$ ,  $P < 0.01$ ).”

According to the news editors, the researchers concluded: “In kidney cancer, the circadian clock circuitry is deregulated and the altered expression of the clock genes might be involved in disease onset and progression.”

For more information on this research see: Altered expression of the clock gene machinery in kidney cancer patients. *Biomedicine & Pharmacotherapy*, 2012;66(3):175-179. *Biomedicine & Pharmacotherapy* can be contacted at: Elsevier France-Editions Scientifiques Medicales Elsevier, 23 Rue Linois, 75724 Paris, France. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedicine & Pharmacotherapy* - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

Our news journalists report that additional information may be obtained by contacting G. Mazzocchi, University of Foggia, Foggia, Italy. (2012 Jul 10)

## General Teaching Hospital, Prague: Dynamic Causal Modeling and subspace identification methods

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in Prague, Czech Republic, by NewsRx journalists, researchers stated “The main contribution of the paper is in formulating the problem of detection of brain regions structure within the framework of dynamic system theory. The motivation is to see if the mature domain of experimental identification of dynamic systems can provide a methodology alternative to Dynamic Causal Modeling (DCM) which is currently used as an exclusive tool to estimate the structure of interconnections among a given set of brain regions using the measured data from functional magnetic resonance imaging (fMRI).”

The news reporters obtained a quote from the research by the authors from General Teaching Hospital, “The key tool proposed for modeling the structure of brain interconnections in this paper is subspace identification methods which produce linear state-space model, thus neglecting the bilinear term from DCM. The procedure is illustrated using a simple two-region model with maximally simplified linearized hemodynamics. We assume that the underlying system can be modeled by a set of linear differential equations, and identify the parameters (in terms of state space matrices), without any a priori constraints.”

According to the news reporters, the researchers concluded: “We then transform the hidden states so that the implicit state matrix has a form or structure that is consistent with the generation of (region-specific) hemodynamic signals by coupled neuronal states.”

For more information on this research see: Dynamic Causal Modeling and subspace identification methods. *Biomedical Signal Processing and Control*, 2012;7(4):365-370. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news correspondents report that additional information may be obtained by contacting J. Novakova, Gen Teaching Hosp, Prague, Czech Republic. (2012 Jul 09)

## **Idaho State University, Pocatello: Automated diagnosis of epileptic EEG using entropies**

By a News Reporter-Staff News Editor at Journal of Robotics & Machine Learning – Current study results on Biomedical Engineering have been published. According to news reporting from Pocatello, Idaho, by VerticalNews journalists, researchers stated “Epilepsy is a neurological disorder characterized by the presence of recurring seizures. Like many other neurological disorders, epilepsy can be assessed by the electroencephalogram (EEG).”

The news correspondents obtained a quote from the research by the authors from Idaho State University, “The EEG signal is highly non-linear and non-stationary, and hence, it is difficult to characterize and interpret it. However, it is a well-established clinical technique with low associated costs. In this work, we propose a methodology for the automatic detection of normal, pre-ictal, and ictal conditions from recorded EEG signals. Four entropy features namely Approximate Entropy (ApEn), Sample Entropy (SampEn), Phase Entropy 1 (Si), and Phase Entropy 2 (S2) were extracted from the collected EEG signals. These features were fed to seven different classifiers: Fuzzy Sugeno Classifier (FSC), Support Vector Machine (SVM), K-Nearest Neighbour (KNN), Probabilistic Neural Network (PNN), Decision Tree (DT), Gaussian Mixture Model (GMM), and Naive Bayes Classifier (NBC). Our results show that the Fuzzy classifier was able to differentiate the three classes with a high accuracy of 98.1%.”

According to the news reporters, the researchers concluded: “Overall, compared to previous techniques, our proposed strategy is more suitable for diagnosis of epilepsy with higher accuracy.”

For more information on this research see: Automated diagnosis of epileptic EEG using entropies. *Biomedical Signal Processing and Control*, 2012;7(4):401-408. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting U.R. Acharya, Idaho State University, Dept. of Biomed Engn, Pocatello, ID, United States. (2012 Jul 09)

### **King Saud University, Riyadh: A wavelet optimization approach for ECG signal classification**

By a News Reporter-Staff News Editor at Journal of Robotics & Machine Learning – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Riyadh, Saudi Arabia, by VerticalNews journalists, researchers stated “Wavelets have proved particularly effective for extracting discriminative features in ECG signal classification. In this paper, we show that wavelet performances in terms of classification accuracy can be pushed further by customizing them for the considered classification task.”

The news correspondents obtained a quote from the research by the authors from King Saud University, “A novel approach for generating the wavelet that best represents the ECG beats in terms of discrimination capability is proposed. It makes use of the polyphase representation of the wavelet filter bank and formulates the design problem within a particle swarm optimization (PSO) framework.”

According to the news reporters, the researchers concluded: “Experimental results conducted on the benchmark MIT/BIH arrhythmia database with the state-of-the-art support vector machine (SVM) classifier confirm the superiority in terms of classification accuracy and stability of the proposed method over standard wavelets (i.e., Daubechies and Symlet wavelets).”

For more information on this research see: A wavelet optimization approach for ECG signal classification. *Biomedical Signal Processing and Control*, 2012;7(4):342-349. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting A. Daamouche, King Saud Univ, Coll Comp & Informat Sci, ALISR Lab, Riyadh 11543, Saudi Arabia. (2012 Jul 09)

### **Technion-Israel Institute of Technology, Haifa: Discovery of multiple level heart-sound morphological variability resulting from changes in physiological states**

By a News Reporter-Staff News Editor at Cardiovascular Week – Data detailed on Biomedical Engineering have been presented. According to news reporting from Haifa, Israel, by NewsRx journalists, researchers stated “Heart sounds carry information about the mechanical activity of the cardiovascular system. This information includes the specific physiological state of the subject, and short term variability related to the respiratory cycle.”

The news correspondents obtained a quote from the research by the authors from the Technion-Israel Institute of Technology, “The interpretation of the sounds and extraction of changes in the physiological state, while monitoring short term variability is still an open problem and is the subject of this paper. We present a novel computational framework for analysis of data with multi-level variability, caused by externally induced changes. The framework presented includes an initial clustering of the first heart sound (S1) according to the morphology, and further aggregation of clusters into super-clusters. The clusters and super clusters are two methods of data segmentation, each reflecting a different level of variability in the data. The framework is applied to heart sounds recorded during laparoscopic surgeries of six patients. Procedures of this kind include anesthesia and abdominal insufflation, which together with the respiratory cycle, induce changes to the heart sound signal. We demonstrate a separation of the heart sound morphology according to different physiological states. The physiological states considered are the respiratory cycle, and the stages of the surgery. We achieve results of 90 +/- 4% classification accuracy of heart beats to operation stages.”

According to the news reporters, the researchers concluded: “The proposed framework is general and can be used to analyze data characterized by multi-level variability for various other (biomedical) applications.”

For more information on this research see: Discovery of multiple level heart-sound morphological variability resulting from changes in physiological states. *Biomedical Signal Processing and Control*, 2012;7(4):315-324. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wnps/product/cws\\_home/706718](http://www.elsevier.com/wnps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting S. Kofman, Technion Israel Inst Technol, Rappaport Fac Med, Haifa, Israel. (2012 Jul 09)

### **University of Florida, Gainesville: Sensitivity analysis of an image-based solid tumor computational model with heterogeneous vasculature and porosity**

By a News Reporter-Staff News Editor at Clinical Oncology Week – Current study results on Solid Cancer have been published. According to news originating from Gainesville, Florida, by NewsRx correspondents, researchers stated “An MR image-based computational model of a murine KHT sarcoma is presented that allows the calculation of plasma fluid and solute transport within tissue. Such image-based

models of solid tumors may be used to optimize patient-specific therapies.”

Our news journalists obtained a quote from the research by the authors from the University of Florida, “This model incorporates heterogeneous vasculature and tissue porosity to account for nonuniform perfusion of an MR-visible tracer, gadolinium-diethylenetriamine pentaacetic acid (Gd-DTPA). Dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI) was conducted following intravenous infusion of Gd-DTPA to provide 1 h of tracer-concentration distribution data within tissue. Early time points (19 min) were used to construct 3D K(trans) and porosity maps using a two-compartment model; tracer transport was predicted at later time points using a 3D porous media model. Model development involved selecting an arterial input function (AIF) and conducting a sensitivity analysis of model parameters (tissue, vascular, and initial estimation of solute concentration in plasma) to investigate the effects on transport for a specific tumor. The developed model was then used to predict transport in two additional tumors. The sensitivity analysis suggests that plasma fluid transport is more sensitive to parameter changes than solute transport due to the dominance of transvascular exchange. Gd-DTPA distribution was similar to experimental patterns, but differences in Gd-DTPA magnitude at later time points may result from inaccurate selection of AIF.”

According to the news editors, the researchers concluded: “Thus, accurate AIF estimation is important for later time point prediction of low molecular weight tracer or drug transport in smaller tumors.”

For more information on this research see: Sensitivity analysis of an image-based solid tumor computational model with heterogeneous vasculature and porosity. *Annals of Biomedical Engineering*, 2011;39(9):2360-73. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from G.L. Pishko, Dept. of Mechanical and Aerospace Engineering, University of Florida, Gainesville, FL 32611-6250, United States. (2012 Jul 09)

### **Aristotle University, Thessaloniki: Feature selection based on a fuzzy complementary criterion: application to gait recognition using ground reaction forces**

By a News Reporter-Staff News Editor at Computer Weekly News – Investigators publish new report on Biomedical Engineering. According to news reporting originating in Thessaloniki, Greece, by VerticalNews journalists, researchers stated “An efficient wavelet-based feature selection (FS) method is proposed in this paper for subject recognition

using ground reaction force measurements. Our approach relies on a local fuzzy evaluation measure with respect to patterns that reveal the adequacy of data coverage for each feature.”

The news reporters obtained a quote from the research by the authors from Aristotle University, “Furthermore, FS is driven by a fuzzy complementary criterion (FuzCoC) which assures that those features are iteratively introduced, providing the maximum additional contribution with regard to the information content given by the previously selected features. On the basis of the principles of FuzCoC, we develop two novel techniques. At Stage 1, wavelet packet (WP) decomposition of gaits is accomplished to obtain a set of discriminating frequency subbands. A computationally simple FS method is then applied at Stage 2, providing a compact set of powerful and complementary features, from WP coefficients.”

According to the news reporters, the researchers concluded: “The quality of our approach is validated via comparative analysis against existing methods on gait recognition.”

For more information on this research see: Feature selection based on a fuzzy complementary criterion: application to gait recognition using ground reaction forces. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(6):627-44.

Our news correspondents report that additional information may be obtained by contacting S.P. Moustakidis, Dept. of Electrical and Computer Engineering, Division of Electronics and Computer Engineering, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece. (2012 Jul 05)

### **City Hospital, Taipei: Biomechanical analysis of foot with different foot arch heights: a finite element analysis**

By a News Reporter-Staff News Editor at Computer Weekly News – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Taipei, Taiwan, by Vertical-News correspondents, researchers stated “Clinically, different foot arch heights are associated with different tissue injuries to the foot. To investigate the possible factors contributing to the difference in foot arch heights, previous studies have mostly measured foot pressure in either low-arched or high-arched feet.”

Our news editors obtained a quote from the research by the authors from City Hospital, “However, little information exists on stress variation inside the foot with different arch heights. Therefore, this study aimed to implement the finite element (FE) method to analyse the influence of different foot arches. This study established a 3D foot FE model using software ANSYS 11.0. After validating the FE model, this

study created low-arched, high-arched and normal-arched foot FE models. The FE analysis found that both the stress and strain on the plantar fascia and metatarsal were higher in the high-arched foot, whereas the stress and strain on the calcaneus, navicular and cuboid were higher in low-arched foot.”

According to the news editors, the researchers concluded: “Additionally, forefoot pressure was increased with an increase in arch height.”

For more information on this research see: Biomechanical analysis of foot with different foot arch heights: a finite element analysis. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(6):563-9.

The news editors report that additional information may be obtained by contacting P.C. Sun, Dept. of Physical Medicine and Rehabilitation, Taipei-City Hospital, Zhongxiao Branch, Taipei, Taiwan. (2012 Jul 05)

### **University of Sheffield: Importance of realistic LVAD profiles for assisted aortic simulations: evaluation of optimal outflow anastomosis locations**

By a News Reporter-Staff News Editor at Computer Weekly News – Researchers detail new data in Biomedical Engineering. According to news reporting from Sheffield, United Kingdom, by VerticalNews journalists, researchers stated “Left ventricular assist devices (LVADs) are carefully designed, but the significance of the implantation configuration and interaction with the vasculature is complex and not fully determined. The present study employs computational fluid dynamics to investigate the importance of applying a realistic LVAD profile when evaluating assisted aortic flow fields and subsequently compares a number of potential anastomosis locations in a patient-specific aortic geometry.”

The news correspondents obtained a quote from the research by the authors from the University of Sheffield, “The outflow profile of the Berlin Heart INCOR® device was provided by Berlin Heart GmbH (Berlin, Germany) and the cannula was attached at a number of locations on the aorta. Simulations were conducted to compare a flat profile against the real LVAD profile. The results illustrate the importance of applying an LVAD profile. It not only affects the magnitude and distribution of oscillatory shear index, but also the distribution of flow to the great arteries.”

According to the news reporters, the researchers concluded: “The ascending aorta was identified as the optimal location for the anastomosis.”

For more information on this research see: Importance of realistic LVAD profiles for assisted aortic simulations: evaluation of optimal outflow anastomosis locations. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(6):669-80.



Our news journalists report that additional information may be obtained by contacting A.G. Brown, Group of Medical Physics, School of Medicine and Biomedical Sciences, The Royal Hallamshire Hospital, University of Sheffield, Room I108, Beech Hill Road, Sheffield S10 2RX, UK. (2012 Jul 05)

### **Chinese University of Hong Kong: Fast imaging of high-resolution two-dimensional effective attenuation profile from diffuse reflectance**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating in Hong Kong, People's Republic of China, by NewsRx journalists, researchers stated "Biological tissue is non-homogeneous in nature. It is difficult to measure its optical properties due to non-uniformity throughout the tissue being tested."

The news reporters obtained a quote from the research by the authors from the Chinese University of Hong Kong, "To obtain the spatial distribution of optical parameters, conventional approaches use an array of light sources and detectors to reconstruct the image, thus, there is very limited spatial resolution. In contrast, solutions that provide high resolution have a high computational complexity. In this paper, we propose a fast, simple scheme to resolve the effective attenuation profile from the spatial diffuse reflectance. Rather than giving one single value for the absorption and reduced scattering coefficients, a novel algorithm is proposed for the reconstruction of an effective attenuation profile in 2-dimension from a diffuse reflectance curve. This technique is applied to the reconstruction of a 2-D effective attenuation profile."

According to the news reporters, the researchers concluded: "By obtaining the diffuse reflectance image from a camera and using the algorithm developed here, fast imaging of the effective attenuation profile with relatively high spatial resolution can be achieved."

For more information on this research see: Fast imaging of high-resolution two-dimensional effective attenuation profile from diffuse reflectance. *Journal of Biomedical Optics*, 2012;17(4):115-123. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting J. Tse, Chinese University of Hong Kong, Dept. of Informat Engn, Hong Kong, Hong Kong, People's Republic of China. (2012 Jul 04)

**Cornell University, Ithaca: In vivo imaging of unstained tissues using a compact and flexible multiphoton microendoscope**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting from Ithaca, New York, by NewsRx journalists, researchers stated “We use a compact and flexible multiphoton microendoscope (MPME) to acquire in vivo images of unstained liver, kidney, and colon from an anesthetized rat. The device delivers femtosecond pulsed 800 nm light from the core of a raster-scanned dual-clad fiber (DCF), which is focused by a miniaturized gradient-index lens assembly into tissue.”

The news correspondents obtained a quote from the research by the authors from Cornell University, “Intrinsic fluorescence and second-harmonic generation signal from the tissue is epi-collected through the core and inner clad of the same DCF. The MPME has a rigid distal tip of 3 mm in outer diameter and 4 cm in length. The image field-of-view measures 115  $\mu\text{m}$  by 115  $\mu\text{m}$  and was acquired at 4.1 frames/s with 75 mW illumination power at the sample. Organs were imaged after anesthetizing Sprague-Dawley rats with isoflurane gas, accessing tissues via a ventral-midline abdominal incision, and isolating the organs with tongue depressors. In vivo multiphoton images acquired from liver, kidney, and colon using this device show features similar to that of conventional histology slides, without motion artifact, in 75% of imaged frames.”

According to the news reporters, the researchers concluded: “To the best of our knowledge, this is the first demonstration of multiphoton imaging of unstained tissue from a live subject using a compact and flexible MPME device.”

For more information on this research see: In vivo imaging of unstained tissues using a compact and flexible multiphoton microendoscope. *Journal of Biomedical Optics*, 2012;17(4):16-18. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting C.M. Brown, Cornell University, Coll Vet Med, Ithaca, NY 14853, United States. (2012 Jul 04)

## **Department of Cardiac Surgery, Boston: Mass-spring model for simulation of heart valve tissue mechanical behavior**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from Boston, Massachusetts, by NewsRx journalists, researchers stated “Heart valves are functionally complex, making surgical repair difficult. Simulation-based surgical planning could facilitate repair, but current finite element (FE) studies are prohibitively slow for rapid, clinically oriented simulations.”

The news correspondents obtained a quote from the research by the authors from the Department of Cardiac Surgery, “Mass-spring (M-S) models are fast but can be inaccurate. We quantify speed and accuracy differences between an anisotropic, nonlinear M-S and an efficient FE membrane model for simulating both biaxial and pressure loading of aortic valve (AV) leaflets. The FE model incurs approximately 10 times the computational cost of the M-S model. For simulated biaxial loading, mean error in normal strains is  $\leq 1\%$  for both FE and M-S models for equibiaxial loading but increases for non-equibiaxial states for the M-S model (7%). The M-S model was less able to simulate shear behavior, with mean strain error of approximately 80%. For pressurized AV leaflets, the M-S model predicts similar leaflet dimensions to the FE model (within 2.6%), and the coaptation zone is similar between models. The M-S model simulates in-plane behavior of AV leaflets considerably faster than the FE model and with only minor differences in the deformed mesh.”

According to the news reporters, the researchers concluded: “While the M-S model does not allow explicit control of shear response, shear does not strongly influence shape of the simulated AV under pressure.”

For more information on this research see: Mass-spring model for simulation of heart valve tissue mechanical behavior. *Annals of Biomedical Engineering*, 2011;39(6):1668-79. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting P.E. Hammer, Dept. of Cardiac Surgery, Children’s Hospital, Boston, MA, United States. (2012 Jul 04)

## **Duke University Medical Center, Durham: Detection of vesicoureteral reflux using microwave radiometry-system characterization with tissue phantoms**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating from Durham, North Carolina, by NewsRx correspondents, researchers stated “Microwave (MW) radiometry is proposed for passive monitoring of kidney temperature to detect vesicoureteral reflux (VUR) of urine that is externally heated by a MW hyperthermia device and thereafter reflows from the bladder to kidneys during reflux. Here, we characterize in tissue-mimicking phantoms the performance of a 1.375 GHz radiometry system connected to an electromagnetically (EM) shielded microstrip log spiral antenna optimized for VUR detection.”

Our news editors obtained a quote from the research by the authors from Duke University Medical Center, “Phantom EM properties are characterized using a coaxial dielectric probe and network analyzer (NA). Power reflection and receive patterns of the antenna are measured in layered tissue phantom. Receiver spectral measurements are used to assess EM shielding provided by a metal cup surrounding the antenna. Radiometer and fiberoptic temperature data are recorded for varying volumes (10-30 mL) and temperaturesg (40-46&#176;C) of the urine phantom at 35 mm depth surrounded by 36.5&#176;C muscle phantom. Directional receive pattern with about 5% power spectral density at 35 mm target depth and better than -10 dB return loss from tissue load are measured for the antenna. Antenna measurements demonstrate no deterioration in power reception and effective EM shielding in the presence of the metal cup. Radiometry power measurements are in excellent agreement with the temperature of the kidney phantom.”

According to the news editors, the researchers concluded: “Laboratory testing of the radiometry system in temperature-controlled phantoms supports the feasibility of passive kidney thermometry for VUR detection.”

For more information on this research see: Detection of vesicoureteral reflux using microwave radiometry-system characterization with tissue phantoms. *Ieee Transactions On Bio-medical Engineering*, 2011;58(6):1629-36.

The news editors report that additional information may be obtained by contacting K. Arunachalam, Duke University Medical Center, Durham, NC 27705, United States. (2012 Jul 04)

## **Hongik University, Seoul: Microtechnology for Mimicking In Vivo Tissue Environment**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Seoul, South Korea, by NewsRx correspondents, researchers stated “Microtechnology provides a new approach for reproducing the in vivo environment in vitro. Mimicking the microenvironment of the natural tissues allows cultured cells to behave in a more authentic manner, and gives researchers more realistic platforms to study biological systems.”

Our news editors obtained a quote from the research by the authors from Hongik University, “In this review article, we discuss the physiochemical aspects of in vivo cellular microenvironment, and relevant technologies that can be used to mimic those aspects. Secondly we identify the core methods used in microtechnology for biomedical applications. Finally we examine the recent application areas of microtechnology, with a focus on reproducing the functions of specific organs, or whole-body response such as homeostasis or metabolism-dependent toxicity of drugs.”

According to the news editors, the researchers concluded: “These new technologies enable researchers to ask and answer questions in a manner that has not been possible with conventional, macroscale technologies.”

For more information on this research see: Microtechnology for Mimicking In Vivo Tissue Environment. *Annals of Biomedical Engineering*, 2012;40(6):1289-1300. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news editors report that additional information may be obtained by contacting J.H. Sung, Hongik Univ, Seoul, South Korea. (2012 Jul 04)

## **Imperial College, London: An integrated geometric modelling framework for patient-specific computational haemodynamic study on wide-ranged vascular network**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from London, United Kingdom, by NewsRx correspondents, researchers stated “Patient-specific haemodynamic computations have been used as an effective tool in researches on cardiovascular disease associated with haemodynamics such as atherosclerosis and aneurysm.

Recent development of computer resource has enabled 3D haemodynamic computations in wide-spread arterial network but there are still difficulties in modelling vascular geometry because of noise and limited resolution in medical images.”

Our news journalists obtained a quote from the research by the authors from Imperial College, “In this paper, an integrated framework to model an arterial network tree for patient-specific computational haemodynamic study is developed. With this framework, 3D vascular geometry reconstruction of an arterial network and quantification of its geometric feature are aimed. The combination of 3D haemodynamic computation and vascular morphology quantification helps better understand the relationship between vascular morphology and haemodynamic force behind ‘geometric risk factor’ for cardiovascular diseases. The proposed method is applied to an intracranial arterial network to demonstrate its accuracy and effectiveness. The results are compared with the marching-cubes (MC) method.”

According to the news editors, the researchers concluded: “The comparison shows that the present modelling method can reconstruct a wide-ranged vascular network anatomically more accurate than the MC method, particularly in peripheral circulation where the image resolution is low in comparison to the vessel diameter, because of the recognition of an arterial network connectivity based on its centreline.”

For more information on this research see: An integrated geometric modelling framework for patient-specific computational haemodynamic study on wide-ranged vascular network. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(6):615-25.

The news correspondents report that additional information may be obtained from R. Torii, Dept. of Chemical Engineering, Imperial College, South Kensington Campus, London SW7 2AZ, UK. (2012 Jul 04)

### **Johns Hopkins University, Baltimore: Application of optical coherence tomography and high-frequency ultrasound imaging during noninvasive laser vasectomy**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Optical Coherence Tomography are presented in a new report. According to news reporting out of Baltimore, Maryland, by NewsRx editors, researchers stated “A noninvasive approach to vasectomy may eliminate male fear of complications related to surgery and increase its acceptance. Noninvasive laser thermal occlusion of the canine vas deferens has recently been reported.”

Our news journalists obtained a quote from the research by the authors from Johns Hopkins University, “Optical coherence tomography (OCT) and high-frequency ultrasound (HFUS) are compared for monitoring laser thermal coagulation of the vas in an acute canine model.

Bilateral noninvasive laser coagulation of the vas was performed in six dogs ( $n = 12$  vasa) using a Ytterbium fiber laser wavelength of 1075 nm, incident power of 9.0 W, pulse duration of 500 ms, pulse rate of 1 Hz, and 3-mm-diameter spot. Cryogen spray cooling was used to prevent skin burns during the procedure. An OCT system with endoscopic probe and a HFUS system with 20-MHz transducer were used to image the vas immediately before and after the procedure. Vasa were then excised and processed for gross and histologic analysis for comparison with OCT and HFUS images. OCT provided high-resolution, superficial imaging of the compressed vas within the vas ring clamp, while HFUS provided deeper imaging of the vas held manually in the scrotal fold.”

According to the news editors, the researchers concluded: “Both OCT and high HFUS are promising imaging modalities for real-time confirmation of vas occlusion during noninvasive laser vasectomy.”

For more information on this research see: Application of optical coherence tomography and high-frequency ultrasound imaging during noninvasive laser vasectomy. *Journal of Biomedical Optics*, 2012;17(4):124-128. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting C.M. Cilip, Johns Hopkins Med Inst, Dept. of Urol, Baltimore, MD 21205, United States. (2012 Jul 04)

### **Kansas State University, Manhattan: A Wireless Reflectance Pulse Oximeter With Digital Baseline Control for Unfiltered Photoplethysmograms**

By a News Reporter-Staff News Editor at Electronics Newsweekly – Current study results on Biomedical Engineering have been published. According to news originating from Manhattan, Kansas, by Vertical-News correspondents, researchers stated “Pulse oximeters are central to the move toward wearable health monitoring devices and medical electronics either hosted by, e. g., smart phones or physically embedded in their design. This paper presents a small, low-cost pulse oximeter design appropriate for wearable and surface-based applications that also produces quality, unfiltered photo-plethysmograms (PPGs) ideal for emerging diagnostic algorithms.”

Our news journalists obtained a quote from the research by the authors from Kansas State University, “The design’s ‘filter-free’ embodiment, which employs only digital baseline subtraction as a signal compensation mechanism, distinguishes it from conventional pulse oximeters that incorporate filters for signal extraction and noise reduction.

This results in high-fidelity PPGs with thousands of peak-to-peak digitization levels that are sampled at 240 Hz to avoid noise aliasing. Electronic feedback controls make these PPGs more resilient in the face of environmental changes (e. g., the device can operate in full room light), and data stream in real time across either a ZigBee wireless link or a wired USB connection to a host. On-board flash memory is available for store-and-forward applications.”

According to the news editors, the researchers concluded: “This sensor has demonstrated an ability to gather high-integrity data at fingertip, wrist, earlobe, palm, and temple locations from a group of 48 subjects (20 to 64 years old).”

For more information on this research see: A Wireless Reflectance Pulse Oximeter With Digital Baseline Control for Unfiltered Photoplethysmograms. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(3):269-278. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Circuits and Systems* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

The news correspondents report that additional information may be obtained from K.J. Li, Kansas State University, Dept. of Elect & Comp Engn, Manhattan, KS 66506, United States. (2012 Jul 04)

### **McMaster University, Hamilton: HDAC inhibitor M344 suppresses MCF-7 breast cancer cell proliferation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Breast Cancer. According to news reporting from Hamilton, Canada, by NewsRx journalists, researchers stated “Histone deacetylase (HDAC) inhibitors represent a novel class of drugs that selectively induce cell cycle arrest and apoptosis in transformed cells. This study examined, for the first time, the effects of the relatively new HDAC inhibitor, M344 [4-dimethylamino-N-(6-hydroxycarbamoylhexyl)-benzamide], on the proliferation of MCF-7 breast cancer cells.”

The news correspondents obtained a quote from the research by the authors from McMaster University, “MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide] assays revealed significant concentration-and time-dependent decreases in MCF-7 cell proliferation following treatment with M344 (1-100M). In contrast to the significant induction of p21(waf1/cip1) mRNA expression following treatment with M344 (10M) for 1 or 3 days, there was a significant decrease in p53



mRNA expression, although p53 protein levels were unchanged. Similar treatment with M344 also induced expression of the pro-apoptotic genes, Puma and Bax, together with the morphological features of apoptosis, in MCF-7 cells.”

According to the news reporters, the researchers concluded: “The results of this study reinforce previous findings indicating that HDAC inhibitors are an important group of oncostatic drugs, and show that M344 is a potent suppressor of breast cancer cell proliferation.”

For more information on this research see: HDAC inhibitor M344 suppresses MCF-7 breast cancer cell proliferation. *Biomedicine & Pharmacotherapy*, 2012;66(3):232-6. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedicine & Pharmacotherapy - [http://www.elsevier.com/wps/product/cws\\_home/505810](http://www.elsevier.com/wps/product/cws_home/505810))

Our news journalists report that additional information may be obtained by contacting A. Yeung, Dept. of Psychiatry and Behavioural Neurosciences, McMaster University, 1200 Main Street West, Hamilton, Ontario, Canada. (2012 Jul 04)

### **UNIST, Ulsan: Organs-on-a-Chip: A Focus on Compartmentalized Microdevices**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting from Ulsan, South Korea, by NewsRx journalists, researchers stated “Advances in microengineering technologies have enabled a variety of insights into biomedical sciences that would not have been possible with conventional techniques.”

The news correspondents obtained a quote from the research by the authors from UNIST, “Engineering microenvironments that simulate in vivo organ systems may provide critical insight into the cellular basis for pathophysiologies, development, and homeostasis in various organs, while curtailing the high experimental costs and complexities associated with in vivo studies. In this article, we aim to survey recent attempts to extend tissue-engineered platforms toward simulating organ structure and function, and discuss the various approaches and technologies utilized in these systems.”

According to the news reporters, the researchers concluded: “We specifically focus on microtechnologies that exploit phenomena associated with compartmentalization to create model culture systems that better represent the in vivo organ microenvironment.”

For more information on this research see: Organs-on-a-Chip: A Focus on Compartmentalized Microdevices. *Annals of Biomedical Engineering*, 2012;40(6):1211-1227. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013,

USA. (Springer - [www.springer.com](http://www.springer.com); Annals of Biomedical Engineering - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting C. Moraes, UNIST, Div Nanobio & Chem Engn, WCU Project, Ulsan, South Korea. (2012 Jul 04)

### **University College London: Active Books: The Design of an Implantable Stimulator That Minimizes Cable Count Using Integrated Circuits Very Close to Electrodes**

By a News Reporter-Staff News Editor at Electronics Newsweekly – Current study results on Biomedical Engineering have been published. According to news reporting out of London, United Kingdom, by VerticalNews editors, researchers stated “This paper presents an integrated stimulator that can be embedded in implantable electrode books for interfacing with nerve roots at the cauda equina. The Active Book overcomes the limitation of conventional nerve root stimulators which can only support a small number of stimulating electrodes due to cable count restriction through the dura.”

Our news journalists obtained a quote from the research by the authors from University College London, “Instead, a distributed stimulation system with many tripole electrodes can be configured using several Active Books which are addressed sequentially. The stimulator was fabricated in a 0.6- $\mu$  m high-voltage CMOS process and occupies a silicon area of 4.2 x 6.5 mm<sup>2</sup>. The circuit was designed to deliver up to 8 mA stimulus current to tripole electrodes from an 18 V power supply. Input pad count is limited to five (two power and three control lines) hence requiring a specific procedure for downloading stimulation commands to the chip and extracting information from it. Supported commands include adjusting the amplitude of stimulus current, varying the current ratio at the two anodes in each channel, and measuring relative humidity inside the chip package. In addition to stimulation mode, the chip supports quiescent mode, dissipating less than 100 nA current from the power supply.”

According to the news editors, the researchers concluded: “The performance of the stimulator chip was verified with bench tests including measurements using tripoles in saline.”

For more information on this research see: Active Books: The Design of an Implantable Stimulator That Minimizes Cable Count Using Integrated Circuits Very Close to Electrodes. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(3):216-227. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Circuits*

and Systems - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

Our news journalists report that additional information may be obtained by contacting X. Liu, UCL, Dept. of Med Phys & Bioengn, London WC1E 6BT, United Kingdom. (2012 Jul 04)

### **University of Arizona, Tucson: Error analysis of ratiometric imaging of extracellular pH in a window chamber model**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Tucson, Arizona, by NewsRx correspondents, researchers stated “Ratiometric fluorescence-imaging technique is commonly used to measure extracellular pH in tumors and surrounding tissue within a dorsal skin-fold window chamber. Using a pH-sensitive fluorophore such as carboxy SNARF-1 one can measure pH distributions with high precision.”

Our news journalists obtained a quote from the research by the authors from the University of Arizona, “However, it is often observed that the measured pH is lower than expected, with a bias that varies from one image to another. A comprehensive analysis of possible error sources is presented.”

According to the news editors, the researchers concluded: “These error sources include photon noise, estimator bias, instrument errors, temperature, and calibration errors from biological factors.”

For more information on this research see: Error analysis of ratiometric imaging of extracellular pH in a window chamber model. *Journal of Biomedical Optics*, 2012;17(4):109-114. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from Y.X. Lin, University of Arizona, Coll Opt Sci, Tucson, AZ 85721, United States. (2012 Jul 04)

### **University of California, La Jolla: Characterization of individual ultrasound microbubble dynamics with a light-scattering system**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Optics is now available. According to news originating from La Jolla, California, by NewsRx correspondents, researchers stated “Ultrasound microbubbles are contrast agents used for diagnostic ultrasound imaging and as carriers for noninvasive payload delivery. Understanding the acoustic properties of individual microbubble formulations is important for optimizing the ultrasound imaging parameters for improved image contrast and efficient payload delivery.”

Our news journalists obtained a quote from the research by the authors from the University of California, “We report here a practical and simple optical tool for direct real-time characterization of ultrasound contrast microbubble dynamics based on light scattering. Fourier transforms of raw linear and nonlinear acoustic oscillations, and microbubble cavitations are directly recorded.”

According to the news editors, the researchers concluded: “Further, the power of this tool is demonstrated by comparing clinically relevant microbubble cycle-to-cycle dynamics and their corresponding Fourier transforms.”

For more information on this research see: Characterization of individual ultrasound microbubble dynamics with a light-scattering system. *Journal of Biomedical Optics*, 2011;16(6):067002.

The news correspondents report that additional information may be obtained from M.J. Hsu, University of California at San Diego, Dept. of Electrical and Computer Engineering, 9500 Gilman Drive, Mail Code 0407, La Jolla, California 92092, United States. (2012 Jul 04)

### **University of California, Santa Cruz: Analysis of Dual Band Power and Data Telemetry for Biomedical Implants**

By a News Reporter-Staff News Editor at Telecommunications Business – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Santa Cruz, California, by VerticalNews correspondents, researchers stated “Inductive coupling is commonly used for wireless power and data transfer in biomedical telemetry systems. To increase data bandwidth while maintaining power transfer efficiency, a multiband telemetry system transmitting power and data using different frequencies has been adopted.”

Our news journalists obtained a quote from the research by the authors from the University of California, “However, the power link and data link interact with each other, complicating the operation of both power and data transmission. In this paper, we demonstrate that

to achieve high performance data transmission, the cross-coupling between the power coils and data coils have to be taken into consideration. Design equations have been derived and shown that the signal to noise (interference) ratio could be significantly reduced and the resulting data transmission could fail if only the data link coupling is optimized without considering the cross-coupling between the power link and the data link. Design examples have been constructed to demonstrate that there could be more than 30 dB difference in the signal to noise ratio.”

According to the news editors, the researchers concluded: “The analysis has been verified with simulation and measurement results.”

For more information on this research see: Analysis of Dual Band Power and Data Telemetry for Biomedical Implants. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(3):208-215. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Circuits and Systems - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

The news correspondents report that additional information may be obtained from G.X. Wang, University of California, Baskin Sch Engrn, Santa Cruz, CA 95064, United States. (2012 Jul 04)

### **University of Colorado, Denver: A Linear Parametric Approach for Analysis of Mouse Respiratory Impedance**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Asthma. According to news reporting originating in Denver, Colorado, by NewsRx journalists, researchers stated “Assessment of the lung mechanics is crucial in lung function studies. Commonly lung mechanics is achieved through measurement of the input impedance of the lung where the experimental data is ideal for the application of system identification techniques.”

The news reporters obtained a quote from the research by the authors from the University of Colorado, “This study proposes a new approach for investigating the severity of lung conditions and also evaluating the treatment progression. The proposed method is established based on linear parametric identification of lung input impedance in mice and is applied to normal and asthmatic models (including acute, tolerant and chronic asthma) as well as a pharmacological intervention model. Experimental findings confirm the effectiveness of the analysis technique applied here.”

According to the news reporters, the researchers concluded: “We discuss the potential application of this method to analyses of human lung mechanics.”

For more information on this research see: A Linear Parametric Approach for Analysis of Mouse Respiratory Impedance. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(3):287-294. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Circuits and Systems - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

Our news correspondents report that additional information may be obtained by contacting A. Hanifi, University of Colorado, Denver, CO 80206, United States. (2012 Jul 04)

### **University of Jena: Raman and coherent anti-Stokes Raman scattering microspectroscopy for biomedical applications**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news originating from Jena, Germany, by NewsRx correspondents, researchers stated “A tutorial article is presented for the use of linear and non-linear Raman microspectroscopies in biomedical diagnostics. Coherent anti-Stokes Raman scattering (CARS) is the most frequently applied nonlinear variant of Raman spectroscopy.”

Our news journalists obtained a quote from the research by the authors from the University of Jena, “The basic concepts of Raman and CARS are introduced first, and subsequent biomedical applications of Raman and CARS are described. Raman microspectroscopy is applied to both in-vivo and in-vitro tissue diagnostics, and the characterization and identification of individual mammalian cells. These applications benefit from the fact that Raman spectra provide specific information on the chemical composition and molecular structure in a label-free and nondestructive manner. Combining the chemical specificity of Raman spectroscopy with the spatial resolution of an optical microscope allows recording hyperspectral images with molecular contrast. We also elaborate on interfacing Raman spectroscopic tools with other technologies such as optical tweezing, microfluidics and fiber optic probes.”

According to the news editors, the researchers concluded: “Thereby, we aim at presenting a guide into one exciting branch of modern biophotonics research.”

For more information on this research see: Raman and coherent anti-Stokes Raman scattering microspectroscopy for biomedical applications. *Journal of Biomedical Optics*, 2012;17(4):22-36. *Journal of*

*Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from C. Krafft, University of Jena, Abbe Center Photon, D-07743 Jena, Germany. (2012 Jul 04)

### **University of Melbourne, Victoria: Estimates of muscle function in human gait depend on how foot-ground contact is modelled**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting out of Victoria, Australia, by NewsRx editors, researchers stated “Computational analyses of leg-muscle function in human locomotion commonly assume that contact between the foot and the ground occurs at discrete points on the sole of the foot. Kinematic constraints acting at these contact points restrict the motion of the foot and, therefore, alter model calculations of muscle function.”

Our news journalists obtained a quote from the research by the authors from the University of Melbourne, “The aim of this study was to evaluate how predictions of muscle function obtained from musculoskeletal models are influenced by the model used to simulate ground contact. Both single-and multiple-point contact models were evaluated. Muscle function during walking and running was determined by quantifying the contributions of individual muscles to the vertical, fore-aft and mediolateral components of the ground reaction force (GRF). The results showed that two factors—the number of foot-ground contact points assumed in the model and the type of kinematic constraint enforced at each point—affect the model predictions of muscle coordination. Whereas single-and multiple-point contact models produced similar predictions of muscle function in the sagittal plane, inconsistent results were obtained in the mediolateral direction. Kinematic constraints applied in the sagittal plane altered the model predictions of muscle contributions to the vertical and fore-aft GRFs, while constraints applied in the frontal plane altered the calculations of muscle contributions to the mediolateral GRF.”

According to the news editors, the researchers concluded: “The results illustrate the sensitivity of calculations of muscle coordination to the model used to simulate foot-ground contact.”

For more information on this research see: Estimates of muscle function in human gait depend on how foot-ground contact is modelled. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(6):657-68.

Our news journalists report that additional information may be obtained by contacting T.W. Dorn, Dept. of Mechanical Engineering, University of Melbourne, Melbourne, Victoria 3010, Australia. (2012 Jul 04)

### **University of Minnesota, Minneapolis: Label-Free CMOS Bio Sensor With On-Chip Noise Reduction Scheme for Real-Time Quantitative Monitoring of Biomolecules**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting out of Minneapolis, Minnesota, by NewsRx editors, researchers stated “We present a label-free CMOS field-effect transistor sensing array to detect the surface potential change affected by the negative charge in DNA molecules for real-time monitoring and quantification. The proposed CMOS bio sensor includes a new sensing pixel architecture implemented with correlated double sampling for reducing offset fixed pattern noise and 1/f noise of the sensing devices.”

Our news journalists obtained a quote from the research by the authors from the University of Minnesota, “We incorporated non-surface binding detection which allows real-time continuous monitoring of DNA concentrations without immobilizing them on the sensing surface. Various concentrations of 19-bp oligonucleotides solution can be discriminated using the prototype device fabricated in 1- $\mu$ m double-poly double-metal standard CMOS process.”

According to the news editors, the researchers concluded: “The detection limit was measured as 1.1 ng/ $\mu$ l with a dynamic range of 40 dB and the transient response time was measured less than 20 seconds.”

For more information on this research see: Label-Free CMOS Bio Sensor With On-Chip Noise Reduction Scheme for Real-Time Quantitative Monitoring of Biomolecules. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(3):189-196. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Circuits and Systems* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

Our news journalists report that additional information may be obtained by contacting S.J. Kim, University of Minnesota, Dept. of Elect & Comp Engr, Minneapolis, MN 55455, United States. (2012 Jul 04)



## University of Valencia: Effects of endodontic treatment on apparent Young's modulus of human teeth: in vitro study using speckle interferometry

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Endodontics have been published. According to news reporting out of Valencia, Spain, by NewsRx editors, researchers stated “The introduction of new techniques for endodontic procedures requires the analysis of the biomechanical behavior of dental structures. Digital speckle shearing pattern interferometry (DSSPI) is a nondestructive optical measuring technique that allows one to directly quantify deformations in teeth that are subjected to stress.”

Our news journalists obtained a quote from the research by the authors from the University of Valencia, “DSSPI technique was applied to measure small deformations caused by flexion in different types of teeth. The test was carried out both before and after endodontic treatment with the ProTaper method in order to evaluate the variation of dental elasticity, taking into the account the type of tooth and the endodontic treatment. The results obtained show that dental elasticity, established by means of the apparent Young's modulus, before and after the endodontic treatment, differs between incisors and premolars. The endodontic process does not affect dental elasticity ( $p > 0.7$ ). Specifically, 57.1% of central incisors and 56.3% of second premolars slightly increase their elasticity after the endodontic process. In turn, 42.9% of central incisors and 43.7% of second premolars slightly decrease elasticity. The endodontic treatment especially affects the ‘neutral fibre’; therefore, there is little influence on elasticity by flexion.”

According to the news editors, the researchers concluded: “However, after finishing the process, the channel was restored with material, which can slightly increase tooth elasticity in sonic cases.”

For more information on this research see: Effects of endodontic treatment on apparent Young's modulus of human teeth: in vitro study using speckle interferometry. *Journal of Biomedical Optics*, 2012;17(4):244-248. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting R.J. Gonzalez-Pena, University of Valencia, Dept. of Estomatol, Fac Med & Odontol, E-46003 Valencia, Spain. (2012 Jul 04)

## **Walter Reed Army Medical Center, Washington: In vivo terahertz imaging of rat skin burns**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Burn Care have been presented. According to news reporting originating from Washington, District of Columbia, by NewsRx correspondents, researchers stated “A reflective, pulsed terahertz (THz) imaging system was used to acquire high-resolution ( $d(10-90)/\lambda$  similar to 1.925) images of deep, partial thickness burns in a live rat. The rat’s abdomen was burned with a brass brand heated to similar to 220 degrees C and pressed against the skin with contact pressure for similar to 10 sec.”

Our news editors obtained a quote from the research by the authors from Walter Reed Army Medical Center, “The burn injury was imaged beneath a Mylar window every 15 to 30 min for up to 7 h. Initial images display an increase in local water concentration of the burned skin as evidenced by a marked increase in THz reflectivity, and this likely correlates to the post-injury inflammatory response. After similar to 1 h the area of increased reflectivity consolidated to the region of skin that had direct contact with the brand. Additionally, a low reflecting ring of tissue could be observed surrounding the highly reflective burned tissue. We hypothesize that these regions of increased and decreased reflectivity correlate to the zones of coagulation and stasis that are the classic foundation of burn wound histopathology.”

According to the news editors, the researchers concluded: “While further investigations are necessary to confirm this hypothesis, if true, it likely represents the first in vivo THz images of these pathologic zones and may represent a significant step forward in clinical application of THz technology.”

For more information on this research see: In vivo terahertz imaging of rat skin burns. *Journal of Biomedical Optics*, 2012;17(4):10-12. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting P. Tewari, Walter Reed Army Med Center, Dept. of Surg, Washington, DC 20307, United States. (2012 Jul 04)

## **Warsaw University of Technology: Double peacock eye optical element for extended focal depth imaging with ophthalmic applications**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Presbyopia have been published. According to news reporting from Warsaw, Poland, by NewsRx journalists, researchers stated “The aged human eye is commonly affected by presbyopia, and therefore, it gradually loses its capability to form images of objects placed at different distances. Extended depth of focus (EDOF) imaging elements can overcome this inability, despite the introduction of a certain amount of aberration.”

The news correspondents obtained a quote from the research by the authors from the Warsaw University of Technology, “This paper evaluates the EDOF imaging performance of the so-called peacock eye phase diffractive element, which focuses an incident plane wave into a segment of the optical axis and explores the element’s potential use for ophthalmic presbyopia compensation optics. Two designs of the element are analyzed: the single peacock eye, which produces one focal segment along the axis, and the double peacock eye, which is a spatially multiplexed element that produces two focal segments with partial overlapping along the axis. The performances of the peacock eye elements are compared with those of multifocal lenses through numerical simulations as well as optical experiments in the image space. The results demonstrate that the peacock eye elements form sharper images along the focal segment than the multifocal lenses and, therefore, are more suitable for presbyopia compensation. The extreme points of the depth of field in the object space, which represent the remote and the near object points, have been experimentally obtained for both the single and the double peacock eye optical elements.”

According to the news reporters, the researchers concluded: “The double peacock eye element has better imaging quality for relatively short and intermediate distances than the single peacock eye, whereas the latter seems better for far distance vision.”

For more information on this research see: Double peacock eye optical element for extended focal depth imaging with ophthalmic applications. *Journal of Biomedical Optics*, 2012;17(4):180-187. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting L.A. Romero, Warsaw University of Technology, Fac Phys, PL-00662 Warsaw, Poland. (2012 Jul 04)

## **Washington University, St. Louis: Dependence of photoacoustic speckles on boundary roughness**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting originating in St. Louis, Missouri, by NewsRx journalists, researchers stated “Speckles have been considered ubiquitous in all scattering-based coherent imaging technologies. However, as an optical-absorption-based coherent imaging technology, photoacoustic (PA) tomography (PAT) suppresses speckles by building up prominent boundary signals.”

The news reporters obtained a quote from the research by the authors from Washington University, “We theoretically study the dependence of PAT speckles on the boundary roughness, which is quantified by the root-mean-squared value and the correlation length of the boundary height. Both the speckle visibility and the correlation coefficient between the reconstructed and actual boundaries are quantified. If the root-mean-squared height fluctuation is much greater than, and the height correlation length is much smaller than the imaging resolution, the reconstructed boundaries become fully developed speckles. In other words, speckle formation requires large uncorrelated height fluctuations within the resolution cell. The first- and second-order statistics of PAT speckles are also studied experimentally.”

According to the news reporters, the researchers concluded: “While the amplitude of the speckles follows a Gaussian distribution, the autocorrelation of the speckle patterns tracks that of the system point spread function.”

For more information on this research see: Dependence of photoacoustic speckles on boundary roughness. *Journal of Biomedical Optics*, 2012;17(4):149-154. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting Z.J. Guo, Washington University, Opt Imaging Lab, Dept. of Biomed Engn, St Louis, MO 63130, United States. (2012 Jul 04)

### **Washington University, St. Louis: In vivo photoacoustic tomography of mouse cerebral edema induced by cold injury**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Edema have been published. According to news reporting originating in St. Louis, Missouri, by NewsRx journalists, researchers stated “For the first time, we have implemented photoacoustic tomography (PAT) to image the water content of an edema in vivo. We produced and imaged a cold-induced cerebral edema transcranially, then obtained blood vessel and water accumulation images at 610 and 975 nm, respectively.”

The news reporters obtained a quote from the research by the authors from Washington University, “We tracked the changes at 12, 24, and 36 h after the cold injury. The blood volume decreased after the cold injury, and the maximum area of edema was observed 24 h after the cold injury.”

According to the news reporters, the researchers concluded: “We validated PAT of the water content of the edema through magnetic Resonance Imaging and the water spectrum from the spectrophotometric measurement.”

For more information on this research see: In vivo photoacoustic tomography of mouse cerebral edema induced by cold injury. *Journal of Biomedical Optics*, 2011;16(6):066020.

Our news correspondents report that additional information may be obtained by contacting Z. Xu, Washington University, Optical Imaging Laboratory, Dept. of Biomedical Engineering, St Louis, Missouri 63130-4899, United States. (2012 Jul 04)

### **Cornell University, Ithaca: Nanofabrication for the Analysis and Manipulation of Membranes**

By a News Reporter-Staff News Editor at Life Science Weekly – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting out of Ithaca, New York, by NewsRx editors, researchers stated “Recent advancements and applications of nanofabrication have enabled the characterization and control of biological membranes at submicron scales. This review focuses on the application of nanofabrication towards the nanoscale observing, patterning, sorting, and concentrating membrane components.”

Our news journalists obtained a quote from the research by the authors from Cornell University, “Membranes on living cells are a necessary component of many fundamental cellular processes that naturally

incorporate nanoscale rearrangement of the membrane lipids and proteins. Nanofabrication has advanced these understandings, for example, by providing 30 nm resolution of membrane proteins with metal-enhanced fluorescence at the tip of a scanning probe on fixed cells. Naturally diffusing single molecules at high concentrations on live cells have been observed at 60 nm resolution by confining the fluorescence excitation light through nanoscale metallic apertures. The lateral reorganization on the plasma membrane during membrane-mediated signaling processes has been examined in response to nanoscale variations in the patterning and mobility of the signal-triggering molecules. Further, membrane components have been separated, concentrated, and extracted through on-chip electrophoretic and microfluidic methods.”

According to the news editors, the researchers concluded: “Nanofabrication provides numerous methods for examining and manipulating membranes for both greater understandings of membrane processes as well as for the application of membranes to other biophysical methods.”

For more information on this research see: Nanofabrication for the Analysis and Manipulation of Membranes. *Annals of Biomedical Engineering*, 2012;40(6):1356-1366. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting C.V. Kelly, Cornell University, Ithaca, NY 14853, United States. (2012 Jul 03)

### **Harvard School of Medicine, Cambridge: Engineering approaches toward deconstructing and controlling the stem cell environment**

By a News Reporter-Staff News Editor at Ivy League Week – A new study on Stem Cell Research is now available. According to news reporting out of Cambridge, Massachusetts, by NewsRx editors, researchers stated “Stem cell-based therapeutics have become a vital component in tissue engineering and regenerative medicine. The microenvironment within which stem cells reside, i.e., the niche, plays a crucial role in regulating stem cell self-renewal and differentiation.”

Our news journalists obtained a quote from the research by the authors from the Harvard School of Medicine, “However, current biological techniques lack the means to recapitulate the complexity of this microenvironment. Nano-and microengineered materials offer innovative methods to (1) deconstruct the stem cell niche to understand the effects of individual elements; (2) construct complex tissue-like structures resembling the niche to better predict and control cellular processes; and

(3) transplant stem cells or activate endogenous stem cell populations for regeneration of aged or diseased tissues.”

According to the news editors, the researchers concluded: “In this article, we highlight some of the latest advances in this field and discuss future applications and directions of the use of nano-and microtechnologies for stem cell engineering.”

For more information on this research see: Engineering approaches toward deconstructing and controlling the stem cell environment. *Annals of Biomedical Engineering*, 2012;40(6):1301-15. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting F. Edalat, Center for Biomedical Engineering, Dept. of Medicine, Brigham and Women’s Hospital, Harvard Medical School, Partners Research Building, Room 252, 65 Landsdowne Street, Cambridge, MA, 02139, United States. (2012 Jul 03)

### **Kongju National University, Kong Ju: Integrated Microfluidics Platforms for Investigating Injury and Regeneration of CNS Axons**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of Kong Ju, South Korea, by NewsRx editors, researchers stated “We describe the development of experimental platforms to quantify the regeneration of injured central nervous system (CNS) neurons by combining engineering technologies and primary neuronal cultures. Although the regeneration of CNS neurons is an important area of research, there are no currently available methods to screen for drugs.”

Our news journalists obtained a quote from the research by the authors from Kongju National University, “Conventional tissue culture based on Petri dish does not provide controlled microenvironment for the neurons and only provide qualitative information. In this review, we introduced the recent advances to generate in vitro model system that is capable of mimicking the niche of CNS injury and regeneration and also of testing candidate drugs. We reconstructed the microenvironment of the regeneration of CNS neurons after injury to provide as in vivo like model system where the soluble and surface bounded inhibitors for regeneration are presented in physiologically relevant manner using microfluidics and surface patterning methods.”

According to the news editors, the researchers concluded: “The ability to control factors and also to monitor them using live cell imaging allowed us to develop quantitative assays that can be used to compare

various drug candidates and also to understand the basic mechanism behind nerve regeneration after injury.”

For more information on this research see: Integrated Microfluidics Platforms for Investigating Injury and Regeneration of CNS Axons. *Annals of Biomedical Engineering*, 2012;40(6):1268-1276. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting H.J. Kim, Kongju Natl Univ, Dept. of Chem, Kong Ju 314701, South Korea. (2012 Jul 03)

### **Marquette University, Milwaukee: Optical imaging of tissue mitochondrial redox state in intact rat lungs in two models of pulmonary oxidative stress**

By a News Reporter-Staff News Editor at Life Science Weekly – A new study on Biomedical Engineering is now available. According to news reporting out of Milwaukee, Wisconsin, by NewsRx editors, researchers stated “Ventilation with enhanced fractions of O-2 (hyperoxia) is a common and necessary treatment for hypoxemia in patients with lung failure, but prolonged exposure to hyperoxia causes lung injury. Ischemia-reperfusion (IR) injury of lung tissue is common in lung transplant or crush injury to the chest.”

Our news journalists obtained a quote from the research by the authors from Marquette University, “These conditions are associated with apoptosis and decreased survival of lung tissue. The objective of this work is to use cryoimaging to evaluate the effect of exposure to hyperoxia and IR injury on lung tissue mitochondrial redox state in rats. The autofluorescent mitochondrial metabolic coenzymes nicotinamide adenine dinucleotide (NADH) and flavin adenine dinucleotide (FAD) are electron carriers in ATP generation. These intrinsic fluorophores were imaged for rat lungs using low-temperature fluorescence imaging (cryoimaging). Perfused lungs from four groups of rats were studied: normoxia (control), control perfused with an mitochondrial complex IV inhibitor (potassium cyanide, KCN), rats exposed to hyperoxia (85% O-2) for seven days, and from rats subjected to lung IR in vivo 24 hours prior to study. Each lung was sectioned sequentially in the transverse direction, and the images were used to reconstruct a three-dimensional (3-D) rendering.”

According to the news editors, the researchers concluded: “In KCN perfused lungs the respiratory chain was more reduced, whereas hyperoxic and IR lung tissue have a more oxidized respiratory chain than



control lung tissue, consistent with previously measured mitochondrial dysfunction in both hyperoxic and IR lungs.”

For more information on this research see: Optical imaging of tissue mitochondrial redox state in intact rat lungs in two models of pulmonary oxidative stress. *Journal of Biomedical Optics*, 2012;17(4):155-161. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting R. Sepehr, Marquette University, Dept. of Biomed Engn, Milwaukee, WI 53233, United States. (2012 Jul 03)

### **National Tsing Hua University, Hsinchu: Sample Pretreatment and Nucleic Acid-Based Detection for Fast Diagnosis Utilizing Microfluidic Systems**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Biomedical Engineering have been published. According to news originating from Hsinchu, Taiwan, by NewsRx correspondents, researchers stated “Recently, micro-electro-mechanical-systems (MEMS) technology and micromachining techniques have enabled miniaturization of biomedical devices and systems. Not only do these techniques facilitate the development of miniaturized instrumentation for biomedical analysis, but they also open a new era for integration of microdevices for performing accurate and sensitive diagnostic assays.”

Our news journalists obtained a quote from the research by the authors from National Tsing Hua University, “A so-called ‘micro-total-analysis-system’, which integrates sample pretreatment, transport, reaction, and detection on a small chip in an automatic format, can be realized by combining functional microfluidic components manufactured by specific MEMS technologies. Among the promising applications using microfluidic technologies, nucleic acid-based detection has shown considerable potential recently. For instance, micro-polymerase chain reaction chips for rapid DNA amplification have attracted considerable interest. In addition, microfluidic devices for rapid sample pretreatment prior to nucleic acid-based detection have also achieved significant progress in the recent years. In this review paper, microfluidic systems for sample preparation, nucleic acid amplification and detection for fast diagnosis will be reviewed. These microfluidic devices and systems have several advantages over their large-scale counterparts, including lower sample/reagent consumption, lower power consumption, compact size, faster analysis, and lower per unit cost.”

According to the news editors, the researchers concluded: “The development of these microfluidic devices and systems may provide a revolutionary platform technology for fast sample pretreatment and accurate, sensitive diagnosis.”

For more information on this research see: Sample Pretreatment and Nucleic Acid-Based Detection for Fast Diagnosis Utilizing Microfluidic Systems. *Annals of Biomedical Engineering*, 2012;40(6):1367-1383. *Annals of Biomedical Engineering* can be contacted at: Springer, 233 Spring St, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from J.H. Wang, Natl Tsing Hua Univ, Dept. of Power Mech Engn, Hsinchu 30013, Taiwan. (2012 Jul 03)

### **Seoul National University: Patterning methods for polymers in cell and tissue engineering**

By a News Reporter-Staff News Editor at Life Science Weekly – A new study on Biomedical Engineering is now available. According to news originating from Seoul, South Korea, by NewsRx correspondents, researchers stated “Polymers provide a versatile platform for mimicking various aspects of physiological extracellular matrix properties such as chemical composition, rigidity, and topography for use in cell and tissue engineering applications. In this review, we provide a brief overview of patterning methods of various polymers with a particular focus on biocompatibility and processability.”

Our news journalists obtained a quote from the research by the authors from Seoul National University, “The materials highlighted here are widely used polymers including thermally curable polydimethyl siloxane, ultraviolet-curable polyurethane acrylate and polyethylene glycol, thermo-sensitive poly(N-isopropylacrylamide) and thermoplastic and conductive polymers. We also discuss how micro- and nanofabricated polymeric substrates of tunable elastic modulus can be used to engineer cell and tissue structure and function.”

According to the news editors, the researchers concluded: “Such synergistic effect of topography and rigidity of polymers may be able to contribute to constructing more physiologically relevant microenvironment.”

For more information on this research see: Patterning methods for polymers in cell and tissue engineering. *Annals of Biomedical Engineering*, 2012;40(6):1339-55. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

The news correspondents report that additional information may be obtained from H.N. Kim, School of Mechanical and Aerospace Engineering, Seoul National University, Seoul, 151-742, South Korea. (2012 Jul 03)

### **Texas A&M University, College Station: Tracking transcriptional activities with high-content epifluorescent imaging**

By a News Reporter-Staff News Editor at Information Technology Newsweekly – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting from College Station, Texas, by VerticalNews journalists, researchers stated “High-content cell imaging based on fluorescent protein reporters has recently been used to track the transcriptional activities of multiple genes under different external stimuli for extended periods. This technology enhances our ability to discover treatment-induced regulatory mechanisms, temporally order their onsets and recognize their relationships.”

The news correspondents obtained a quote from the research by the authors from Texas A&M University, “To fully realize these possibilities and explore their potential in biological and pharmaceutical applications, we introduce a new data processing procedure to extract information about the dynamics of cell processes based on this technology. The proposed procedure contains two parts: (1) image processing, where the fluorescent images are processed to identify individual cells and allow their transcriptional activity levels to be quantified; and (2) data representation, where the extracted time course data are summarized and represented in a way that facilitates efficient evaluation. Experiments show that the proposed procedure achieves fast and robust image segmentation with sufficient accuracy. The extracted cellular dynamics are highly reproducible and sensitive enough to detect subtle activity differences and identify mechanisms responding to selected perturbations.”

According to the news reporters, the researchers concluded: “This method should be able to help biologists identify the alterations of cellular mechanisms that allow drug candidates to change cell behavior and thereby improve the efficiency of drug discovery and treatment design.”

For more information on this research see: Tracking transcriptional activities with high-content epifluorescent imaging. *Journal of Biomedical Optics*, 2012;17(4):134-148. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting J.P. Hua, Texas A&M University, Dept. of Elect & Comp Engn, College Stn, TX 77843, United States. (2012 Jul 03)

### **University of Western Ontario, London: Statistical finite element method for real-time tissue mechanics analysis**

By a News Reporter-Staff News Editor at Information Technology Newsweekly – Investigators discuss new findings in Biomedical Engineering. According to news reporting out of London, Canada, by VerticalNews editors, researchers stated “The finite element (FE) method can accurately calculate tissue deformation. However, its low speed renders it ineffective for many biomedical applications involving real-time data processing.”

Our news journalists obtained a quote from the research by the authors from the University of Western Ontario, “To accelerate FE analysis, we introduce a novel tissue mechanics simulation technique. This technique is suitable for real-time estimation of tissue deformation of specific organs, which is required in computer-aided diagnostic or therapeutic procedures. In this method, principal component analysis is used to describe each organ shape and its corresponding FE field for a pool of patients by a small number of weight factors. A mapping function is developed to relate the parameters of organ shape to their FE field counterpart. We show that irrespective of the complexity of the tissue’s constitutive law or its loading conditions, the proposed technique is highly accurate and fast in estimating the FE field.”

According to the news editors, the researchers concluded: “Average deformation errors of less than 2% demonstrate the accuracy of the proposed technique.”

For more information on this research see: Statistical finite element method for real-time tissue mechanics analysis. *Computer Methods In Biomechanics and Biomedical Engineering*, 2012;15(6):595-608.

Our news journalists report that additional information may be obtained by contacting S.R. Mousavi, Dept. of Electrical and Computer Engineering, University of Western Ontario, London, Ontario, Canada. (2012 Jul 03)

## **Vanderbilt University, Nashville: A versatile valve-enabled microfluidic cell co-culture platform and demonstration of its applications to neurobiology and cancer biology**

By a News Reporter-Staff News Editor at Cancer Weekly – Investigators publish new report on Biomedical Microdevices. According to news reporting out of Nashville, Tennessee, by NewsRx editors, researchers stated “A versatile microfluidic platform allowing co-culture of multiple cell populations in close proximity with separate control of their microenvironments would be extremely valuable for many biological applications. Here, we report a simple and compact microfluidic platform that has these desirable features and allows for real-time, live-cell imaging of cell-cell interactions.”

Our news journalists obtained a quote from the research by the authors from Vanderbilt University, “Using a pneumatically/hydraulically controlled poly(dimethylsiloxane) (PDMS) valve barrier, distinct cell types can be cultured in side-by-side microfluidic chambers with their optimum culture media and treated separately without affecting the other cell population. The platform is capable of both two-dimensional and three-dimensional cell co-culture and through variations of the valve barrier design, the platform allows for cell-cell interactions through either direct cell contact or soluble factors alone. The platform has been used to perform dynamic imaging of synapse formation in hippocampal neurons by separate transfection of two groups of neurons with fluorescent pre-and post-synaptic protein markers.”

According to the news editors, the researchers concluded: “In addition, cross-migration of 4T1 tumor cells and endothelial cells has been studied under normoxic and hypoxic conditions, which revealed different migration patterns, suggesting the importance of the microenvironments in cell-cell interactions and biological activities.”

For more information on this research see: A versatile valve-enabled microfluidic cell co-culture platform and demonstration of its applications to neurobiology and cancer biology. *Biomedical Microdevices*, 2011;13(3):539-48. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting Y. Gao, Dept. of Mechanical Engineering, Vanderbilt University, Nashville, TN 37235, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Jul 03)

## **Middlesex University, London: A Tripolar Current-Steering Stimulator ASIC for Field Shaping in Deep Brain Stimulation**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators publish new report on Deep Brain Stimulation. According to news reporting originating in London, United Kingdom, by NewsRx journalists, researchers stated “A significant problem with clinical deep brain stimulation (DBS) is the high variability of its efficacy and the frequency of side effects, related to the spreading of current beyond the anatomical target area. This is the result of the lack of control that current DBS systems offer on the shaping of the electric potential distribution around the electrode.”

The news reporters obtained a quote from the research by the authors from Middlesex University, “This paper presents a stimulator ASIC with a tripolar current-steering output stage, aiming at achieving more selectivity and field shaping than current DBS systems. The ASIC was fabricated in a 0.35- $\mu$ m CMOS technology occupying a core area of 0.71 mm<sup>2</sup>. It consists of three current sourcing/sinking channels. It is capable of generating square and exponential-decay biphasic current pulses with five different time constants up to 28 ms and delivering up to 1.85 mA of cathodic current, in steps of 4  $\mu$ A, from a 12 V power supply.”

According to the news reporters, the researchers concluded: “Field shaping was validated by mapping the potential distribution when injecting current pulses through a multicontact DBS electrode in saline.”

For more information on this research see: A Tripolar Current-Steering Stimulator ASIC for Field Shaping in Deep Brain Stimulation. *IEEE Transactions on Biomedical Circuits and Systems*, 2012;6(3):197-207. *IEEE Transactions on Biomedical Circuits and Systems* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Circuits and Systems* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4156126>)

Our news correspondents report that additional information may be obtained by contacting V. Valente, Middlesex University, Dept. of Nat Sci, London NW4 4BT, United Kingdom. (2012 Jul 02)

**NorthShore University Health System, Evanston: In vivo measurement of the shape of the tissue-refractive-index correlation function and its application to detection of colorectal field carcinogenesis**

By a News Reporter-Staff News Editor at Gastroenterology Week – Investigators publish new report on Colorectal Research. According to news reporting from Evanston, Illinois, by NewsRx journalists, researchers stated “Polarization-gated spectroscopy is an established method to depth-selectively interrogate the structural properties of biological tissue. We employ this method in vivo in the azoxymethane (AOM)-treated rat model to monitor the morphological changes that occur in the field of a tumor during early carcinogenesis.”

The news correspondents obtained a quote from the research by the authors from NorthShore University Health System, “The results demonstrate a statistically significant change in the shape of the refractive-index correlation function for AOM-treated rats versus saline-treated controls. Since refractive index is linearly proportional to mass density, these refractive-index changes can be directly linked to alterations in the spatial distribution patterns of macromolecular density. Furthermore, we found that alterations in the shape of the refractive-index correlation function shape were an indicator of both present and future risk of tumor development.”

According to the news reporters, the researchers concluded: “These results suggest that noninvasive measurement of the shape of the refractive-index correlation function could be a promising marker of early cancer development.”

For more information on this research see: In vivo measurement of the shape of the tissue-refractive-index correlation function and its application to detection of colorectal field carcinogenesis. *Journal of Biomedical Optics*, 2012;17(4):229-236. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting A.J. Gomes, NorthShore Univ Hlth Syst, Dept. of Internal Med, Evanston, IL 60218, United States. (2012 Jul 02)

## National Cancer Institute, Bethesda: Automatic Detection and Quantification of Tree-in-Bud (TIB) Opacities From CT Scans

By a News Reporter-Staff News Editor at Computer Weekly News – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Bethesda, Maryland, by VerticalNews journalists, researchers stated “This study presents a novel computer-assisted detection (CAD) system for automatically detecting and precisely quantifying abnormal nodular branching opacities in chest computed tomography (CT), termed tree-in-bud (TIB) opacities by radiology literature. The developed CAD system in this study is based on 1) fast localization of candidate imaging patterns using local scale information of the images, and 2) Mobius invariant feature extraction method based on learned local shape and texture properties of TIB patterns.”

The news reporters obtained a quote from the research by the authors from National Cancer Institute, “For fast localization of candidate imaging patterns, we use ball-scale filtering and, based on the observation of the pattern of interest, a suitable scale selection is used to retain only small size patterns. Once candidate abnormality patterns are identified, we extract proposed shape features from regions where at least one candidate pattern occupies. The comparative evaluation of the proposed method with commonly used CAD methods is presented with a dataset of 60 chest CTs (laboratory confirmed 39 viral bronchiolitis human parainfluenza CTs and 21 normal chest CTs). The quantitative results are presented as the area under the receiver operator characteristics curves and a computer score (volume affected by TIB) provided as an output of the CAD system. In addition, a visual grading scheme is applied to the patient data by three well-trained radiologists. Interobserver and observer-computer agreements are obtained by the relevant statistical methods over different lung zones. Experimental results demonstrate that the proposed CAD system can achieve high detection rates with an overall accuracy of 90.96%.”

According to the news reporters, the researchers concluded: “Moreover, correlations of observer-observer ( $R^2 = 0.8848$ ,  $p < 0.01$ ) and observer-CAD agreements ( $R^2 = 0.824$ ,  $p < 0.01$ ) validate the feasibility of the use of the proposed CAD system in detecting and quantifying TIB patterns.”

For more information on this research see: Automatic Detection and Quantification of Tree-in-Bud (TIB) Opacities From CT Scans. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1620-1632. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers



- <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting U. Bagci, National Cancer Institute, National Institutes of Health, Bethesda, MD 20892, United States. (2012 Jun 28)

### **University of Washington, Seattle: Surface Mosaics of the Bladder Reconstructed From Endoscopic Video for Automated Surveillance**

By a News Reporter-Staff News Editor at Computer Weekly News – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating in Seattle, Washington, by VerticalNews journalists, researchers stated “Flexible cystoscopy is frequently performed for recurrent bladder cancer surveillance, making it the most expensive cancer to treat over the patient’s lifetime. An automated bladder surveillance system is being developed to robotically scan the bladder surface using an ultrathin and highly flexible endoscope.”

The news reporters obtained a quote from the research by the authors from the University of Washington, “Such a system would allow cystoscopic procedures to be overseen by technical staff while urologists could review cystoscopic video postoperatively. In this paper, we demonstrate a method for reconstructing the surface of the whole bladder from endoscopic video using structure from motion. Video is acquired from a custom ultrathin and highly flexible endoscope that can retroflex to image the entire internal surface of the bladder. Selected frames are subsequently stitched into a mosaic and mapped to a reconstructed surface, creating a 3-D surface model of the bladder that can be expediently reviewed. Our software was tested on endoscopic video of an excised pig bladder.”

According to the news reporters, the researchers concluded: “The resulting reconstruction possessed a projection error of 1.66 pixels on average and covered 99.6% of the bladder surface area.”

For more information on this research see: Surface Mosaics of the Bladder Reconstructed From Endoscopic Video for Automated Surveillance. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1670-1680. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting T.D. Soper, University of Washington, Dept. of Mech Engn, Seattle, WA 98195, United States. (2012 Jun 28)

### **Alignment of angular velocity sensors for a vestibular prosthesis**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Prostheses. According to news originating from Zurich, Switzerland, by NewsRx correspondents, researchers stated “Vestibular prosthetics transmit angular velocities to the nervous system via electrical stimulation. Head-fixed gyroscopes measure angular motion, but the gyroscope coordinate system will not be coincident with the sensory organs the prosthetic replaces.”

Our news journalists obtained a quote from the research by the authors, “Here we show a simple calibration method to align gyroscope measurements with the anatomical coordinate system. We benchmarked the method with simulated movements and obtain proof-of-concept with one healthy subject.”

According to the news editors, the researchers concluded: “The method was robust to misalignment, required little data, and minimal processing.”

For more information on this research see: Alignment of angular velocity sensors for a vestibular prosthesis. *Journal of Neuroengineering and Rehabilitation*, 2012;9(0):14. (BioMed Central - <http://www.biomedcentral.com/>; Journal of Neuroengineering and Rehabilitation - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

The news correspondents report that additional information may be obtained from J. Digiovanna, Neuroprosthetics Control Group - Automatic Control Lab, ETH Zurich, Physikstrasse 3, ETL k24, 8092 Zurich, Switzerland. (2012 Jun 27)

### **Arizona State University, Tempe: A Subject-Independent Method for Automatically Grading Electromyographic Features During a Fatiguing Contraction**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news originating from Tempe, Arizona, by NewsRx correspondents, researchers stated “Many studies have attempted to monitor fatigue from electromyogram (EMG) signals. However, fatigue affects EMG in a subject-specific manner.”

Our news journalists obtained a quote from the research by the authors from Arizona State University, “We present here a subject-independent framework for monitoring the changes in EMG features

that accompany muscle fatigue based on principal component analysis and factor analysis. The proposed framework is based on several time-and frequency-domain features, unlike most of the existing work, which is based on two to three features. Results show that latent factors obtained from factor analysis on these features provide a robust and unified framework. This framework learns a model from EMG signals of multiple subjects, that form a reference group, and monitors the changes in EMG features during a sustained submaximal contraction on a test subject on a scale from zero to one. The framework was tested on EMG signals collected from 12 muscles of eight healthy subjects.”

According to the news editors, the researchers concluded: “The distribution of factor scores of the test subject, when mapped onto the framework was similar for both the subject-specific and subject-independent cases.”

For more information on this research see: A Subject-Independent Method for Automatically Grading Electromyographic Features During a Fatiguing Contraction. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1749-1757. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from R. Chattopadhyay, Arizona State University, Center Evolutionary Med & Informat, Biodesign Inst, Tempe, AZ 85287, United States. (2012 Jun 27)

### **China University of Science and Technology, Hefei: High-Density Myoelectric Pattern Recognition Toward Improved Stroke Rehabilitation**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating from Hefei, People’s Republic of China, by NewsRx correspondents, researchers stated “Myoelectric pattern-recognition techniques have been developed to infer user’s intention of performing different functional movements. Thus electromyogram (EMG) can be used as control signals of assisted devices for people with disabilities.”

Our news editors obtained a quote from the research by the authors from the China University of Science and Technology, “Pattern-recognition-based myoelectric control systems have rarely been designed for stroke survivors. Aiming at developing such a system for improved stroke rehabilitation, this study assessed detection of the

affected limb's movement intention using high-density surface EMG recording and pattern-recognition techniques. Surface EMG signals comprised of 89 channels were recorded from 12 hemiparetic stroke subjects while they tried to perform 20 different arm, hand, and finger/thumb movements involving the affected limb. A series of pattern-recognition algorithms were implemented to identify the intended tasks of each stroke subject. High classification accuracies (96.1% +/- 4.3%) were achieved, indicating that substantial motor control information can be extracted from paretic muscles of stroke survivors."

According to the news editors, the researchers concluded: "Such information may potentially facilitate improved stroke rehabilitation."

For more information on this research see: High-Density Myoelectric Pattern Recognition Toward Improved Stroke Rehabilitation. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1649-1657. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting X. Zhang, China University of Science & Technology, Inst Biomed Engn, Hefei 230027, People's Republic of China. (2012 Jun 27)

### **Cornell University, Ithaca: Extrapolatable Analytical Functions for Tendon Excursions and Moment Arms From Sparse Datasets**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting out of Ithaca, New York, by NewsRx editors, researchers stated "Computationally efficient modeling of complex neuromuscular systems for dynamics and control simulations often requires accurate analytical expressions for moment arms over the entire range of motion. Conventionally, polynomial expressions are regressed from experimental data."

Our news journalists obtained a quote from the research by the authors from Cornell University, "But these polynomial regressions can fail to extrapolate, may require large datasets to train, are not robust to noise, and often have numerous free parameters. We present a novel method that simultaneously estimates both the form and parameter values of arbitrary analytical expressions for tendon excursions and moment arms over the entire range of motion from sparse datasets. This symbolic regression method based on genetic programming has been shown to find the appropriate form of mathematical expressions

that capture the physics of mechanical systems. We demonstrate this method by applying it to 1) experimental data from a physical tendon-driven robotic system with arbitrarily routed multiarticular tendons and 2) synthetic data from musculoskeletal models.”

According to the news editors, the researchers concluded: “We show it outperforms polynomial regressions in the amount of training data, ability to extrapolate, robustness to noise, and representation containing fewer parameters—all critical to realistic and efficient computational modeling of complex musculoskeletal systems.”

For more information on this research see: Extrapolatable Analytical Functions for Tendon Excursions and Moment Arms From Sparse Datasets. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1572-1582. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting M.U. Kurse, Cornell University, Cornell Creat Machines Lab, Ithaca, NY 14853, United States. (2012 Jun 27)

### **Debrecen University of Medicine: An Ensemble-Based System for Microaneurysm Detection and Diabetic Retinopathy Grading**

By a News Reporter-Staff News Editor at Telemedicine Business Week – Current study results on Diabetes have been published. According to news reporting originating in Debrecen, Hungary, by NewsRx journalists, researchers stated “Reliable microaneurysm detection in digital fundus images is still an open issue in medical image processing. We propose an ensemble-based framework to improve microaneurysm detection.”

The news reporters obtained a quote from the research by the authors from the Debrecen University of Medicine, “Unlike the well-known approach of considering the output of multiple classifiers, we propose a combination of internal components of microaneurysm detectors, namely preprocessing methods and candidate extractors. We have evaluated our approach for microaneurysm detection in an online competition, where this algorithm is currently ranked as first, and also on two other databases.”

According to the news reporters, the researchers concluded: “Since microaneurysm detection is decisive in diabetic retinopathy (DR) grading, we also tested the proposed method for this task on the publicly

available Messidor database, where a promising AUC 0.90+/-0.01 is achieved in a 'DR/non-DR'-type classification."

For more information on this research see: An Ensemble-Based System for Microaneurysm Detection and Diabetic Retinopathy Grading. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1720-1726. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting B. Antal, Debrecen University Med, Fac Informat, H-4032 Debrecen, Hungary. (2012 Jun 27)

### **Hacettepe University, Ankara: Multilevel Segmentation of Histopathological Images Using Cooccurrence of Tissue Objects**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting out of Ankara, Turkey, by NewsRx editors, researchers stated "This paper presents a new approach for unsupervised segmentation of histopathological tissue images. This approach has two main contributions."

Our news journalists obtained a quote from the research by the authors from Hacettepe University, "First, it introduces a new set of high-level texture features to represent the prior knowledge of spatial organization of the tissue components. These texture features are defined on the tissue components, which are approximately represented by tissue objects, and quantify the frequency of two component types being cooccurred in a particular spatial relationship. As they are defined on components, rather than on image pixels, these object cooccurrence features are expected to be less vulnerable to noise and variations that are typically observed at the pixel level of tissue images. Second, it proposes to obtain multiple segmentations by multilevel partitioning of a graph constructed on the tissue objects and combine them by an ensemble function. This multilevel graph partitioning algorithm introduces randomization in graph construction and refinements in its multilevel scheme to increase diversity of individual segmentations, and thus, improve the final result. The experiments on 200 colon tissue images reveal that the proposed approach-the object cooccurrence features together with the multilevel segmentation algorithm-is effective to obtain high-quality results."

According to the news editors, the researchers concluded: “The experiments also show that it improves the segmentation results compared to the previous approaches.”

For more information on this research see: Multilevel Segmentation of Histopathological Images Using Cooccurrence of Tissue Objects. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1681-1690. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting A.C. Simsek, Hacettepe University, Dept. of Pathol, Sch Med, TR-06100 Ankara, Turkey. (2012 Jun 27)

### **Harvard University, Cambridge: Methods for Automated Identification of Informative Behaviors in Natural Bioptic Driving**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news originating from Cambridge, Massachusetts, by NewsRx correspondents, researchers stated “Visually impaired people may legally drive if wearing bioptic telescopes in some developed countries. To address the controversial safety issue of the practice, we have developed a low-cost in-car recording system that can be installed in study participants’ own vehicles to record their daily driving activities.”

Our news journalists obtained a quote from the research by the authors from Harvard University, “We also developed a set of automated identification techniques of informative behaviors to facilitate efficient manual review of important segments submerged in the vast amount of uncontrolled data. Here, we present the methods and quantitative results of the detection performance for six types of driving maneuvers and behaviors that are important for bioptic driving: bioptic telescope use, turns, curves, intersections, weaving, and rapid stops. The testing data were collected from one normally sighted and two visually impaired subjects across multiple days. The detection rates ranged from 82% up to 100%, and the false discovery rates ranged from 0% to 13%. In addition, two human observers were able to interpret about 80% of targets viewed through the telescope.”

According to the news editors, the researchers concluded: “These results indicate that with appropriate data processing the low-cost system is able to provide reliable data for natural bioptic driving studies.”

For more information on this research see: Methods for Automated Identification of Informative Behaviors in Natural Bioptic Driving. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1780-1786. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from G. Luo, Harvard University, Dept. of Ophthalmol, Sch Med, Cambridge, MA 02138, United States. (2012 Jun 27)

### **Indiana University School of Medicine, Indianapolis: Biodegradable Microfabricated Plug-Filters for Glaucoma Drainage Devices**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Glaucoma have been published. According to news reporting from Indianapolis, Indiana, by NewsRx journalists, researchers stated “We report on the development of a batch fabricated biodegradable truncated-cone-shaped plug filter to overcome the postoperative hypotony in nonvalved glaucoma drainage devices. Plug filters are composed of biodegradable polymers that disappear once wound healing and bleb formation has progressed past the stage where hypotony from overfiltration may cause complications in the human eye.”

The news correspondents obtained a quote from the research by the authors from the Indiana University School of Medicine, “The biodegradable nature of device eliminates the risks associated with permanent valves that may become blocked or influence the aqueous fluid flow rate in the long term. The plug-filter geometry simplifies its integration with commercial shunts. Aqueous humor outflow regulation is achieved by controlling the diameter of a laser-drilled through-hole. The batch compatible fabrication involves a modified SU-8 molding to achieve truncated-cone-shaped pillars, polydimethylsiloxane micromolding, and hot embossing of biodegradable polymers.”

According to the news reporters, the researchers concluded: “The developed plug filter is 500  $\mu\text{m}$  long with base and apex plane diameters of 500 and 300  $\mu\text{m}$ , respectively, and incorporates a laser-drilled through-hole with 44- $\mu\text{m}$  effective diameter in the center.”

For more information on this research see: Biodegradable Microfabricated Plug-Filters for Glaucoma Drainage Devices. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1507-1513. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ



08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting T. Maleki, Indiana Univ Sch Med, Dept. of Ophthalmol, Eugene & Marilyn Glick Eye Inst, Indianapolis, IN 47906, United States. (2012 Jun 27)

### **King's College, London: A Comparative Study of Graph-Based, Eikonal, and Monodomain Simulations for the Estimation of Cardiac Activation Times**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting from London, United Kingdom, by NewsRx journalists, researchers stated “The bidomain and monodomain equations are well established as the standard set of equations for the simulation of cardiac electrophysiological behavior. However, the computational cost of detailed bidomain/monodomain simulations limits their applicability in scenarios where a large number of simulations needs to be performed (e.g., parameter estimation).”

The news correspondents obtained a quote from the research by the authors from King's College, “In this study, we present a graph-based method, which relies on point-to-point path finding to estimate activation times for single points in cardiac tissue with minimal computational costs. To validate our approach, activation times are compared to monodomain simulation results for an anatomically based rabbit ventricular model, incorporating realistic fiber orientation and conduction heterogeneities. Differences in activation times between the graph-based method and monodomain results are less than 10% of the total activation time, and computational performance is orders of magnitude faster with the proposed method when calculating activation times at single points.”

According to the news reporters, the researchers concluded: “These results suggest that the graph-based method is well suited for estimating activation times when the need for fast performance justifies a limited loss of accuracy.”

For more information on this research see: A Comparative Study of Graph-Based, Eikonal, and Monodomain Simulations for the Estimation of Cardiac Activation Times. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1739-1748. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.>

ieee.org/; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting M. Wallman, Kings Coll London, Dept. of Biomed Engn, London WC2R 2LS, United Kingdom. (2012 Jun 27)

### **Massachusetts Institute of Technology, Cambridge: Electrodiffusion of Molecules in Aqueous Media: A Robust, Discretized Description for Electroporation and Other Transport Phenomena**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Cambridge, Massachusetts, by NewsRx journalists, researchers stated “Electrically driven transport of molecules and ions within aqueous electrolytes is of long-standing interest, with direct relevance to applications that include the delivery/release of biologically active solutes to/from cells and tissues. Examples include iontophoretic and electroporation-mediated drug delivery.”

The news reporters obtained a quote from the research by the authors from the Massachusetts Institute of Technology, “Here, we describe a robust method for characterizing electrodiffusive transport in physiologic aqueous media. Specifically, we treat the case of solute present in sufficiently low concentration as to negligibly contribute to the total ionic current within the system. In this limiting case, which applies to many systems of interest, the predominant electrical behavior due to small ions is decoupled from solute transport. Thus, electrical behavior may be characterized using existing methods and treated as known in characterizing electrodiffusive molecular transport. First, we present traditional continuum equations governing electrodiffusion of charged solutes within aqueous electrolytes and then adapt them to discretized systems. Second, we examine the time-dependent and steady-state interfacial concentration gradients that result from the combination of diffusion and electrical drift. Third, we show how interfacial concentration gradients are related to electric field strength and duration. Finally, we examine how discretization size affects the accuracy of these methods.”

According to the news reporters, the researchers concluded: “Overall these methods are motivated by and well suited to addressing an outstanding goal: estimation of the net ionic and molecular transport facilitated by electroporation in biological systems.”

For more information on this research see: Electrodiffusion of Molecules in Aqueous Media: A Robust, Discretized Description for Electroporation and Other Transport Phenomena. *IEEE Transactions*

on *Biomedical Engineering*, 2012;59(6):1514-1522. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting K.C. Smith, MIT, Dept. of Elect Engn & Comp Sci, Cambridge, MA 02139, United States. (2012 Jun 27)

### **McGill University, Montreal: Viscoelastic Modeling of the Contact Interaction Between a Tactile Sensor and an Atrial Tissue**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on *Biomedical Engineering* have been presented. According to news reporting originating from Montreal, Canada, by NewsRx correspondents, researchers stated “Modeling and parameter identification of soft tissue are essential in establishing an accurate contact model for tool-tissue interaction, which can be used in the development of high-fidelity surgical instruments. This paper discusses the interaction between a tissue and a tactile sensor in minimally invasive surgery, the focus being a novel technique for robotic-assisted mitral valve repair, in which tactile sensors are used to distinguish between different kinds of tissue by their relative softness.”

Our news editors obtained a quote from the research by the authors from McGill University, “A discrete viscoelastic model is selected to represent the tissue behavior. To populate the model of the tissue with actual data, a set of tissue-testing experiments is designed and implemented on the atrial tissue of a swine heart by analyzing its dynamic response. By means of a genetic algorithm, data of the complex compliance are extracted and used to find the coefficients of the model. Further, a viscoelastic contact model is developed to model the interaction between the tissue and the tactile sensor with annular shape.”

According to the news editors, the researchers concluded: “Finally, the relation among the indentation displacement, the ratio of the radii, and the applied force is established parametrically.”

For more information on this research see: Viscoelastic Modeling of the Contact Interaction Between a Tactile Sensor and an Atrial Tissue. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1727-1738. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical*

Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting J.J. Shen, McGill University, Dept. of Mech Engn, Montreal, PQ H3A 0G4, Canada. (2012 Jun 27)

### **Methodist Hospital, Houston: Embedding Topic Discovery in Conditional Random Fields Model for Segmenting Nuclei Using Multispectral Data**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news originating from Houston, Texas, by NewsRx correspondents, researchers stated “Segmentation of cells/nuclei is a challenging problem in 2-D histological and cytological images. Although a large number of algorithms have been proposed, newer efforts continue to be devoted to investigate robust models that could have high level of adaptability with regard to considerable amount of image variability.”

Our news journalists obtained a quote from the research by the authors from Methodist Hospital, “In this paper, we propose a multiclassification conditional random fields (CRFs) model using a combination of low-level cues (bottom-up) and high-level contextual information (top-down) for separating nuclei from the background. In our approach, the contextual information is extracted by an unsupervised topic discovery process, which efficiently helps to suppress segmentation errors caused by intensity inhomogeneity and variable chromatin texture. In addition, we propose a multilayer CRF, an extension of the traditional single-layer CRF, to handle high-dimensional dataset obtained through spectral microscopy, which provides combined benefits of spectroscopy and imaging microscopy, resulting in the ability to acquire spectral images of microscopic specimen. The approach is evaluated with color images, as well as spectral images. The overall accuracy of the proposed segmentation algorithm reaches 95% when applying multilayer CRF model to the spectral microscopy dataset.”

According to the news editors, the researchers concluded: “Experiments also show that our method outperforms seeded watershed, a widely used algorithm for cell segmentation.”

For more information on this research see: Embedding Topic Discovery in Conditional Random Fields Model for Segmenting Nuclei Using Multispectral Data. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1539-1549. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical

and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from X.Q. Wu, Methodist Hosp Phys Organization, Dept. of Pathol & Lab Med, Houston, TX 77030, United States. (2012 Jun 27)

### **Northwestern University, Chicago: Evaluation of a Smartphone Platform as a Wireless Interface Between Tongue Drive System and Electric-Powered Wheelchairs**

By a News Reporter-Staff News Editor at Telecommunications Business – Current study results on Biomedical Engineering have been published. According to news reporting out of Chicago, Illinois, by Vertical-News editors, researchers stated “Tongue drive system (TDS) is a new wireless assistive technology (AT) for the mobility impaired population. It provides users with the ability to drive powered wheelchairs (PWC) and access computers using their unconstrained tongue motion.”

Our news journalists obtained a quote from the research by the authors from Northwestern University, “Migration of the TDS processing unit and user interface platform from a bulky personal computer to a smartphone (iPhone) has significantly facilitated its usage by turning it into a true wireless and wearable AT. After implementation of the necessary interfacing hardware and software to allow the smartphone to act as a bridge between the TDS and PWC, the wheelchair navigation performance and associated learning was evaluated in nine able-bodied subjects in five sessions over a 5-week period. Subjects wore magnetic tongue studs over the duration of the study and drove the PWC in an obstacle course with their tongue using three different navigation strategies; namely unlatched, latched, and semiproportional. Qualitative aspects of using the TDS-iPhone-PWC interface were also evaluated via a five-point Likert scale questionnaire.”

According to the news editors, the researchers concluded: “Subjects showed more than 20% improvement in the overall completion time between the first and second sessions, and maintained a modest improvement of similar to 9% per session over the following three sessions.”

For more information on this research see: Evaluation of a Smartphone Platform as a Wireless Interface Between Tongue Drive System and Electric-Powered Wheelchairs. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1787-1796. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting J. Kim, Northwestern University, Dept. of Dermatol, Feinberg Sch Med, Chicago, IL 60208, United States. (2012 Jun 27)

### **Public University of Navarra, Pamplona: Nonstationary Harmonic Modeling for ECG Removal in Surface EMG Signals**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Pamplona, Spain, by NewsRx correspondents, researchers stated “We present a compact approach for mitigating the presence of electrocardiograms (ECG) in surface electromyographic (EMG) signals by means of time-variant harmonic modeling of the cardiac artifact. Heart rate and QRS complex variability, which often account for amplitude and frequency time variations of the ECG, are simultaneously captured by a set of third-order constant-coefficient polynomials modulating a stationary harmonic basis in the analysis window.”

Our news editors obtained a quote from the research by the authors from the Public University of Navarra, “Such a characterization allows us to significantly suppress ECG from the mixture by preserving most of the EMG signal content at low frequencies (less than 20 Hz). Moreover, the resulting model is linear in parameters and the least-squares solution to the corresponding linear system of equations efficiently provides model parameter estimates.”

According to the news editors, the researchers concluded: “The comparative results suggest that the proposed method outperforms two reference methods in terms of the EMG preservation at low frequencies.”

For more information on this research see: Nonstationary Harmonic Modeling for ECG Removal in Surface EMG Signals. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1633-1640. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting M. Zivanovic, Univ Public Navarra, Dept. of Elect Engr, Pamplona 31006, Spain. (2012 Jun 27)

## **Singapore National University Hospital: A Multiscale Model for Bioimpedance Dispersion of Liver Tissue**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting out of Singapore, Singapore, by NewsRx editors, researchers stated “Radio-frequency ablation (RFA) has been used in liver surgery to minimize blood loss during tissue division. However, the current RFA tissue division method lacks an effective way of determining the stoppage of blood flow.”

Our news journalists obtained a quote from the research by the authors from Singapore National University Hospital, “There is limitation on the current state-of-the-art laser Doppler flow sensor due to its small sensing area. A new technique was proposed to use bioimpedance for blood flow sensing. This paper discusses a new geometrical multiscale model of the liver bioimpedance incorporating blood flow impedance. This model establishes correlation between the physical tissue structure and bioimpedance measurement. The basic Debye structure within a multilevel framework is used in the model to account for bioimpedance dispersion. This dispersion is often explained by the Cole-Cole model that includes a constant phase element without physical explanation. Our model is able to account for reduced blood flow in its output with changes in permittivity in gamma dispersion that is mainly due to the polarization of water molecules.”

According to the news editors, the researchers concluded: “This study demonstrates the potential of a multiscale model in determining the stoppage of blood flow during surgery.”

For more information on this research see: A Multiscale Model for Bioimpedance Dispersion of Liver Tissue. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1593-1597. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting W.H. Huang, Singapore National University Hospital, Dept. of Surg, Singapore 119074, Singapore. (2012 Jun 27)

## Swiss Federal Institute of Technology, Zurich: Phantom Model of Physiologic Intracranial Pressure and Cerebrospinal Fluid Dynamics

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Zurich, Switzerland, by NewsRx correspondents, researchers stated “We describe herein a novel life-size phantom model of the intracranial cavity and its validation. The cerebrospinal fluid (CSF) domains including ventricular, cysternal, and subarachnoid spaces were derived via magnetic resonance imaging.”

Our news editors obtained a quote from the research by the authors from the Swiss Federal Institute of Technology, “Brain mechanical properties and cranio-spinal compliance were set based on published data. Both bulk and pulsatile physiologic CSF flow were modeled. Model validation was carried out by comparisons of flow and pressure measurements in the phantom with published in vivo data of healthy subjects. Physiologic intracranial pressure with 10 mmHg mean and 0.4 mmHg peak pulse amplitude was recorded in the ventricles. Peak CSF flow rates of 0.2 and 2 ml/s were measured in the cerebral aqueduct and subarachnoid space, respectively. The phantom constitutes a first-of-its-kind approach to modeling physiologic intracranial dynamics in vitro.”

According to the news editors, the researchers concluded: “Herein, we describe the phantom design and manufacturing, definition and implementation of its operating parameters, as well as the validation of the modeled dynamics.”

For more information on this research see: Phantom Model of Physiologic Intracranial Pressure and Cerebrospinal Fluid Dynamics. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1532-1538. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting S. Botta, ETH, Lab Thermodynam Emerging Technol, Dept. of Mech & Proc Engr, CH-8092 Zurich, Switzerland. (2012 Jun 27)



## **University College London: A Simulation Study of the Combined Thermoelectric Extracellular Stimulation of the Sciatic Nerve of the *Xenopus Laevis*: The Localized Transient Heat Block**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in London, United Kingdom, by NewsRx journalists, researchers stated “The electrical behavior of the *Xenopus laevis* nerve fibers was studied when combined electrical (cuff electrodes) and optical (infrared laser, low power sub-5 mW) stimulations are applied. Assuming that the main effect of the laser irradiation on the nerve tissue is the localized temperature increase, this paper analyzes and gives new insights into the function of the combined thermoelectric stimulation on both excitation and blocking of the nerve action potentials (AP).”

The news reporters obtained a quote from the research by the authors from University College London, “The calculations involve a finite-element model (COMSOL) to represent the electrical properties of the nerve and cuff. Electric-field distribution along the nerve was computed for the given stimulation current profile and imported into a NEURON model, which was built to simulate the electrical behavior of myelinated nerve fiber under extracellular stimulation. The main result of this study of combined thermoelectric stimulation showed that local temperature increase, for the given electric field, can create a transient block of both the generation and propagation of the APs.”

According to the news reporters, the researchers concluded: “Some preliminary experimental data in support of this conclusion are also shown.”

For more information on this research see: A Simulation Study of the Combined Thermoelectric Extracellular Stimulation of the Sciatic Nerve of the *Xenopus Laevis*: The Localized Transient Heat Block. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1758-1769. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting Z.X. Mou, UCL, Dept. of Elect & Elect Engn, London WC1E 6EZ, United Kingdom. (2012 Jun 27)

## University of Florida, Gainesville: Time-Based Compression and Classification of Heartbeats

By a News Reporter-Staff News Editor at Telecommunications Business – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Gainesville, Florida, by VerticalNews editors, researchers stated “Heart function measured by electrocardiograms (ECG) is crucial for patient care. ECG generated waveforms are used to find patterns of irregularities in cardiac cycles in patients.”

Our news journalists obtained a quote from the research by the authors from the University of Florida, “In many cases, irregularities evolve over an extended period of time that requires continuous monitoring. However, this requires wireless ECG recording devices. These devices consist of an enclosed system that includes electrodes, processing circuitry, and a wireless communication block imposing constraints on area, power, bandwidth, and resolution. In order to provide continuous monitoring of cardiac functions for real-time diagnostics, we propose a methodology that combines compression and analysis of heartbeats. The signal encoding scheme is the time-based integrate and fire sampler. The diagnostics can be performed directly on the samples avoiding reconstruction required by the competing finite rate of innovation and compressed sensing. As an added benefit, our scheme provides an efficient hardware implementation and a compressed representation for the ECG recordings, while still preserving discriminative features. We demonstrate the performance of our approach through a heartbeat classification application consisting of normal and irregular heartbeats known as arrhythmia.”

According to the news editors, the researchers concluded: “Our approach that uses simple features extracted from ECG signals is comparable to results in the published literature.”

For more information on this research see: Time-Based Compression and Classification of Heartbeats. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1641-1648. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting A.S. Alvarado, University of Florida, Univ Florida Computat Neuroengn Lab, Gainesville, FL 32611, United States. (2012 Jun 27)

## Aravind Eye Hospital, Tamil Nadu: Depth Discontinuity-Based Cup Segmentation From Multiview Color Retinal Images

By a News Reporter-Staff News Editor at Information Technology Newsweekly – Investigators publish new report on Biomedical Engineering. According to news originating from Tamil Nadu, India, by VerticalNews correspondents, researchers stated “Accurate segmentation of the cup region from retinal images is needed to derive relevant measurements for glaucoma assessment. Anovel, depth discontinuity (in the retinal surface)-based approach to estimate the cup boundary is proposed in this paper.”

Our news journalists obtained a quote from the research by the authors from Aravind Eye Hospital, “The proposed approach shifts focus from the cup region used by existing approaches to cup boundary. The given set of images, acquired sequentially, are related via a relative motion model and the depth discontinuity at the cup boundary is determined from cues such as motion boundary and partial occlusion. The information encoded by these cues is used to approximate the cup boundary with a set of best-fitting circles. The final boundary is found by considering points on these circles at different sectors using a confidence measure. Four different kinds of data sets ranging from synthetic to real image pairs, covering different multiview scenarios, have been used to evaluate the proposed method. The proposed method was found to yield an error reduction of 16% for cup-to-disk vertical diameter ratio (CDR) and 13% for cup-to-disk area ratio (CAR) estimation, over an existing monocular image-based cup segmentation method.”

According to the news editors, the researchers concluded: “The error reduction increased to 33% in CDR and 18% in CAR with the addition of a third view (image) which indicates the potential of the proposed approach.”

For more information on this research see: Depth Discontinuity-Based Cup Segmentation From Multiview Color Retinal Images. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1523-1531. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news correspondents report that additional information may be obtained from G.D. Joshi, Aravind Eye Hosp, Madurai 625020, Tamil Nadu, India. (2012 Jun 26)

## **Ottawa Hospital Research Institute: Filter-Based Methodology for the Location of Hot Spots in Proteins and Exons in DNA**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Biomedical Engineering. According to news reporting originating in Ottawa, Canada, by NewsRx journalists, researchers stated “The so-called receiver operating characteristic technique is used as a tool in an optimization procedure for the improvement and assessment of a filter-based methodology for the location of hot spots in protein sequences and exons in DNA sequences.”

The news reporters obtained a quote from the research by the authors from Ottawa Hospital Research Institute, “By optimizing the characteristic values of the nucleotides, high efficiency as well as improved accuracy can be achieved relative to results obtained with the electron-ion interaction potentials. On the other hand, by using the proposed filter-based methodology with binary sequences, improved accuracy can be achieved although the efficiency is somewhat compromised relative to that achieved using the optimized characteristic values.”

According to the news reporters, the researchers concluded: “Extensive experimental results, evaluated using measures such as the g-mean, the Matthews correlation coefficient, and the chi-square statistic, show that the filter-based methodology performs much better than existing techniques using the short-time discrete Fourier transform, particularly in applications where short exons are involved.”

For more information on this research see: Filter-Based Methodology for the Location of Hot Spots in Proteins and Exons in DNA. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1598-1609. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news correspondents report that additional information may be obtained by contacting P. Ramachandran, Ottawa Hosp Res Inst, Ottawa, ON K1H 8L6, Canada. (2012 Jun 26)

## **University of California, Santa Cruz: Redundancy Resolution of the Human Arm and an Upper Limb Exoskeleton**

By a News Reporter-Staff News Editor at Technology Business Journal – Investigators publish new report on Robotics. According to news reporting originating from Santa Cruz, California, by VerticalNews correspondents, researchers stated “The human arm has 7 degrees of freedom (DOF) while only 6 DOF are required to position the wrist and orient the palm. Thus, the inverse kinematics of an human arm has a nonunique solution.”

Our news editors obtained a quote from the research by the authors from the University of California, “Resolving this redundancy becomes critical as the human interacts with a wearable robot and the inverse kinematics solution of these two coupled systems must be identical to guarantee a seamless integration. The redundancy of the arm can be formulated by defining the swivel angle, the rotation angle of the plane defined by the upper and lower arm around a virtual axis that connects the shoulder and wrist joints. Analyzing reaching tasks recorded with a motion capture system indicates that the swivel angle is selected such that when the elbow joint is flexed, the palm points to the head. Based on these experimental results, a new criterion is formed to resolve the human arm redundancy. This criterion was implemented into the control algorithm of an upper limb 7-DOF wearable robot.”

According to the news editors, the researchers concluded: “Experimental results indicate that by using the proposed redundancy resolution criterion, the error between the predicted and the actual swivel angle adopted by the motor control system is less than 5 degrees.”

For more information on this research see: Redundancy Resolution of the Human Arm and an Upper Limb Exoskeleton. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1770-1779. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting H. Kim, University of California, Bion Lab, Santa Cruz, CA 95064, United States. (2012 Jun 26)

## University of Texas, Houston: Generating Stochastic Gene Regulatory Networks Consistent With Pathway Information and Steady-State Behavior

By a News Reporter-Staff News Editor at Life Science Weekly – Researchers detail new data in Biomedical Engineering. According to news reporting out of Houston, Texas, by NewsRx editors, researchers stated “We present a procedure to generate a stochastic genetic regulatory network model consistent with pathway information. Using the stochastic dynamics of Markov chains, we produce a model constrained by the prior knowledge despite the sometimes incomplete, time independent, and often conflicting nature of these pathways.”

Our news journalists obtained a quote from the research by the authors from the University of Texas, “We apply the Markov theory to study the model’s long run behavior and introduce a biologically important transformation to aid in comparison with real biological outcome prediction in the steady-state domain. Our technique produces biologically faithful models without the need for rate kinetics, detailed timing information, or complex inference procedures.”

According to the news editors, the researchers concluded: “To demonstrate the method, we produce a model using 28 pathways from the biological literature pertaining to the transcription factor family nuclear factor-kappa B. Predictions from this model in the steady-state domain are then validated against nine mice knockout experiments.”

For more information on this research see: Generating Stochastic Gene Regulatory Networks Consistent With Pathway Information and Steady-State Behavior. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1701-1710. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting J.M. Knight, Univ Texas MD Anderson Canc Center, Dept. of Bioinformat & Computat Biol, Houston, TX 77030, United States. (2012 Jun 26)

## University of Pavia: Neural Network Incorporating Meal Information Improves Accuracy of Short-Time Prediction of Glucose Concentration

By a News Reporter-Staff News Editor at Internet Networks & Communications – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Pavia, Italy, by VerticalNews correspondents, researchers stated “Diabetes mellitus is one of the most common chronic diseases, and a clinically important task in its management is the prevention of hypo/hyperglycemic events. This can be achieved by exploiting continuous glucose monitoring (CGM) devices and suitable short-term prediction algorithms able to infer future glycemia in real time.”

Our news editors obtained a quote from the research by the authors from the University of Pavia, “In the literature, several methods for short-time glucose prediction have been proposed, most of which do not exploit information on meals, and use past CGM readings only. In this paper, we propose an algorithm for short-time glucose prediction using past CGM sensor readings and information on carbohydrate intake. The predictor combines a neural network (NN) model and a first-order polynomial extrapolation algorithm, used in parallel to describe, respectively, the nonlinear and the linear components of glucose dynamics. Information on the glucose rate of appearance after a meal is described by a previously published physiological model. The method is assessed on 20 simulated datasets and on 9 real Abbott FreeStyle Navigator datasets, and its performance is successfully compared with that of a recently proposed NN glucose predictor.”

According to the news editors, the researchers concluded: “Results suggest that exploiting meal information improves the accuracy of short-time glucose prediction.”

For more information on this research see: Neural Network Incorporating Meal Information Improves Accuracy of Short-Time Prediction of Glucose Concentration. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1550-1560. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; *IEEE Transactions on Biomedical Engineering* - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

The news editors report that additional information may be obtained by contacting C. Zecchin, University of Pavia, Dept. of Comp & Syst Sci, I-27100 Pavia, Italy. (2012 Jun 25)

## University of Rostock: Modeling the Field Distribution in Deep Brain Stimulation: The Influence of Anisotropy of Brain Tissue

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – A new study on Central Nervous System is now available. According to news reporting from Rostock, Germany, by NewsRx journalists, researchers stated “The neurosurgical method of deep brain stimulation (DBS) is used to treat symptoms of movement disorders like Parkinson’s disease by implanting stimulation electrodes in deep brain areas. The aim of this study was to examine the field distribution in DBS and the role of heterogeneous and anisotropic material properties in the brain areas where stimulation is applied.”

The news correspondents obtained a quote from the research by the authors from the University of Rostock, “Finite element models of the human brain were developed comprising tissue heterogeneity and anisotropy. The tissue data were derived from averaged magnetic resonance imaging and diffusion tensor imaging datasets. Unilateral stimulation of the subthalamic nucleus (STN) was computed using an accurate model of an electrode used in clinical treatment of DBS extended with an encapsulation layer around the electrode body. Computations of anisotropic and isotropic brain models, which consider resistive tissue properties for unipolar and bipolar electrode configurations, were carried out. Electrode position was varied within an area around the stimulation center. Results have shown a deviation of 2% between anisotropic and isotropic field distributions in the vicinity of the STN.”

According to the news reporters, the researchers concluded: “The sensitivity of this deviation referring to the electrode position remained small, but increased when the electrode position approached areas of high anisotropy.”

For more information on this research see: Modeling the Field Distribution in Deep Brain Stimulation: The Influence of Anisotropy of Brain Tissue. *IEEE Transactions on Biomedical Engineering*, 2012;59(6):1583-1592. *IEEE Transactions on Biomedical Engineering* can be contacted at: Ieee-Inst Electrical Electronics Engineers Inc, 445 Hoes Lane, Piscataway, NJ 08855-4141, USA. (Institute of Electrical and Electronics Engineers - <http://www.ieee.org/>; IEEE Transactions on Biomedical Engineering - <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10>)

Our news journalists report that additional information may be obtained by contacting C. Schmidt, University of Rostock, Inst Gen Elect Engn, D-18057 Rostock, Germany. (2012 Jun 25)



## Ohio State University, Columbus: Three-dimensional finite element analysis of Eustachian tube function under normal and pathological conditions

By a News Reporter-Staff News Editor at Pediatrics Week – Investigators discuss new findings in Cleft Palate. According to news reporting from Columbus, Ohio, by VerticalNews journalists, researchers stated “A primary etiological factor underlying chronic middle ear disease is an inability to open the collapsible Eustachian tube (ET). However, the structure-function relationships responsible for ET dysfunction in patient populations at risk for developing otitis media (OM) are not known.”

The news correspondents obtained a quote from the research by the authors from Ohio State University, “In this study, three-dimensional (3D) finite element (FE) modeling techniques were used to investigate how changes in biomechanical and anatomical properties influence opening phenomena in three populations: normal adults, young children and infants with cleft palate. Histological data was used to create anatomically accurate models and FE techniques were used to simulate tissue deformation and ET opening. Lumen dilation was quantified using a computational fluid dynamic (CFD) technique and a sensitivity analysis was performed to ascertain the relative importance of the different anatomical and tissue mechanical properties. Results for adults suggest that ET function is highly sensitive to tensor veli palatini muscle (TVPM) forces and to periluminal mucosal tissue (PMT) elasticity. Young children and cleft palate subjects exhibited reduced sensitivity to TVPM forces while changes in PMT stiffness continued to have a significant impact on ET function. These results suggest that reducing PMT stiffness might be an effective way to restore ET function in these populations. Varying TVPM force vector relationships via changes in hamulus location had no effect on ET opening in young children and cleft palate subjects but did alter force transmission to the ET lumen during conditions of elevated adhesion.”

According to the news reporters, the researchers concluded: “These models have therefore provided important new insights into the biomechanical mechanisms responsible for ET dysfunction.”

For more information on this research see: Three-dimensional finite element analysis of Eustachian tube function under normal and pathological conditions. *Medical Engineering & Physics*, 2012;34(5):605-16. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting F.J. Sheer, Dept. of Mechanical Engineering, The Ohio State University, Columbus, OH 43210, United States. (2012 Jun 23)

**University of Michigan, Ann Arbor: Development and validation of a modified Hybrid-III six-year-old dummy model for simulating submarining in motor-vehicle crashes**

By a News Reporter-Staff News Editor at Journal of Transportation – Investigators publish new report on Medical Engineering and Physics. According to news originating from Ann Arbor, Michigan, by VerticalNews correspondents, researchers stated “In motor-vehicle crashes, young school-aged children restrained by vehicle seat belt systems often suffer from abdominal injuries due to submarining. However, the current anthropomorphic test device, so-called ‘crash dummy’, is not adequate for proper simulation of submarining.”

Our news journalists obtained a quote from the research by the authors from the University of Michigan, “In this study, a modified Hybrid-III six-year-old dummy model capable of simulating and predicting submarining was developed using MADYMO (TNO Automotive Safety Solutions). The model incorporated improved pelvis and abdomen geometry and properties previously tested in a modified physical dummy. The model was calibrated and validated against four sled tests under two test conditions with and without submarining using a multi-objective optimization method. A sensitivity analysis using this validated child dummy model showed that dummy knee excursion, torso rotation angle, and the difference between head and knee excursions were good predictors for submarining status.”

According to the news editors, the researchers concluded: “It was also shown that restraint system design variables, such as lap belt angle, D-ring height, and seat coefficient of friction (COF), may have opposite effects on head and abdomen injury risks; therefore child dummies and dummy models capable of simulating submarining are crucial for future restraint system design optimization for young school-aged children.”

For more information on this research see: Development and validation of a modified Hybrid-III six-year-old dummy model for simulating submarining in motor-vehicle crashes. *Medical Engineering & Physics*, 2012;34(5):541-51. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from J. Hu, University of Michigan Transportation Research Institute, Ann Arbor, MI 48109, United States. (2012 Jun 23)

## **Cracow University of Technology, Krakow: Equivalence of mean intercept length and gradient fabric tensors - 3d study**

By a News Reporter-Staff News Editor at Health & Medicine Week – Research findings on Medical Engineering and Physics are discussed in a new report. According to news reporting from Krakow, Poland, by NewsRx editors, the researcher stated “In this study the relationship between the mean intercept length (MIL) method -the current standard histomorphometric method of assessing structural anisotropy and an alternative method of the gray-level structure tensor (GST) is investigated. Both methods are applied to a set of 25 three-dimensional binary CT images of trabecular bone.”

The news correspondents obtained a quote from the research by the author from the Cracow University of Technology, “It is shown that there is a very strong correlation between the logarithms of the principal values of the MIL and the GST fabric tensors (Pearson’s coefficient of correlation higher than 0.98) and between the logarithms of the invariants of the MIL and the GST fabric tensors (Pearson’s coefficient of correlation higher than 0.999). There is also a good correlation between the degree of anisotropy calculated from the MIL and from the GST tensors (Pearson’s coefficient of correlation equal to 0.90). The principal anisotropy directions of the MIL and the GST fabric tensors coincide at the 5% significance level.”

According to the news reporters, the researchers concluded: “Additionally, the performance of both methods is tested, based on a set of artificial structures with prescribed orientations.”

For more information on this research see: Equivalence of mean intercept length and gradient fabric tensors - 3d study. *Medical Engineering & Physics*, 2012;34(5):598-604. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting Z. Tabor, Institute of Applied Informatics, Cracow University of Technology, Al Jana Pawla II 37, 31-864 Cracow, Poland. (2012 Jun 22)

**Logan University, Chesterfield: Progressive disc degeneration at C5-C6 segment affects the mechanics between disc heights and posterior facets above and below the degenerated segment: A flexion-extension investigation using a poroelastic C3-T1 finite element model**

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Medical Engineering and Physics is the subject of a report. According to news reporting originating from Chesterfield, Missouri, by NewsRx correspondents, researchers stated “Disc degeneration (DD) is often accompanied by a height reduction of the anterior and posterior discs (AD and PD, respectively), and this affect the way in which articulating posterior facets (PFs) come into contact during physiological motions. Any increase in the contact between overlapping articulating facet surfaces increases PF loading.”

Our news editors obtained a quote from the research by the authors from Logan University, “Development of adjacent segment disease is a significant clinical concern. It still is not clear how degenerative motion changes in AD and PD heights affect the mechanics of adjacent segment discs and facets. We hypothesized that changes in axial height patterns (in the AD and PD) at the degenerated C5-C6 disc-segment would affect axial height patterns (in the AD and PD) above and below the degenerated disc-segment. A previously validated poroelastic three-dimensional finite element (FE) model of a normal C3-T1 segment was used. Two additional C3-T1 models were built with moderate and severe DD at C5-C6. The three FE models were evaluated in flexion and extension. With progressive C5-C6 DD, AD and PD flexibility (axial deformation or elongation per unit load) at C5-C6 decrease with a compensatory corresponding flexibility increase in adjacent segments (normal), whereas PF loading increased at all segments only during extension. Changes in AD and PD flexibility and PF loading were higher at inferior segments than at superior segments. This study confirmed the hypothesis that the anterior and posterior discs and articulating facets of cervical spine segments are affected during flexion and extension motions when a disc-segment degenerates. Motion changes involving a higher PD height loss, both at the degenerated and adjacent segments, would further increase PF loading along the posterior spinal column -a possible mechanism for the dysfunctioning of the facet joints.”

According to the news editors, the researchers concluded: “The current data should be compared to other multi-segmental cervical spine experiments.”

For more information on this research see: Progressive disc degeneration at C5-C6 segment affects the mechanics between disc heights and posterior facets above and below the degenerated segment: A flexion-extension investigation using a poroelastic C3-T1 finite element

model. *Medical Engineering & Physics*, 2012;34(5):552-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting M. Hussain, Division of Research, Logan University, Chesterfield, MO 63017, United States. (2012 Jun 22)

### **Teikyo University, Tokyo: A new method for long-term home monitoring of fetal movement by pregnant women themselves**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Medical Engineering and Physics. According to news originating from Tokyo, Japan, by NewsRx correspondents, researchers stated “Fetal movement is one index of fetal well-being. We designed and built a new recorder based on fetal movement acceleration measurement (FMAM).”

Our news journalists obtained a quote from the research by the authors from Teikyo University, “The FMAM recorder has a newly developed, capacitive acceleration sensor that can detect the oscillations of the maternal abdominal wall caused by fetal movements. In this study, the recorder was examined for its suitability for long-term home monitoring of fetal movement by pregnant women themselves. Experiment I: Fourteen pregnant women underwent 45 examinations in the laboratory at gestational 20-39 weeks. We simultaneously recorded fetal movement as detected by the recorder, ultrasonography, and maternal perception, and then calculated agreement among the three methods. We evaluated agreement using prevalence-adjusted bias-adjusted kappa (PABAK). Agreement for gross fetal movement as detected by FMAM and ultrasonography was substantial or almost perfect, while agreement between maternal perception and ultrasonography was moderate or substantial. Experiment II: Six pregnant women undertook 53 experiments at home by themselves. Fetal movement during maternal nocturnal sleep was successfully recorded 50 out of 53 times at home.”

According to the news editors, the researchers concluded: “There was high agreement for gross fetal movement between FMAM and ultrasonography. The recorder is promising for objective, accurate, and long-term home monitoring of gross fetal movement by pregnant women themselves.”

For more information on this research see: A new method for long-term home monitoring of fetal movement by pregnant women themselves. *Medical Engineering & Physics*, 2012;34(5):566-72. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from E. Ryo, Dept. of Obstetrics and Gynecology, Teikyo University, School of Medicine, 2-1-11, Kaga, Itabashi-ku, Tokyo 173-8606, Japan. (2012 Jun 22)

### **University of Maryland School of Medicine, Baltimore: A review of wearable sensors and systems with application in rehabilitation**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Neuroengineering have been published. According to news reporting from Baltimore, Maryland, by NewsRx journalists, researchers stated “ The aim of this review paper is to summarize recent developments in the field of wearable sensors and systems that are relevant to the field of rehabilitation. The growing body of work focused on the application of wearable technology to monitor older adults and subjects with chronic conditions in the home and community settings justifies the emphasis of this review paper on summarizing clinical applications of wearable technology currently undergoing assessment rather than describing the development of new wearable sensors and systems.”

The news correspondents obtained a quote from the research by the authors from the University of Maryland School of Medicine, “A short description of key enabling technologies (i.e. sensor technology, communication technology, and data analysis techniques) that have allowed researchers to implement wearable systems is followed by a detailed description of major areas of application of wearable technology. Applications described in this review paper include those that focus on health and wellness, safety, home rehabilitation, assessment of treatment efficacy, and early detection of disorders. The integration of wearable and ambient sensors is discussed in the context of achieving home monitoring of older adults and subjects with chronic conditions.”

According to the news reporters, the researchers concluded: “Future work required to advance the field toward clinical deployment of wearable sensors and systems is discussed.”

For more information on this research see: A review of wearable sensors and systems with application in rehabilitation. *Journal of Neuroengineering and Rehabilitation*, 2012;9(0):21. (BioMed Central - <http://www.biomedcentral.com/>; Journal of Neuroengineering and Rehabilitation - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

Our news journalists report that additional information may be obtained by contacting S. Patel, Dept. of Physical Therapy and Rehabilitation Science, University of Maryland School of Medicine, Baltimore, MD, United States. (2012 Jun 22)

### **Aalborg University: Automated sleep breath disorders detection utilizing patient sound analysis**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Signal Processing is now available. According to news reporting originating from Aalborg, Denmark, by NewsRx correspondents, researchers stated “Results of clinical studies suggest that there is a relationship between breathing-related sleep disorders and behavioral disorder and health effects. Apnea is considered one of the major sleep disorders with great accession in population and significant impact on patient’s health.”

Our news editors obtained a quote from the research by the authors from Aalborg University, “Symptoms include disruption of oxygenation, snoring, choking sensations, apneic episodes, poor concentration, memory loss, and daytime somnolence. Diagnosis of apnea and breath disorders involves monitoring patient’s biosignals and breath during sleep in specialized clinics requiring expensive equipment and technical personnel. This paper discusses the design and technical details of an integrated low-cost system capable for preliminary detection of sleep breath disorders at patient’s home utilizing patient sound signals.”

According to the news editors, the researchers concluded: “The paper describes the proposed architecture and the corresponding HW and SW modules, along with a preliminary evaluation.”

For more information on this research see: Automated sleep breath disorders detection utilizing patient sound analysis. *Biomedical Signal Processing and Control*, 2012;7(3):256-264. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news editors report that additional information may be obtained by contacting C. Doukas, University of Aalborg, Aalborg, Denmark. (2012 Jun 20)

### **Institute of Chemical Kinetics and Combustion, Novosibirsk: Light-scattering flow cytometry for identification and characterization of blood microparticles**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Cytometry. According to news reporting originating in Novosibirsk, Russia, by NewsRx journalists, researchers stated “We describe a novel approach to study blood microparticles using the scanning flow cytometer, which measures light scattering patterns (LSPs) of individual particles. Starting from platelet-rich plasma,

we separated spherical microparticles from non-spherical plasma constituents, such as platelets and cell debris, based on similarity of their LSP to that of sphere.”

The news reporters obtained a quote from the research by the authors from the Institute of Chemical Kinetics and Combustion, “This provides a label-free method for identification (detection) of microparticles, including those larger than 1 [micro sign]m. Next, we rigorously characterized each measured particle, determining its size and refractive index including errors of these estimates. Finally, we employed a deconvolution algorithm to determine size and refractive index distributions of the whole population of microparticles, accounting for largely different reliability of individual measurements. Developed methods were tested on a blood sample of a healthy donor, resulting in good agreement with literature data.”

According to the news reporters, the researchers concluded: “The only limitation of this approach is size detection limit, which is currently about 0.5 [micro sign]m due to used laser wavelength of 0.66 [micro sign]m.”

For more information on this research see: Light-scattering flow cytometry for identification and characterization of blood microparticles. *Journal of Biomedical Optics*, 2012;17(5):057006.

Our news correspondents report that additional information may be obtained by contacting A.I. Konokhova, Institute of Chemical Kinetics and Combustion SB RAS, Institutskaya 3, 630090, Novosibirsk, Russia. (2012 Jun 20)

### **Physikalisch-Technische Bundesanstalt, Berlin: Separation of indocyanine green boluses in the human brain and scalp based on time-resolved in-vivo fluorescence measurements**

By a News Reporter-Staff News Editor at Biotech Week – New research on Central Nervous System is the subject of a report. According to news reporting originating in Berlin, Germany, by NewsRx journalists, researchers stated “Non-invasive detection of fluorescence from the optical tracer indocyanine green is feasible in the adult human brain when employing a time-domain technique with picosecond resolution. A fluorescence-based assessment may offer higher signal-to-noise ratio when compared to bolus tracking relying on changes in time-resolved diffuse reflectance.”

The news reporters obtained a quote from the research by the authors from Physikalisch-Technische Bundesanstalt, “The essential challenge is to discriminate the fluorescence originating from the brain from contamination by extracerebral fluorescence and hence to reconstruct



the bolus kinetics; however, a method to reliably perform the necessary separation is missing. We present a novel approach for the decomposition of the fluorescence contributions from the two tissue compartments. The corresponding sensitivity functions pertaining to the brain and to the extracerebral compartment are directly derived from the in-vivo measurement. This is achieved by assuming that during the initial and the late phase of bolus transit the fluorescence signal originates largely from one of the compartments. Solving the system of linear equations allows one to approximate time courses of a bolus for each compartment. We applied this method to repetitive measurements on two healthy subjects with an overall 34 boluses.”

According to the news reporters, the researchers concluded: “A reconstruction of the bolus kinetics was possible in 62% of all cases.”

For more information on this research see: Separation of indocyanine green boluses in the human brain and scalp based on time-resolved in-vivo fluorescence measurements. *Journal of Biomedical Optics*, 2012;17(5):057003.

Our news correspondents report that additional information may be obtained by contacting A. Jelzow, Physikalisch-Technische Bundesanstalt (PTB), Abbestrasse 2-12, 10587 Berlin, Germany. (2012 Jun 20)

### **Polish Academy of Sciences, Warsaw: Determination of absorption changes from moments of distributions of times of flight of photons: optimization of measurement conditions for a two-layered tissue model**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Optics are presented in a new report. According to news reporting from Warsaw, Poland, by NewsRx journalists, researchers stated “Time-resolved near-infrared spectroscopy allows for depth-selective determination of absorption changes in the adult human head that facilitates separation between cerebral and extra-cerebral responses to brain activation. The aim of the present work is to analyze which combinations of moments of measured distributions of times of flight (DTOF) of photons and source-detector separations are optimal for the reconstruction of absorption changes in a two-layered tissue model corresponding to extra-and intra-cerebral compartments.”

The news correspondents obtained a quote from the research by the authors from the Polish Academy of Sciences, “To this end we calculated the standard deviations of the derived absorption changes in both layers by considering photon noise and a linear relation between the absorption changes and the DTOF moments. The results show that the standard deviation of the absorption change in the deeper (superficial)

layer increases (decreases) with the thickness of the superficial layer. It is confirmed that for the deeper layer the use of higher moments, in particular the variance of the DTOF, leads to an improvement. For example, when measurements at four different source-detector separations between 8 and 35 mm are available and a realistic thickness of the upper layer of 12 mm is assumed, the inclusion of the change in mean time of flight, in addition to the change in attenuation, leads to a reduction of the standard deviation of the absorption change in the deeper tissue layer by a factor of 2.5.”

According to the news reporters, the researchers concluded: “A reduction by another 4% can be achieved by additionally including the change in variance.”

For more information on this research see: Determination of absorption changes from moments of distributions of times of flight of photons: optimization of measurement conditions for a two-layered tissue model. *Journal of Biomedical Optics*, 2012;17(5):057005.

Our news journalists report that additional information may be obtained by contacting A. Liebert, Nalecz Institute of Biocybernetics and Biomedical Engineering, Polish Academy of Sciences, Trojdena 4, 02-109 Warsaw, Poland. (2012 Jun 20)

### **State University of New Jersey, Piscataway: Relating biceps EMG to elbow kinematics during self-paced arm flexions**

By a News Reporter-Staff News Editor at Journal of Engineering – Researchers detail new data in Medical Engineering and Physics. According to news originating from Piscataway, New Jersey, by VerticalNews correspondents, researchers stated “Repetitive reaching movements to a fixed target can be generally characterized by bell-shaped velocity profiles and sigmoidal trajectories with variable morphologies across multiple repetitions. A neuromuscular correspondence of these kinematic variations has thus far eluded electromyographic (EMG) analysis.”

Our news journalists obtained a quote from the research by the authors from the State University of New Jersey, “We recorded EMG and elbow kinematics from fourteen healthy individuals performing repetitive, self-paced, isolated elbow flexions, with their arms supported against gravity. The global kinematic pattern of each flexion was classified as either sigmoidal (S) or non-sigmoidal (NS), based on goodness of fit with analytical curves. Ten of the fourteen subjects generated an approximately equal number of S and NS types (383 movement cycles). Trajectories of the other four subjects were not classifiable or did not vary sufficiently and were excluded from subsequent analysis. A post hoc predictor of trajectory type was derived by testing linear support vector machines trained with a strategically selected 3-feature

sub-space of the early phase of enveloped biceps EMG during a leave-one-out cross-validation paradigm. EMG features predicted kinematic morphology with sensitivity and specificity both exceeding 80%.”

According to the news editors, the researchers concluded: “The high predictive accuracy suggests neuromotor signals coding for subtle variations in elbow kinematics during self-paced, unloaded motions, can be deciphered from the biceps EMG.”

For more information on this research see: Relating biceps EMG to elbow kinematics during self-paced arm flexions. *Medical Engineering & Physics*, 2012;34(5):617-24. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from G.S. Natarajan, Dept. of Biomedical Engineering, Rutgers, The State University of New Jersey, Piscataway, NJ 08854, United States. (2012 Jun 20)

### **Tokyo Medical and Dental University: Quantitative analysis of optical properties of flowing blood using a photon-cell interactive Monte Carlo code: effects of red blood cells' orientation on light scattering**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Optics are discussed in a new report. According to news reporting originating from Tokyo, Japan, by NewsRx correspondents, researchers stated “Optical properties of flowing blood were analyzed using a photon-cell interactive Monte Carlo (pciMC) model with the physical properties of the flowing red blood cells (RBCs) such as cell size, shape, refractive index, distribution, and orientation as the parameters. The scattering of light by flowing blood at the He-Ne laser wavelength of 632.8 nm was significantly affected by the shear rate.”

Our news editors obtained a quote from the research by the authors from Tokyo Medical and Dental University, “The light was scattered more in the direction of flow as the flow rate increased. Therefore, the light intensity transmitted forward in the direction perpendicular to flow axis decreased. The pciMC model can duplicate the changes in the photon propagation due to moving RBCs with various orientations. The resulting RBC's orientation that best simulated the experimental results was with their long axis perpendicular to the direction of blood flow. Moreover, the scattering probability was dependent on the orientation of the RBCs. Finally, the pciMC code was used to predict the hematocrit of flowing blood with accuracy of approximately 1.0 HCT%.”

According to the news editors, the researchers concluded: “The photon-cell interactive Monte Carlo (pciMC) model can provide optical properties of flowing blood and will facilitate the development of

the non-invasive monitoring of blood in extra corporeal circulatory systems.”

For more information on this research see: Quantitative analysis of optical properties of flowing blood using a photon-cell interactive Monte Carlo code: effects of red blood cells’ orientation on light scattering. *Journal of Biomedical Optics*, 2012;17(5):057007.

The news editors report that additional information may be obtained by contacting D. Sakota, Tokyo Medical and Dental University, Dept. of Artificial Organs, Tokyo, Japan. (2012 Jun 20)

### **University College Dublin: European study of research and development in mobility technology for persons with disabilities**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Neuroengineering is now available. According to news originating from Dublin, Ireland, by NewsRx correspondents, researchers stated “In the fall of 2010, the National Science Foundation, the National Institutes of Health and the U.S. Veteran’s Administration jointly supported a review of mobility technology in Europe.”

Our news journalists obtained a quote from the research by the authors from University College Dublin, “A delegation of American Scientists traveled to Europe to visit a number of research centers and engaged in a demonstration and dialogue related to the global state-of-the-art for mobility impairment rectification and augmentation. From the observations and exchanges between the U.S. delegation and host institutions, the researchers were able to derive a series of papers which are now published in this thematic series of *Journal of NeuroEngineering and Rehabilitation*.”

According to the news editors, the researchers concluded: “The papers describe the main themes of the European mobility technology research activities showing a healthy picture of research and innovation in the field.”

For more information on this research see: European study of research and development in mobility technology for persons with disabilities. *Journal of Neuroengineering and Rehabilitation*, 2012;9(0):23. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Neuroengineering and Rehabilitation* - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

The news correspondents report that additional information may be obtained from B. Caufield, University College Dublin, Dublin, Ireland. (2012 Jun 20)

## **University of California, San Francisco: Performance of laser fluorescence devices and visual examination for the detection of occlusal caries in permanent molars**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Optics is the subject of a report. According to news reporting originating from San Francisco, California, by NewsRx correspondents, researchers stated “The aim of this study was to evaluate the diagnostic capabilities of a laser fluorescence tool DIAGNOdent (KaVo, Biberach, Germany) and two light-emitting diode fluorescence tools- Spectra Caries Detection Aid (AIR TECHNIQUES, Melville, NY), and SOPROLIFE light-induced fluorescence evaluator in daylight and blue fluorescence mode (SOPRO, ACTEON Group, La Ciotat, France)-in comparison to the caries detection and assessment system (ICDAS-II) in detection of caries lesions. In 100 subjects (age 23.4±10.6 years), 433 posterior permanent unrestored teeth were examined.”

Our news editors obtained a quote from the research by the authors from the University of California, “On the occlusal surfaces, up to 1066 data points for each assessment method were available for statistical evaluation, including 1034 ICDAS scores (intra-examiner kappa=0.884). For the SOPROLIFE tool, a new caries-scoring system was developed. Per assessment tool each average score for one given ICDAS code was significantly different from the one for another ICDAS code. Normalized data linear regression revealed that both SOPROLIFE assessment tools allowed for best caries score discrimination followed by DIAGNOdent and Spectra Caries Detection Aid. The area under the receiver operating characteristics curve calculations showed the same grading sequence when cutoff point ICDAS codes 0-1-2 were grouped together.”

According to the news editors, the researchers concluded: “Sensitivity and specificity values at the same cutoff were calculated (DIAGNOdent 87/66, Spectra Caries Detection Aid 93/37, SOPROLIFE 93/63, SOPROLIFE blue fluorescence 95/55.”

For more information on this research see: Performance of laser fluorescence devices and visual examination for the detection of occlusal caries in permanent molars. *Journal of Biomedical Optics*, 2012;17(3):036006.

The news editors report that additional information may be obtained by contacting P. Rechmann, University of California at San Francisco, School of Dentistry, Dept. of Preventive and Restorative Dental Sciences, San Francisco, California 94143, United States. (2012 Jun 20)

## **University of Ljubljana: Laser 3-D measuring system and real-time visual feedback for teaching and correcting breathing**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Optics. According to news reporting out of Ljubljana, Slovenia, by NewsRx editors, researchers stated “We present a novel method for real-time 3-D body-shape measurement during breathing based on the laser multiple-line triangulation principle. The laser projector illuminates the measured surface with a pattern of 33 equally inclined light planes.”

Our news journalists obtained a quote from the research by the authors from the University of Ljubljana, “Simultaneously, the camera records the distorted light pattern from a different viewpoint. The acquired images are transferred to a personal computer, where the 3-D surface reconstruction, shape analysis, and display are performed in real time. The measured surface displacements are displayed with a color palette, which enables visual feedback to the patient while breathing is being taught. The measuring range is approximately 400 x 600 x 500 mm in width, height, and depth, respectively, and the accuracy of the calibrated apparatus is  $\pm 0.7$  mm. The system was evaluated by means of its capability to distinguish between different breathing patterns. The accuracy of the measured volumes of chest-wall deformation during breathing was verified using standard methods of volume measurements.”

According to the news editors, the researchers concluded: “The results show that the presented 3-D measuring system with visual feedback has great potential as a diagnostic and training assistance tool when monitoring and evaluating the breathing pattern, because it offers a simple and effective method of graphical communication with the patient.”

For more information on this research see: Laser 3-D measuring system and real-time visual feedback for teaching and correcting breathing. *Journal of Biomedical Optics*, 2012;17(3):036004.

Our news journalists report that additional information may be obtained by contacting K. Povžic, University of Ljubljana, Faculty of Mechanical Engineering, Askerčeva 6, 1000 Ljubljana, Slovenia. (2012 Jun 20)

## University of Southampton: Identification of sound-localization cues in the HRTF of the bat-head model

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Signal Processing. According to news reporting out of Southampton, United Kingdom, by NewsRx editors, researchers stated “Animals such as bats and dolphins exhibit impressive echolocation abilities in terms of ranging, resolution and imaging and therefore represent a valuable learning model for the study of spatial hearing and sound source localization leading to a better understanding of the hearing mechanism and further improvement of the existing localization strategies. This study aims to examine and understand the directional characteristics of a sonar receiver modeled upon the bat auditory system via measurements of the head-related transfer function (HRTF) in the horizontal plane.”

Our news journalists obtained a quote from the research by the authors from the University of Southampton, “Four different models of the bat head were considered here and used to evaluate acoustic spectral characteristics of the sound received by the bat’s ears - a sphere model, a sphere model with a pinna attached (two pinnae of different size were used in this study) and a bat-head cast. The performed HRTF measurements of the bat-head models were further analyzed and compared to identify monaural spectral localization cues in the horizontal plane defined by the bat’s head and pinna shape and size. Our study suggests that the acoustical characteristics of a bio-inspired sonar head measured and specified in advance can potentially improve the performance of a receiver.”

According to the news editors, the researchers concluded: “Moreover, the generated auditory models may hold clues for the design of receiver characteristics in ultrasound imaging and navigation systems.”

For more information on this research see: Identification of sound-localization cues in the HRTF of the bat-head model. *Biomedical Signal Processing and Control*, 2012;7(3):270-277. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

Our news journalists report that additional information may be obtained by contacting D. Nikolic, University of Southampton, Inst Sound & Vibrat Res, Southampton, Hants, United Kingdom. (2012 Jun 20)

### **Weizmann Institute of Science, Rehovot: Label free in vivo laser speckle imaging of blood and lymph vessels**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Optics is now available. According to news reporting out of Rehovot, Israel, by NewsRx editors, researchers stated “The peripheral lymphatic vascular system is a part of the immune body system comprising a complex network of lymph vessels and nodes that are flowing lymph toward the heart. Traditionally the imaging of lymphatic vessels is based on the conventional imaging modalities utilizing contrast fluorescence materials.”

Our news journalists obtained a quote from the research by the authors from the Weizmann Institute of Science, “Given the important role of the lymphatic system there is a critical need for the development of noninvasive imaging technologies for functional quantitative diagnosis of the lymph vessels and lymph flow without using foreign chemicals. We report a label free methodology for noninvasive in vivo imaging of blood and lymph vessels, using long-exposure laser speckle imaging approach.”

According to the news editors, the researchers concluded: “This approach entails great promise in the noninvasive studies of tissues blood and lymph vessels distribution in vivo.”

For more information on this research see: Label free in vivo laser speckle imaging of blood and lymph vessels. *Journal of Biomedical Optics*, 2012;17(5):050502.

Our news journalists report that additional information may be obtained by contacting V. Kalchenko, Weizmann Institute of Science, Dept. of Veterinary Resources, Rehovot, 76100, Israel. (2012 Jun 20)

### **Arizona State University, Tempe: Method for physiologic phenotype characterization at the single-cell level in non-interacting and interacting cells**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Biomedical Optics are presented in a new report. According to news reporting out of Tempe, Arizona, by NewsRx editors, researchers stated “Intercellular heterogeneity is a key factor in a variety of core cellular processes including proliferation, stimulus response, carcinogenesis, and drug resistance. However, cell-to-cell variability studies at the single-cell level have been hampered by the lack of enabling experimental techniques.”

Our news journalists obtained a quote from the research by the authors from Arizona State University, “We present a measurement platform that features the capability to quantify oxygen consumption rates of individual, non-interacting and interacting cells under normoxic and



hypoxic conditions. It is based on real-time concentration measurements of metabolites of interest by means of extracellular optical sensors in cell-isolating microwells of subnanoliter volume. We present the results of a series of measurements of oxygen consumption rates (OCRs) of individual non-interacting and interacting human epithelial cells. We measured the effects of cell-to-cell interactions by using the system's capability to isolate two and three cells in a single well."

According to the news editors, the researchers concluded: "The major advantages of the approach are: 1. ratiometric, intensity-based characterization of the metabolic phenotype at the single-cell level, 2. minimal invasiveness due to the distant positioning of sensors, and 3. ability to study the effects of cell-cell interactions on cellular respiration rates."

For more information on this research see: Method for physiologic phenotype characterization at the single-cell level in non-interacting and interacting cells. *Journal of Biomedical Optics*, 2012;17(3):037008.

Our news journalists report that additional information may be obtained by contacting L. Kelbauskas, Arizona State University, Biodesign Institute, Tempe, Arizona, United States. (2012 Jun 19)

### **Saha Institute of Nuclear Physics, Kolkata: Validity of a theoretical model to examine blood oxygenation dependent optoacoustics**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in *Biomedical Optics*. According to news reporting from Kolkata, India, by NewsRx journalists, researchers stated "A theoretical model investigating the dependence of optoacoustic (OA) signal on blood oxygen saturation (SO(2)) is discussed. The derivations for the nonbandlimited and bandlimited OA signals from many red blood cells (RBCs) are presented."

The news correspondents obtained a quote from the research by the authors from the Saha Institute of Nuclear Physics, "The OA field generated by many RBCs was obtained by summing the OA field emitted by each RBC approximated as a fluid sphere. A Monte Carlo technique was employed generating the spatial organizations of RBCs in two-dimensional. The RBCs were assumed to have the same SO(2) level in a simulated configuration. The fractional number of oxyhemoglobin molecules, confined in a cell, determined the cellular SO(2) and also defined the blood SO(2). For the nonbandlimited case, the OA signal amplitude decreased and increased linearly with blood SO(2) when illuminated by 700 and 1000 nm radiations, respectively. The power spectra exhibited similar trends over the entire frequency range (MHz to GHz). For the bandlimited case, three acoustic receivers with 2, 10, and 50 MHz as the center frequencies were considered. The linear variations

of the OA amplitude with blood SO(2) were also observed for each receiver at those laser sources.”

According to the news reporters, the researchers concluded: “The good agreement between simulated and published experimental results validates the model qualitatively.”

For more information on this research see: Validity of a theoretical model to examine blood oxygenation dependent optoacoustics. *Journal of Biomedical Optics*, 2012;17(5):055002.

Our news journalists report that additional information may be obtained by contacting R.K. Saha, Saha Institute of Nuclear Physics, Applied Material Science Division, 1, AF Bidhannagar, Kolkata 700 064, India. (2012 Jun 19)

### **Aristotle University, Thessaloniki: How does the metric choice affect brain functional connectivity networks?**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators publish new report on Central Nervous System. According to news reporting originating from Thessaloniki, Greece, by NewsRx correspondents, researchers stated “Brain functional connectivity has gained increasing interest over the last few years. The application of Graph Theory on functional connectivity networks (FCNs) has shed light into different topics related to physiology as well as pathology.”

Our news editors obtained a quote from the research by the authors from Aristotle University, “To this end, different connectivity metrics may be used; however, some concerns are often raised related with inconsistency of results and their associated neurophysiological interpretations depending on the metric used. This paper examines how the use of different connectivity metrics affects the small-world-ness of the FCNs and eventually the neuroscientific evidences and their interpretation; to achieve this, electroencephalography (EEG) data recorded from healthy subjects during an emotional paradigm are utilized. Participants passively viewed emotional stimuli from the international affective picture system (IAPS), categorized in four groups ranging in pleasure (valence) and arousal. Four different pair-wise metrics were used to estimate the connectivity between each pair of EEG channels: the magnitude square coherence (MSC), cross-correlation (CCOR), normalized mutual information (NMI) and normalized joint entropy (NJE). The small-world-ness is found to be varying among the connectivity metrics, while it was also affected by the choice of the threshold level. The use of different connectivity metrics affected the significance of the neurophysiological results. However, the results from different metrics were to the same direction: pleasant images exhibited shorter characteristic path length than unpleasant ones, while high arousing images

were related to lower local efficiency as compared to the low arousing ones.”

According to the news editors, the researchers concluded: “Our findings suggest that the choice of different metrics modulates the small-world-ness of the FCNs as well as the neurophysiological results and should be taken into account when studying brain functional connectivity using graph theory.”

For more information on this research see: How does the metric choice affect brain functional connectivity networks? *Biomedical Signal Processing and Control*, 2012;7(3):228-236. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Biomedical Signal Processing and Control* - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news editors report that additional information may be obtained by contacting C. Lithari, Aristotle University, Physiol Lab, Sch Med, GR-54006 Thessaloniki, Greece. (2012 Jun 18)

### **Estimating the cortex and autonomic nervous activity during a mental arithmetic task**

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators publish new report on Signal Processing. According to news originating from Shenyang, People’s Republic of China, by NewsRx correspondents, researchers stated “The cerebral cortex has massive connections with autonomic nervous system and then arouses cardiovascular events, but the coupling mechanism between brain and heart is not clear. In this study the heart rate variability (HRV) and directed transfer function (DTF) methods are used to investigate the cortico-cortical functional coupling and direction of information flow between brain and heart during a mental arithmetic (MA) task.”

Our news journalists obtained a quote from the research by the authors, “Electroencephalogram (EEG) and ECG were used for measuring neural/cardiac activity. Forty-three healthy male subjects were voluntarily participated in the study. Our results showed compared with control, LF/HF and LFn significantly increased while HF, HF<sub>n</sub> and total power significantly decreased ( $P < 0.05$ ) during MA task. HR (79  $\pm$  1.7 beats/min) was also significantly higher compared with the control (71  $\pm$  1.4 beats/min). Moreover, MA task trigger the neurons of pre-central and central areas and then information transmit from front to back, and finished information integration at parietal and occipital locations. Our findings suggested that MA task caused an increase of the coupling of brain regions and quickened heart rate by virtue of increasing sympathetic activity and decreasing parasympathetic activity.”

According to the news editors, the researchers concluded: “The regulation from post-central areas to heart as well as feedback regulation from heart to central areas exists in the MA task.”

For more information on this research see: Estimating the cortex and autonomic nervous activity during a mental arithmetic task. *Biomedical Signal Processing and Control*, 2012;7(3):303-308. *Biomedical Signal Processing and Control* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Biomedical Signal Processing and Control - [http://www.elsevier.com/wps/product/cws\\_home/706718](http://www.elsevier.com/wps/product/cws_home/706718))

The news correspondents report that additional information may be obtained from X.L. Yu, Armed Police Force, Dept. of Teaching & Res, Command College, Shenyang 110113, People’s Republic of China. (2012 Jun 18)

### **Institute for Cancer Research and Treatment (IRCCS), Milan: Thoughts turned into high-level commands: Proof-of-concept study of a vision-guided robot arm driven by functional MRI (fMRI) signals**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Current study results on Central Nervous System have been published. According to news originating from Milan, Italy, by NewsRx correspondents, researchers stated “Previous studies have demonstrated the possibility of using functional MRI to control a robot arm through a brain-machine interface by directly coupling haemodynamic activity in the sensory-motor cortex to the position of two axes. Here, we extend this work by implementing interaction at a more abstract level, whereby imagined actions deliver structured commands to a robot arm guided by a machine vision system.”

Our news journalists obtained a quote from the research by the authors from Institute for Cancer Research and Treatment (IRCCS), “Rather than extracting signals from a small number of pre-selected regions, the proposed system adaptively determines at individual level how to map representative brain areas to the input nodes of a classifier network. In this initial study, a median action recognition accuracy of 90% was attained on five volunteers performing a game consisting of collecting randomly positioned coloured pawns and placing them into cups. The ‘pawn’ and ‘cup’ instructions were imparted through four mental imagery tasks, linked to robot arm actions by a state machine. With the current implementation in MatLab language the median action recognition time was 24.3s and the robot execution time was 17.7s.”

According to the news editors, the researchers concluded: “We demonstrate the notion of combining haemodynamic brain-machine interfacing with computer vision to implement interaction at the level of high-level commands rather than individual movements, which may find application in future fMRI approaches relevant to brain-lesioned patients, and provide source code supporting further work on larger command sets and real-time processing.”

For more information on this research see: Thoughts turned into high-level commands: Proof-of-concept study of a vision-guided robot arm driven by functional MRI (fMRI) signals. *Medical Engineering & Physics*, 2012;34(5):650-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news correspondents report that additional information may be obtained from L. Minati, Scientific Department, Fondazione IRCCS Istituto Neurologico Carlo Besta, Milan, Italy. (2012 Jun 18)

### **Polytechnic University, Milan: Load-dependent brain activation assessed by time-domain functional near-infrared spectroscopy during a working memory task with graded levels of difficulty**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Data detailed on Central Nervous System have been presented. According to news reporting out of Milan, Italy, by NewsRx editors, researchers stated “We evaluated frontal brain activation during a mixed attentional/working memory task with graded levels of difficulty in a group of 19 healthy subjects, by means of time-domain functional near-infrared spectroscopy (fNIRS). Brain activation was assessed, and load-related oxy- and deoxy-hemoglobin changes were studied.”

Our news journalists obtained a quote from the research by the authors from Polytechnic University, “Generalized linear model (GLM) was applied to the data to explore the metabolic processes occurring during the mental effort and, possibly, their involvement in short-term memorization. GLM was applied to the data twice: for modeling the task as a whole and for specifically investigating brain activation at each cognitive load. This twofold employment of GLM allowed (1) the extraction and isolation of different information from the same signals, obtained through the modeling of different cognitive categories (sustained attention and working memory), and (2) the evaluation of model fitness, by inspection and comparison of residuals (i.e., unmodeled part of the signal) obtained in the two different cases. Results attest to the presence of a persistent attentional-related metabolic activity, superimposed to a task-related mnemonic contribution. Some hemispherical differences have also been highlighted frontally: deoxy-hemoglobin

changes manifested a strong right lateralization, whereas modifications in oxy-and total hemoglobin showed a medial localization.”

According to the news editors, the researchers concluded: “The present work successfully explored the capability of fNIRS to detect the two neurophysiological categories under investigation and distinguish their activation patterns.”

For more information on this research see: Load-dependent brain activation assessed by time-domain functional near-infrared spectroscopy during a working memory task with graded levels of difficulty. *Journal of Biomedical Optics*, 2012;17(5):056005.

Our news journalists report that additional information may be obtained by contacting E. Molteni, Dipartimento di Bioingegneria, Politecnico di Milano, Piazza Leonardo da Vinci 32, I-20133 Milan, Italy. (2012 Jun 18)

### **University College London: In vivo preclinical photoacoustic imaging of tumor vasculature development and therapy**

By a News Reporter-Staff News Editor at Biotech Business Week – Investigators publish new report on Biomedical Optics. According to news reporting from London, United Kingdom, by NewsRx journalists, researchers stated “The use of a novel all-optical photoacoustic scanner for imaging the development of tumor vasculature and its response to a therapeutic vascular disrupting agent is described. The scanner employs a Fabry-Perot polymer film ultrasound sensor for mapping the photoacoustic waves and an image reconstruction algorithm based upon attenuation-compensated acoustic time reversal.”

The news correspondents obtained a quote from the research by the authors from University College London, “The system was used to non-invasively image human colorectal tumor xenografts implanted subcutaneously in mice. Label-free three-dimensional in vivo images of whole tumors to depths of almost 10 mm with sub-100-micron spatial resolution were acquired in a longitudinal manner. This enabled the development of tumor-related vascular features, such as vessel tortuosity, feeding vessel recruitment, and necrosis to be visualized over time. The system was also used to study the temporal evolution of the response of the tumor vasculature following the administration of a therapeutic vascular disrupting agent (OXi4503). This revealed the well-known destruction and recovery phases associated with this agent.”

According to the news reporters, the researchers concluded: “These studies illustrate the broader potential of this technology as an imaging tool for the preclinical and clinical study of tumors and other pathologies characterized by changes in the vasculature.”

For more information on this research see: In vivo preclinical photoacoustic imaging of tumor vasculature development and therapy. *Journal of Biomedical Optics*, 2012;17(5):056016.

Our news journalists report that additional information may be obtained by contacting J. Laufer, University College London, Dept. of Medical Physics and Bioengineering, Gower Street, London WC1E 6BT, UK. (2012 Jun 18)

### **Scuola Superiore Sant'Anna, Pisa: Removing vascular obstructions: a challenge, yet an opportunity for interventional microdevices**

By a News Reporter-Staff News Editor at Medical Devices & Surgical Technology Week – A new study on Biomedical Microdevices is now available. According to news reporting originating in Pisa, Italy, by NewsRx journalists, researchers stated “Cardiovascular diseases are the leading cause of death worldwide; they are mainly due to vascular obstructions which, in turn, are mainly caused by thrombi and atherosclerotic plaques. Although a variety of removal strategies has been developed for the considered obstructions, none of them is free from limitations and conclusive.”

The news reporters obtained a quote from the research by the authors from Scuola Superiore Sant'Anna, “The present paper analyzes the physical mechanisms underlying state-of-art removal strategies and classifies them into chemical, mechanical, laser and hybrid (namely chemo-mechanical and mechano-chemical) approaches, while also reviewing corresponding commercial/research tools/devices and procedures. Furthermore, challenges and opportunities for interventional micro/nanodevices are highlighted. In this spirit, the present review should support engineers, researchers active in the micro/nanotechnology field, as well as medical doctors in the development of innovative biomedical solutions for treating vascular obstructions. Data were collected by using the ISI Web of Knowledge portal, buyer's guides and FDA databases; devices not reported on scientific publications, as well as commercial devices no more for sale were discarded.”

According to the news reporters, the researchers concluded: “Nearly 70% of the references were published since 2006, 55% since 2008; these percentages respectively raise to 85% and 65% as regards the section specifically reviewing state-of-art removal tools/devices and procedures.”

For more information on this research see: Removing vascular obstructions: a challenge, yet an opportunity for interventional microdevices. *Biomedical Microdevices*, 2012;14(3):511-32. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York,

NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news correspondents report that additional information may be obtained by contacting P. Miloro, The BioRobotics Institute, Scuola Superiore Sant'Anna, Piazza Martiri della Libertà 33, 56127, Pisa, Italy.

The publisher of the journal *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Jun 17)

### **Radboud University, Nijmegen: Can vertebral density changes be explained by intervertebral disc degeneration?**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Bone Research have been published. According to news originating from Nijmegen, Netherlands, by NewsRx correspondents, researchers stated “One of the major problems facing the elderly spine is the occurrence of vertebral fractures due to low bone mass. Although typically attributed to osteoporosis, disc degeneration has also been suggested to play a role in vertebral fractures.”

Our news journalists obtained a quote from the research by the authors from Radboud University, “Existing bone adaptation theories and simulations may explain the biomechanical pathway from a degenerated disc to an increased fracture risk. A finite element model of a lumbar segment was created and calibrated. Subsequently the disc properties were varied to represent either a healthy or degenerated disc and the resulting bone adaptation was simulated. Disc degeneration resulted in a shift of load from the nucleus to the annulus. The resulting bone adaptation led to a dramatically reduced density of the trabecular core and to an increased density in the vertebral walls. Degeneration of just the nucleus, and in particular the dehydration of the nucleus, resulted in most of this bone density change. Additional annulus degeneration had much less of an effect on the density values. The density decrease in the trabecular core as seen in this study matches clinical observations.”

According to the news editors, the researchers concluded: “Therefore, bone remodeling theories can assist in explaining the potential synergistic effects of disc degeneration and osteoporosis in the occurrence of vertebral fractures.”

For more information on this research see: Can vertebral density changes be explained by intervertebral disc degeneration? *Medical Engineering & Physics*, 2012;34(4):453-458. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - <http://www.elsevier.com/locate/medengphys>)



The news correspondents report that additional information may be obtained from J. Homminga, Radboud University, Medical Center, Nijmegen, Netherlands. (2012 Jun 15)

**Dalian University of Technology: Extraction of plasma from whole blood using a deposited microbead plug (DMBP) in a capillary-driven microfluidic device**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting originating from Dalian, People's Republic of China, by NewsRx correspondents, researchers stated “We presented a deposited microbead plug (DMBP)-based microfluidic device capable of extracting plasma from whole blood by capillary forces. This device was fabricated by reversibly bonding a PDMS slab with a straight channel to a hydrophilic glass substrate.”

Our news editors obtained a quote from the research by the authors from the Dalian University of Technology, “The DMBP was easily constructed at the inlet of the channel within 2 min by a method of natural deposition of microbeads without the need of weirs or photopolymerization. Capillary forces generated mainly on the hydrophilic glass substrate provided a driving force during the fabrication of the DMBP and plasma extraction, resulting in simplicity of operations. The DMBP only allows blood plasma to pass through but blocks blood cells, which was demonstrated experimentally using sheep blood. The DMBP enabled to remain in its initial configuration during plasma extraction. The high quality plasma was obtained without contamination of microbeads and blood cells.”

According to the news editors, the researchers concluded: “This easy-to-use, easy-to-integrate, disposable the DMBP-based microfluidic device has the potential to be integrated with on-chip bioanalytical units for the applications of point-of-care diagnostics.”

For more information on this research see: Extraction of plasma from whole blood using a deposited microbead plug (DMBP) in a capillary-driven microfluidic device. *Biomedical Microdevices*, 2012;14(3):565-572. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news editors report that additional information may be obtained by contacting C.Y. Li, Dalian University of Technology, Key Lab Micro Nano Technol & Syst Liaoning Prov, Dalian, People's Republic of China. (2012 Jun 13)

## **Fujian Medical University: Maximum Lyapunov exponents as predictors of global gait stability: A modelling approach**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting originating in Fujian, People's Republic of China, by NewsRx journalists, researchers stated “To examine the stability of human walking, methods such as local dynamic stability have been adopted from dynamical systems theory. Local dynamic stability is calculated by estimating maximal finite time Lyapunov exponents ( $\lambda(S)$  and  $\lambda(L)$ ), which quantify how a system responds continuously to very small (i.e. ‘local’) perturbations.”

The news reporters obtained a quote from the research by the authors from Fujian Medical University, “However, it is unknown if, and to what extent, these measures are correlated to global stability, defined operationally as the probability of falling. We studied whether changes in probability of falling of a simple model of human walking (a so-called dynamic walker) could be predicted from maximum finite time Lyapunov exponents. We used an extended version of the simplest walking model with arced feet and a hip spring. This allowed us to change the probability of falling of the model by changing either the foot radius, the slope at which the model walks, the stiffness of the hip spring, or a combination of these factors. Results showed that  $\lambda(S)$  correlated fairly well with global stability, although this relationship was dependent upon differences in the distance between initial nearest neighbours on the divergence curve. A measure independent of such changes (the  $\log(\text{distance between initially nearest neighbours after 50 samples})$ ) correlated better with global stability, and, more importantly, showed a more consistent relationship across conditions. In contrast,  $\lambda(L)$  showed either weak correlations, or correlations opposite to expected, thus casting doubt on the use of this measure as a predictor of global gait stability.”

According to the news reporters, the researchers concluded: “Our findings support the use of  $\lambda(S)$ , but not of  $\lambda(L)$ , as measure of human gait stability.”

For more information on this research see: Maximum Lyapunov exponents as predictors of global gait stability: A modelling approach. *Medical Engineering & Physics*, 2012;34(4):428-436. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news correspondents report that additional information may be obtained by contacting S.M. Bruijn, Fujian Med Univ, Dept. of Rehabil, Fuzhou, Fujian, People's Republic of China. (2012 Jun 13)

### **Kennedy Center, Glostrup: Advanced microtechnologies for detection of chromosome abnormalities by fluorescent hybridization**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting out of Glostrup, Denmark, by NewsRx editors, researchers stated “Cytogenetic and molecular cytogenetic analyses, which aim to detect chromosome abnormalities, are routinely performed in cytogenetic laboratories all over the world. Traditional cytogenetic studies are performed by analyzing the banding pattern of chromosomes, and are complemented by molecular cytogenetic techniques such as fluorescent hybridization (FISH).”

Our news journalists obtained a quote from the research by the authors from Kennedy Center, “To improve FISH application in cytogenetic analysis the issues with long experimental time, high volumes of expensive reagents and requirement for trained technicians need to be addressed. The protocol has recently evolved towards on chip detection of chromosome abnormalities with the development of microsystems for FISH analysis. The challenges addressed by the developed microsystems are mainly the automation of the assay performance, reduction in probe volume, as well as reduction of assay time.”

According to the news editors, the researchers concluded: “The recent focus on the development of automated systems for performing FISH on chip is summarized in this review.”

For more information on this research see: Advanced microtechnologies for detection of chromosome abnormalities by fluorescent hybridization. *Biomedical Microdevices*, 2012;14(3):453-460. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting D. Kwasny, Kennedy Center, Center Appl Human Mol Genet, Glostrup, Denmark. (2012 Jun 13)

### **Marmara University School of Medicine, Istanbul: Comparative study of intravenous opioid consumption in the postoperative period**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Anesthesia. According to news reporting from Istanbul, Turkey, by NewsRx journalists, researchers stated “Intravenous patient-controlled analgesia (IV PCA) using opioids is an accepted method for delivering postoperative analgesia. The aim of this

study was to compare fentanyl and tramadol with IV PCA after spinal anesthesia (SA) and general anesthesia (GA) following cesarean section (C/S).”

The news correspondents obtained a quote from the research by the authors from the Marmara University School of Medicine, “Ninety women were randomly assigned to three groups (n=30). Group 1 was treated with IV fentanyl PCA after SA. Groups 2 and 3 were treated with IV fentanyl PCA and IV tramadol PCA after GA. Outcome measures were recorded for the first 24 h post-anesthesia. PCA use was significantly lower after SA ( $p < 0.05$ ). Eighteen patients in the SA Group and 27 patients and 24 patients from the GA groups required additional opioid. Opioid consumption and patient satisfaction were similar for groups after GA ( $p > 0.05$ ). 638.4  $\pm$  179.1 g fentanyl was consumed by patients of Group 2, 356.3  $\pm$  87.0 g fentanyl and 559.5  $\pm$  207.0 mg tramadol was consumed by Group 1 and Group 3 respectively. There was no significant difference in the overall severity and incidence of nausea, drowsiness or pruritus.”

According to the news reporters, the researchers concluded: “Our study shows that analgesic consumption and post-operative pain scores after SA in C/S decreased, without increase in adverse reactions.”

For more information on this research see: Comparative study of intravenous opioid consumption in the postoperative period. *Biomedical Papers of the Medical Faculty of the University Palacky, Olomouc, Czechosl*, 2012;156(1):48-51.

Our news journalists report that additional information may be obtained by contacting K.T. Saracoglu, Dept. of Anesthesiology and Re-animation, Marmara University School of Medicine, Istanbul, Turkey. (2012 Jun 13)

### **Nanyang Technological University, Singapore: Modified Wiener estimation of diffuse reflectance spectra from RGB values by the synthesis of new colors for tissue measurements**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Singapore, Singapore, by NewsRx correspondents, researchers stated “We present a new method for the accurate estimation of diffuse reflectance spectra from ROB values based on Wiener estimation. In the proposed method, a system matrix obtained from the original RGB values is combined with a set of synthetic optical filters to generate another three values corresponding to new colors.”

Our news journalists obtained a quote from the research by the authors from Nanyang Technological University, “A modified Wiener matrix can then be created with the original ROB values and the new color

values, which will yield a more accurate estimation because of the new color information that has been incorporated. This method was tested on in vivo color measurements from 200 skin sites in 10 volunteers. The results show that the proposed method is able to improve the estimation accuracy significantly compared with the traditional Wiener estimation method.”

According to the news editors, the researchers concluded: “The fast speed of this method may enable the estimation of diffuse reflectance spectra at multiple tissue locations from color images in real time, which provides a cost-effective alternative to spectral imaging with the additional advantage of high spectral resolution.”

For more information on this research see: Modified Wiener estimation of diffuse reflectance spectra from RGB values by the synthesis of new colors for tissue measurements. *Journal of Biomedical Optics*, 2012;17(3):4-6. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from S. Chen, Nanyang Technological University, Sch Chem & Biomed Engn, Div Bioengn, Singapore 637457, Singapore. (2012 Jun 13)

### **North Carolina State University, Raleigh: A three-dimensional microfluidic approach to scaling up microencapsulation of cells**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Microdevices. According to news reporting out of Raleigh, North Carolina, by NewsRx editors, researchers stated “Current applications of the microencapsulation technique include the use of encapsulated islet cells to treat Type 1 diabetes, and encapsulated hepatocytes for providing temporary but adequate metabolic support to allow spontaneous liver regeneration, or as a bridge to liver transplantation for patients with chronic liver disease. Also, microcapsules can be used for controlled delivery of therapeutic drugs.”

Our news journalists obtained a quote from the research by the authors from North Carolina State University, “The two most widely used devices for microencapsulation are the air-syringe pump droplet generator and the electrostatic bead generator, each of which is fitted with a single needle through which droplets of cells suspended in alginate solution are produced and cross-linked into microbeads. A major drawback in the design of these instruments is that they are incapable of producing sufficient numbers of microcapsules in a short-time period to permit mass production of encapsulated and viable cells for transplantation in large animals and humans. We present in this paper a

microfluidic approach to scaling up cell and protein encapsulations. The microfluidic chip consists of a 3D air supply and multi-nozzle outlet for microcapsule generation. It has one alginate inlet and one compressed air inlet. The outlet has 8 nozzles, each having 380 micrometers inner diameter, which produce hydrogel microspheres ranging from 500 to 700  $\mu\text{m}$  in diameter. These nozzles are concentrically surrounded by air nozzles with 2 mm inner diameter. There are two tubes connected at the top to allow the air to escape as the alginate solution fills up the chamber. A variable flow pump 115 V is used to pump alginate solution and Tygon® tubing is used to connect in-house air supply to the air channel and peristaltic/syringe pump to the alginate chamber. A pressure regulator is used to control the flow rate of air.”

According to the news editors, the researchers concluded: “We have encapsulated islets and proteins with this high throughput device, which is expected to improve product quality control in microencapsulation of cells, and hence the outcome of their transplantation.”

For more information on this research see: A three-dimensional microfluidic approach to scaling up microencapsulation of cells. *Biomedical Microdevices*, 2012;14(3):461-9. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting S. Tendulkar, Dept. of Mechanical & Aerospace Engineering, North Carolina State University, Raleigh, NC, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Jun 13)

### **Northwestern University, Evanston: Optical coherence photoacoustic microscopy: accomplishing optical coherence tomography and photoacoustic microscopy with a single light source**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting out of Evanston, Illinois, by NewsRx editors, researchers stated “We developed optical coherence photoacoustic microscopy (OC-PAM) to demonstrate that the functions of optical coherence tomography (OCT) and photoacoustic microscopy (PAM) can be achieved simultaneously by using a single illuminating light source.”

Our news journalists obtained a quote from the research by the authors from Northwestern University, “We used a pulsed broadband

laser centered at 580 nm and detected the absorbed photons through photoacoustic detection and the backscattered photons with an interferometer. In OC-PAM, each laser pulse generates both one OCT A-line and one PAM A-line simultaneously; as a result, the two imaging modalities are intrinsically co-registered in the lateral directions.”

According to the news editors, the researchers concluded: “In vivo images of the mouse ear were acquired to demonstrate the capabilities of OC-PAM.”

For more information on this research see: Optical coherence photoacoustic microscopy: accomplishing optical coherence tomography and photoacoustic microscopy with a single light source. *Journal of Biomedical Optics*, 2012;17(3):7-9. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting X.Y. Zhang, Northwestern University, Dept. of Biomed Engn, Evanston, IL 60208, United States. (2012 Jun 13)

### **Oregon State University, Corvallis: Urea separation in flat-plate microchannel hemodialyzer; experiment and modeling**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Urea are presented in a new report. According to news reporting out of Corvallis, Oregon, by NewsRx editors, researchers stated “Two flat-plate microchannel hemodialyzers were constructed consisting of two identical laminae separated by a 20[ $\mu$  m] thick ultrafiltration membrane (Gambro AN69). Each lamina contains a parallel array of microchannels 100[ $\mu$  m] deep, 200[ $\mu$  m] wide, and 5.6[cm] or 9.9[cm] in length respectively.”

Our news journalists obtained a quote from the research by the authors from Oregon State University, “Urea was removed from the aqueous stream containing 1.0[g] urea per liter de-ionized water in the , by countercurrent contact with pure de-ionized water in the of the flat-plate hemodialyzer. In all cases volumetric flow rate of water in the was equal or less than the volumetric flow rate in the , which is in large contrast to commercial applications of hollow-fiber hemodialyzers where dialysate flow is severalfold larger than blood flow rate. A three-dimensional finite volume mass transport model, built entirely from the first principles with no adjustable parameters, was written in FORTRAN. The results of the mathematical model excellently predict experimental results. The fractional removals of urea predicted by the

model are within 2.7%-11% of experimentally obtained values for different and velocities/flow rates in microchannels, and for different transmembrane pressures. The overall mass transfer coefficient was calculated using the urea outlet concentrations obtained at various average velocities (1.0-5.0[cm/s]) in the and , and two nominal transmembrane pressures (a dagger  $P_{tm} = 0$  and 10,000.[Pa]). Overall mass transfer coefficients obtained experimentally ranged from 0.068 to 0.14 [cm/min]. The numerical model predicted an average overall mass transfer coefficient of 0.08 [cm/min].”

According to the news editors, the researchers concluded: “This value is 60% higher than those found in commercial dialyzers (similar to 0.05[cm/min]).”

For more information on this research see: Urea separation in flat-plate microchannel hemodialyzer; experiment and modeling. *Biomedical Microdevices*, 2012;14(3):595-602. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news journalists report that additional information may be obtained by contacting A.R. Tuhy, Oregon State University, Dept. of Chem Engr, Corvallis, OR 97331, United States. (2012 Jun 13)

## **Regional Hospital Limerick: Hemodynamic effects of habituation to a week-long program of neuromuscular electrical stimulation**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news reporting out of Limerick, Ireland, by NewsRx editors, researchers stated “Neuromuscular electrical stimulation (NMES) of the calf muscles has been shown to cause instantaneous increases in venous outflow from the lower leg and could be used as an adjunct to current gold-standard compression therapies for the prevention of venous stasis and its related pathologies. However, little is known about the effects of NMES in combination with compression therapies on subject comfort, compliance and popliteal venous blood flow over the course of a week-long NMES protocol.”

Our news journalists obtained a quote from the research by the authors from Regional Hospital Limerick, “This study aimed to assess the effects of a NMES and compression protocol for the prevention of venous stasis on the compliance, comfort and venous blood flow of healthy volunteers over the course of seven days. Twenty-four healthy subjects were assigned to either a stimulation or control group. The stimulation group received 1.5 h of NMES daily while the control group received none. Daily measures of popliteal venous blood flow, subject compliance



and comfort were recorded over 7 days. Ejected blood flow volumes and peak velocities in the popliteal vein during NMES were sustained over a 30-min stimulation session and increased by approximately 100% over the course of seven days. Mean stimulation intensities increased progressively throughout the week, while perceived pain during NMES decreased significantly. Mean compliance to the 7-day protocol was 100%. User habituation to a combined NMES and compression protocol resulted in significant increases in ejected venous volume and peak velocity over the course of 7 days. This resulted in the highest ejected venous volume reported from a single NMES induced contraction of the calf muscles to date which was twice the magnitude of values previously reported in the literature.”

According to the news editors, the researchers concluded: “These findings suggest that NMES based protocols applied over an extended period of days, weeks or months may provide greater hemodynamic effect for the prevention of venous stasis than previously observed during NMES sessions lasting less than a few hours.”

For more information on this research see: Hemodynamic effects of habituation to a week-long program of neuromuscular electrical stimulation. *Medical Engineering & Physics*, 2012;34(4):459-465. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting G.J. Corley, Midwestern Reg Hosp Limerick, Dept. of Vasc Surg, Limerick, Ireland. (2012 Jun 13)

### **Swiss Federal Institute of Technology, Zurich: Porous polysulfone coatings for enhanced drug delivery**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Zurich, Switzerland, by NewsRx correspondents, researchers stated “The synthesis of a porous polysulfone (PSU) coating for use in drug delivery applications is presented. PSU can serve as a functional surface coating for drug delivery vehicles, such as intraocular biomicrorobots.”

Our news editors obtained a quote from the research by the authors from the Swiss Federal Institute of Technology, “The coatings can be applied using spin coating or dip coating. The porosity is introduced by selectively dissolving calcium carbonate nanoparticles embedded in the bulk polymer. The network of pores thus formed increases by a factor of thirty the amount of Rhodamine B (model drug) that can be loaded

and by a factor of fifteen the amount that can be released. The films do not affect cell viability and exhibit poor cell adhesion.”

According to the news editors, the researchers concluded: “The straightforward synthesis and predictability of porosity enables the tuning of the amount of drug that can be loaded.”

For more information on this research see: Porous polysulfone coatings for enhanced drug delivery. *Biomedical Microdevices*, 2012;14(3):603-612. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news editors report that additional information may be obtained by contacting K.M. Sivaraman, ETH, Dept. of Mat Cell & BioMat, CH-8093 Zurich, Switzerland. (2012 Jun 13)

### **University Hospital, Ciudad Real: Autofocus evaluation for brightfield microscopy pathology**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating in Ciudad Real, Spain, by NewsRx journalists, researchers stated “An essential and indispensable component of automated microscopy framework is the automatic focusing system, which determines the in-focus position of a given field of view by searching the maximum value of a focusing function over a range of z-axis positions. The focus function and its computation time are crucial to the accuracy and efficiency of the system.”

The news reporters obtained a quote from the research by the authors from University Hospital, “Sixteen focusing algorithms were analyzed for histological and histopathological images. In terms of accuracy, results have shown an overall high performance by most of the methods.”

According to the news reporters, the researchers concluded: “However, we included in the evaluation study other criteria such as computational cost and focusing curve shape which are crucial for real-time applications and were used to highlight the best practices.”

For more information on this research see: Autofocus evaluation for brightfield microscopy pathology. *Journal of Biomedical Optics*, 2012;17(3):94-101. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting R. Redondo, Hosp Gen Univ Ciudad Real, Ciudad Real 13005, Spain. (2012 Jun 13)

**University of Arizona, Tucson: Wide-field spectral imaging of human ovary autofluorescence and oncologic diagnosis via previously collected probe data**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news reporting out of Tucson, Arizona, by NewsRx editors, researchers stated “With no sufficient screening test for ovarian cancer, a method to evaluate the ovarian disease state quickly and nondestructively is needed. The authors have applied a wide-field spectral imager to freshly resected ovaries of 30 human patients in a study believed to be the first of its magnitude.”

Our news journalists obtained a quote from the research by the authors from the University of Arizona, “Endogenous fluorescence was excited with 365-nm light and imaged in eight emission bands collectively covering the 400- to 640-nm range. Linear discriminant analysis was used to classify all image pixels and generate diagnostic maps of the ovaries. Training the classifier with previously collected single-point autofluorescence measurements of a spectroscopic probe enabled this novel classification. The process by which probe-collected spectra were transformed for comparison with imager spectra is described. Sensitivity of 100% and specificity of 51% were obtained in classifying normal and cancerous ovaries using autofluorescence data alone. Specificity increased to 69% when autofluorescence data were divided by green reflectance data to correct for spatial variation in tissue absorption properties. Benign neoplasm ovaries were also found to classify as nonmalignant using the same algorithm.”

According to the news editors, the researchers concluded: “Although applied ex vivo, the method described here appears useful for quick assessment of cancer presence in the human ovary.”

For more information on this research see: Wide-field spectral imaging of human ovary autofluorescence and oncologic diagnosis via previously collected probe data. *Journal of Biomedical Optics*, 2012;17(3):45-57. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news journalists report that additional information may be obtained by contacting T.E. Renkoski, University of Arizona, Arizona Hlth Sci Center, Dept. of Obstet & Gynecol, Tucson, AZ 85724, United States. (2012 Jun 13)

## **University of Guelph: Mechanically relevant consequences of the composite laminate-like design of the abdominal wall muscles and connective tissues**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting from Guelph, Canada, by NewsRx editors, the researcher stated “Together, three abdominal wall muscles (external oblique, internal oblique and transversus abdominis) form a tightly bound muscular sheet that has been likened to a composite-laminate structure. Previous work has demonstrated the ability of force generated by these three muscles to be passed between one another through connective tissue linkages.”

The news correspondents obtained a quote from the research by the author from the University of Guelph, “Muscle fibres in each muscle are obliquely oriented with respect to its neighbouring muscles. It is proposed here is that this unique morphology of the abdominal wall muscles functions, through the application of constraining forces amongst the muscles, to increase force- and stiffness-generating capabilities. This paper presents a mathematical formulation of the stress-strain relationship for a transversely isotropic fibrous composite, and establishes a strengthening and stiffening effect when stress can be transferred between the fibrous layers. Application of empirical mechanical properties to this formulation demonstrates this effect for the abdominal wall muscles and, in greater proportion, for the anterior aponeurosis of the abdominal wall.”

According to the news reporters, the researchers concluded: “This has implications for increasing the stiffness and passive load bearing ability of the abdominal wall muscles, and has the potential to modulate the whole muscle force-length and force-velocity relationships during contraction.”

For more information on this research see: Mechanically relevant consequences of the composite laminate-like design of the abdominal wall muscles and connective tissues. *Medical Engineering & Physics*, 2012;34(4):521-523. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Medical Engineering & Physics* - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

Our news journalists report that additional information may be obtained by contacting S.H.M. Brown, University of Guelph, Dept. of Human Hlth & Nutr Sci, Guelph, ON N1G 2W1, Canada. (2012 Jun 13)

## **University of Southern California, Los Angeles: An implantable MEMS micropump system for drug delivery in small animals**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Microdevices have been published. According to news originating from Los Angeles, California, by NewsRx correspondents, researchers stated “We present the first implantable drug delivery system for controlled timing and location of dosing in small animals. Current implantable drug delivery devices do not provide control over these factors nor are they feasible for implantation in research animals as small as mice.”

Our news journalists obtained a quote from the research by the authors from the University of Southern California, “Our system utilizes an integrated electrolysis micropump, is refillable, has an inert drug reservoir for broad drug compatibility, and is capable of adjustment to the delivery regimen while implanted. Electrochemical impedance spectroscopy (EIS) was used for characterization of electrodes on glass substrate and a flexible Parylene substrate. Benchtop testing of the electrolysis actuator resulted in flow rates from 1 L/min to 34 L/min on glass substrate and up to 6.8 L/min on Parylene substrate. The fully integrated system generated a flow rate of 4.72±0.35 L/min under applied constant current of 1.0 mA while maintaining a power consumption of only ~3 mW.”

According to the news editors, the researchers concluded: “Finally, we demonstrated in vivo application of the system for anti-cancer drug delivery in mice.”

For more information on this research see: An implantable MEMS micropump system for drug delivery in small animals. *Biomedical Microdevices*, 2012;14(3):483-96. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news correspondents report that additional information may be obtained from H. Gensler, Dept. of Biomedical Engineering, Viterbi School of Engineering, University of Southern California, 1042 Downey Way, DRB-140, Los Angeles, CA, 90089-1111, United States.

The publisher's contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Jun 13)

### **Washington University, St. Louis: Time-reversed ultrasonically encoded optical focusing in biological tissue**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from St. Louis, Missouri, by NewsRx correspondents, researchers stated “We report an experimental investigation of time-reversed ultrasonically encoded optical focusing in biological tissue. This technology combines the concepts of optical phase conjugation and ultrasound modulation of diffused coherent light.”

Our news editors obtained a quote from the research by the authors from Washington University, “The ultrasonically encoded (or tagged) diffused light from a tissue sample is collected in reflection mode and interferes with a reference light in a photorefractive crystal (used as a phase conjugation mirror) to form a hologram. Then a time-reversed copy of the tagged light is generated and traces back the original trajectories to the ultrasonic focus inside the tissue sample.”

According to the news editors, the researchers concluded: “With our current setup, we can achieve a maximum penetration depth of 5 mm in a chicken breast sample and image optical contrasts within a tissue sample with a spatial resolution approximately equaling  $1/\sqrt{2}$  of the ultrasound focal diameter.”

For more information on this research see: Time-reversed ultrasonically encoded optical focusing in biological tissue. *Journal of Biomedical Optics*, 2012;17(3):19-21. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting P.X. Lai, Washington University, Dept. of Biomed Engrn, Opt Imaging Lab, St Louis, MO 63130, United States. (2012 Jun 13)

### **Wellman Center for Photomedicine, Boston: Instrument for fluorescence sensing of circulating cells with diffuse light in mice in vivo**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Engineering. According to news originating from Boston, Massachusetts, by NewsRx correspondents, researchers stated “Accurate quantification of circulating cell populations in mice is important in many areas of preclinical biomedical research. Normally, this is done either by extraction and analysis of small blood samples or, more recently, by using microscopy-based in vivo fluorescence flow cytometry.”

Our news journalists obtained a quote from the research by the authors from Wellman Center for Photomedicine, “We describe a new technological approach to this problem using detection of diffuse fluorescent light from relatively large blood vessels in vivo. The diffuse fluorescence flow cytometer (DFFC) uses a laser to illuminate a mouse limb and an array of optical fibers coupled to a high-sensitivity photomultiplier tube array operating in photon counting mode to detect weak fluorescence signals from cells. We first demonstrate that the DFFC instrument is capable of detecting fluorescent microspheres and Vybrant-DiD-labeled cells in a custom-made optical flow phantom with similar size, optical properties, linear flow rates, and autofluorescence as a mouse limb. We also present preliminary data demonstrating that the DFFC is capable of detecting circulating cells in nude mice in vivo.”

According to the news editors, the researchers concluded: “In principle, this device would allow interrogation of the whole blood volume of a mouse in minutes, with sensitivity improvement by several orders of magnitude compared to current approaches.”

For more information on this research see: Instrument for fluorescence sensing of circulating cells with diffuse light in mice in vivo. *Journal of Biomedical Optics*, 2012;17(3):150-157. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news correspondents report that additional information may be obtained from E. Zettergren, Wellman Center Photomed, Boston, MA 02114, United States. (2012 Jun 13)

### **Children’s Hospital, Philadelphia: Validation of diffuse correlation spectroscopic measurement of cerebral blood flow using phase-encoded velocity mapping magnetic resonance imaging**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Hypercapnia. According to news reporting originating in Philadelphia, Pennsylvania, by NewsRx journalists, researchers stated “Diffuse correlation spectroscopy (DCS) is a novel optical technique that appears to be an excellent tool for assessing cerebral blood flow in a continuous and non-invasive manner at the bedside. We present new clinical validation of the DCS methodology by demonstrating strong agreement between DCS indices of relative cerebral blood flow and indices based on phase-encoded velocity mapping magnetic resonance imaging (VENC MRI) of relative blood flow in the jugular veins and superior vena cava.”

The news reporters obtained a quote from the research by the authors from Children’s Hospital, “Data were acquired from 46 children

with single ventricle cardiac lesions during a hypercapnia intervention. Significant increases in cerebral blood flow, measured both by DCS and by VENC MRI, as well as significant increases in oxyhemoglobin concentration, and total hemoglobin concentration, were observed during hypercapnia. Comparison of blood flow changes measured by VENC MRI in the jugular veins and by DCS revealed a strong linear relationship,  $R = 0.88$ ,  $p < 0.001$ , slope =  $0.91 \pm 0.07$ . Similar correlations were observed between DCS and VENC MRI in the superior vena cava,  $R = 0.77$ , slope =  $0.99 \pm 0.12$ ,  $p < 0.001$ .”

According to the news reporters, the researchers concluded: “The relationship between VENC MRI in the aorta and DCS, a negative control, was weakly correlated,  $R = 0.46$ , slope =  $1.77 \pm 0.45$ ,  $p < 0.001$ .”

For more information on this research see: Validation of diffuse correlation spectroscopic measurement of cerebral blood flow using phase-encoded velocity mapping magnetic resonance imaging. *Journal of Biomedical Optics*, 2012;17(3):194-201. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

Our news correspondents report that additional information may be obtained by contacting E.M. Buckley, Children’s Hospital of Philadelphia, Div Neurol, Philadelphia, PA 19104, United States. (2012 Jun 12)

### **Cornell University, Ithaca: Multiphoton microscopy and microspectroscopy for diagnostics of inflammatory and neoplastic lung**

By a News Reporter-Staff News Editor at Cancer Weekly – Researchers detail new data in Lung Cancer. According to news reporting originating from Ithaca, New York, by NewsRx correspondents, researchers stated “Limitations of current medical procedures for detecting early lung cancers inspire the need for new diagnostic imaging modalities for the direct microscopic visualization of lung nodules. Multiphoton microscopy (MPM) provides for subcellular resolution imaging of intrinsic fluorescence from unprocessed tissue with minimal optical attenuation and photodamage.”

Our news editors obtained a quote from the research by the authors from Cornell University, “We demonstrate that MPM detects morphological and spectral features of lung tissue and differentiates between normal, inflammatory and neoplastic lung. Ex vivo MPM imaging of intrinsic two-photon excited fluorescence was performed on mouse and canine neoplastic, inflammatory and tumor-free lung sites. MPM detected microanatomical differences between tumor-free and neoplastic lung tissue similar to standard histopathology but without the need



for tissue processing. Furthermore, inflammatory sites displayed a distinct red-shifted fluorescence compared to neoplasms in both mouse and canine lung, and adenocarcinomas displayed a less pronounced fluorescence emission in the 500 to 550 nm region compared to adenomas in mouse models of lung cancer. These spectral distinctions were also confirmed by two-photon excited fluorescence microspectroscopy.”

According to the news editors, the researchers concluded: “We demonstrate the feasibility of applying MPM imaging of intrinsic fluorescence for the differentiation of lung neoplasms, inflammatory and tumor-free lung, which motivates the application of multiphoton endoscopy for the in situ imaging of lung nodules.”

For more information on this research see: Multiphoton microscopy and microspectroscopy for diagnostics of inflammatory and neoplastic lung. *Journal of Biomedical Optics*, 2012;17(3):141-149. *Journal of Biomedical Optics* can be contacted at: Spie-Soc Photo-Optical Instrumentation Engineers, 1000 20TH St, PO Box 10, Bellingham, WA 98225, USA.

The news editors report that additional information may be obtained by contacting I. Paylova, Cornell University, Coll Vet Med, Sect Pathol, Ithaca, NY 14853, United States. (2012 Jun 12)

### **Florida State University, Tallahassee: Microfluidic extraction and stretching of chromosomal DNA from single cell nuclei for DNA fluorescence hybridization**

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on DNA Research have been presented. According to news reporting originating in Tallahassee, Florida, by NewsRx journalists, researchers stated “We have developed a novel method for genetic characterization of single cells by integrating microfluidic stretching of chromosomal DNA and fiber fluorescence hybridization (FISH). In this method, individually isolated cell nuclei were immobilized in a microchannel.”

The news reporters obtained a quote from the research by the authors from Florida State University, “Chromosomal DNA was released from the nuclei and stretched by a pressure-driven flow. We analyzed and optimized flow conditions to generate a millimeter-long band of stretched DNA from each nucleus. Telomere fiber FISH was successfully performed on the stretched chromosomal DNA.”

According to the news reporters, the researchers concluded: “Individual telomere fiber FISH signals from single cells could be resolved and their lengths measured, demonstrating the ability of the method to quantify genetic features at the level of single cells.”

For more information on this research see: Microfluidic extraction and stretching of chromosomal DNA from single cell nuclei for DNA fluorescence hybridization. *Biomedical Microdevices*, 2012;14(3):443-451. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

Our news correspondents report that additional information may be obtained by contacting X.Z. Wang, Florida State University, Dept. of Biol Sci, Tallahassee, FL 32306, United States. (2012 Jun 12)

### **Florida State University, Tallahassee: Microfluidic extraction and stretching of chromosomal DNA from single cell nuclei for DNA fluorescence in situ hybridization**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on DNA Research are presented in a new report. According to news reporting originating from Tallahassee, Florida, by NewsRx correspondents, researchers stated “We have developed a novel method for genetic characterization of single cells by integrating microfluidic stretching of chromosomal DNA and fiber fluorescence in situ hybridization (FISH). In this method, individually isolated cell nuclei were immobilized in a microchannel.”

Our news editors obtained a quote from the research by the authors from Florida State University, “Chromosomal DNA was released from the nuclei and stretched by a pressure-driven flow. We analyzed and optimized flow conditions to generate a millimeter-long band of stretched DNA from each nucleus. Telomere fiber FISH was successfully performed on the stretched chromosomal DNA.”

According to the news editors, the researchers concluded: “Individual telomere fiber FISH signals from single cells could be resolved and their lengths measured, demonstrating the ability of the method to quantify genetic features at the level of single cells.”

For more information on this research see: Microfluidic extraction and stretching of chromosomal DNA from single cell nuclei for DNA fluorescence in situ hybridization. *Biomedical Microdevices*, 2012;14(3):443-51. *Biomedical Microdevices* can be contacted at: Springer, 233 Spring Street, New York, NY 10013, USA. (Springer - [www.springer.com](http://www.springer.com); Biomedical Microdevices - <http://www.springerlink.com/content/1387-2176/>)

The news editors report that additional information may be obtained by contacting X. Wang, Dept. of Chemical and Biomedical Engineering, FAMU-FSU College of Engineering, Florida State University, 2525 Pottsdamer Street, Tallahassee, FL, 32310, United States.

Publisher contact information for the journal *Biomedical Microdevices* is: Springer, 233 Spring Street, New York, NY 10013, USA. (2012 Jun 12)

## **Laval University, Quebec City: Predicting fracture using 2D finite element modelling**

By a News Reporter-Staff News Editor at Medical Imaging Law Weekly – Current study results on Bone Research have been published. According to news reporting originating from Quebec City, Canada, by NewsRx correspondents, researchers stated “A decrease in bone density at the hip or spine has been shown to increase the risk of fracture. A limitation of the bone mineral density (BMD) measurement is that it provides only a measure of a bone sample’s average density when projected onto a 2D surface.”

Our news editors obtained a quote from the research by the authors from Laval University, “Effectively, what determines bone fracture is whether an applied load exceeds ultimate strength, with both bone tissue material properties (can be approximated through bone density), and geometry playing a role. The goal of this project was to use bone geometry and BMD obtained from radiographs and DXA measurements respectively to estimate fracture risk, using a two-dimensional finite element model (FEM) of the sagittal plane of lumbar vertebrae. The Canadian Multicentre Osteoporosis Study (CaMos) data was used for this study. There were 4194 men and women over the age of 50 years, with 786 having fractures. Each subject had BMD testing and radiographs of their lumbar vertebrae. A single two dimensional FEM of the first to fourth lumbar vertebra was automatically generated for each subject. Bone tissue stiffness was assigned based on the BMD of the individual vertebrae, and adjusted for patient age. Axial compression boundary conditions were applied with a force proportional to body mass. The resulting overall strain from the applied force was found. Men and women were analyzed separately. At baseline, the sensitivity of BMD to predict fragility fractures in women and men was 3.77% and 0.86%, while the sensitivity of FEM to predict fragility fractures for women and men was 10.8% and 11.3%. The FEM ROC curve demonstrated better performance compared to BMD.”

According to the news editors, the researchers concluded: “The relative risk of being considered at high fracture risk using FEM at baseline, was a better predictor of 5 year incident fragility fracture risk compared to BMD.”

For more information on this research see: Predicting fracture using 2D finite element modelling. *Medical Engineering & Physics*, 2012;34(4):478-484. *Medical Engineering & Physics* can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford

OX5 1GB, Oxon, England. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Medical Engineering & Physics - [http://www.elsevier.com/wps/product/cws\\_home/30456](http://www.elsevier.com/wps/product/cws_home/30456))

The news editors report that additional information may be obtained by contacting J.A.M. MacNeil, Laval University, Quebec City, PQ G1K 7P4, Canada. (2012 Jun 12)

### **University of Freiburg: Highly flexible capacitive strain gauge for continuous long-term blood pressure monitoring**

By a News Reporter-Staff News Editor at Hematology Week – Investigators publish new report on Blood Pressure. According to news reporting originating in Freiburg, Germany, by NewsRx journalists, researchers stated “An innovative procedure for measuring blood pressure, with none of the disadvantages of current procedures, is proposed. A highly-flexible capacitive strain gauge has been designed to measure changes in the diameter of a blood vessel; such changes are indicative of blood pressure.”

The news reporters obtained a quote from the research by the authors from the University of Freiburg, “The sensor is implanted and wrapped around an arterial blood vessel during the normal course of a surgical procedure. tests, demonstrating the feasibility of this concept, are reported, along with tests and notes on sensor design and fabrication. These continuous blood pressure monitoring sensors may be used for a continuous long-term monitoring of blood pressure and pulse.”

According to the news reporters, the researchers concluded: “They may also be combined with a real-time nerve stimulation technique or a course of medication to create a closed-loop system for blood-pressure control.”

For more information on this research see: Highly flexible capacitive strain gauge for continuous long-term blood pressure monitoring. *Biomedical Microdevices*, 2012;14(3):573-581. *Biomedical Microdevices* can be contacted at: Springer, Van Godewijkstraat 30, 3311 Gz Dordrecht, Netherlands. (Springer - [www.springer.com](http://www.springer.com); *Biomedical Microdevices* - <http://www.springerlink.com/content/1387-2176/>)

Our news correspondents report that additional information may be obtained by contacting P. Bingger, University of Freiburg, Dept. of Microsyst Engn IMTEK, D-79110 Freiburg, Germany. (2012 Jun 11)

### **Zhejiang University, Hangzhou: Using graphics processing units to accelerate perturbation Monte Carlo simulation in a turbid medium**

By a News Reporter-Staff News Editor at Science Letter – Research findings on Science are discussed in a new report. According to news originating from Hangzhou, People’s Republic of China, by NewsRx correspondents, researchers stated “We report a fast perturbation Monte Carlo (PMC) algorithm accelerated by graphics processing units (GPU). The two-step PMC simulation [Opt. Lett. 36, 2095 (2011)] is performed by storing the seeds instead of the photon’s trajectory, and thus the requirement in computer random-access memory (RAM) becomes minimal.”

Our news journalists obtained a quote from the research by the authors from Zhejiang University, “The two-step PMC is extremely suitable for implementation onto GPU. In a standard simulation of spatially-resolved photon migration in the turbid media, the acceleration ratio between using GPU and using conventional CPU is about 1000.”

According to the news editors, the researchers concluded: “Furthermore, since in the two-step PMC algorithm one records the effective seeds, which is associated to the photon that reaches a region of interest in this letter, and then re-run the MC simulation based on the recorded effective seeds, radiative transfer equation (RTE) can be solved by two-step PMC not only with an arbitrary change in the absorption coefficient, but also with large change in the scattering coefficient.”

For more information on this research see: Using graphics processing units to accelerate perturbation Monte Carlo simulation in a turbid medium. *Journal of Biomedical Optics*, 2012;17(4):040502.

The news correspondents report that additional information may be obtained from F. Cai, Zhejiang University, Centre for Optical and Electromagnetic Research, Zhejiang Key Laboratory of Sensing Technologies, Hangzhou 310058, People’s Taiwan. (2012 Jun 08)

### **Aarhus University: Equivalence of double and single wave vector diffusion contrast at low diffusion weighting**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Engineering. According to news originating from Aarhus, Denmark, by NewsRx editors, the researcher stated “Multiple pulsed field gradient diffusion sequences have received renewed interest in recent years as a potentially new type of MRI contrast. This attention is largely a result of the ability to measure pore

sizes using low-amplitude diffusion gradients, and to distinguish between macroscopically isotropic systems of anisotropic pores and systems of isotropic pores.”

Our news journalists obtained a quote from the research by the author from Aarhus University, “In this article, it is shown that, under many circumstances, the same type of information can be obtained by combining two or more standard single pulse diffusion-weighted experiments acquired at different diffusion times. Similarly, information from multiple pulsed field gradient diffusion can be reconstructed from several single pulsed diffusion experiments. This possibility is rooted in the information contained in the time dependence of the diffusion tensor, which provides a complete description of the diffusion-weighted MR signal at low gradient amplitudes. The new information arising at the fourth order in the cumulant expansion is discussed. The coupling of the wave vectors at long mixing times is found to be controlled by the variance of the single pore mean displacement tensor. In particular, a discussion is given concerning the way in which the sensitivity of the fourth-order term to the pore shape anisotropy is modulated by pore orientation anisotropy and vanishes in coherently oriented homogeneous ensembles.”

According to the news editors, the researchers concluded: “For macroscopically isotropic systems, a new index of pore shape anisotropy is proposed.”

For more information on this research see: Equivalence of double and single wave vector diffusion contrast at low diffusion weighting. *Nmr In Biomedicine*, 2012;25(6):813-8. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

The news correspondents report that additional information may be obtained from S.N. Jespersen, Center of Functionally Integrative Neuroscience, MINDLab, Aarhus University, Aarhus, Denmark. (2012 Jun 06)

### **Massachusetts Institute of Technology, Cambridge: A nonparametric surrogate-based test of significance for T-wave alternans detection**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news originating from Cambridge, Massachusetts, by NewsRx correspondents, researchers stated “We present a nonparametric adaptive surrogate test that allows for the differentiation of statistically significant T-wave alternans (TWA) from alternating patterns that can be solely explained by the statistics of noise. The proposed test is based on estimating the distribution of noise-induced alternating patterns in

a beat sequence from a set of surrogate data derived from repeated reshuffling of the original beat sequence.”

Our news journalists obtained a quote from the research by the authors from the Massachusetts Institute of Technology, “Thus, in assessing the significance of the observed alternating patterns in the data, no assumptions are made about the underlying noise distribution. In addition, since the distribution of noise-induced alternans magnitudes is calculated separately for each sequence of beats within the analysis window, the method is robust to data nonstationarities in both noise and TWA. The proposed surrogate method for rejecting noise was compared to the standard noise-rejection methods used with the spectral method (SM) and the modified moving average (MMA) techniques. Using a previously described realistic multilead model of TWA and real physiological noise, we demonstrate the proposed approach that reduces false TWA detections while maintaining a lower missed TWA detection, compared with all the other methods tested. A simple averaging-based TWA estimation algorithm was coupled with the surrogate significance testing and was evaluated on three public databases: the Normal Sinus Rhythm Database, the Chronic Heart Failure Database, and the Sudden Cardiac Death Database. Differences in TWA amplitudes between each database were evaluated at matched heart rate (HR) intervals from 40 to 120 beats per minute (BPM). Using the two-sample Kolmogorov-Smirnov test, we found that significant differences in TWA levels exist between each patient group at all decades of HRs.”

According to the news editors, the researchers concluded: “The most-marked difference was generally found at higher HRs, and the new technique resulted in a larger margin of separability between patient populations than when the SM or MMA were applied to the same data.”

For more information on this research see: A nonparametric surrogate-based test of significance for T-wave alternans detection. *Ieee Transactions On Bio-medical Engineering*, 2011;58(5):1356-64.

The news correspondents report that additional information may be obtained from S. Nemati, Massachusetts Institute of Technology, Cambridge, MA 02139, United States. (2012 Jun 06)

### **Mayo Clinic, Rochester: Shear elastic modulus estimation from indentation and SDUV on gelatin phantoms**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Engineering have been published. According to news reporting from Rochester, Minnesota, by NewsRx journalists, researchers stated “Tissue mechanical properties such as elasticity are linked to tissue pathology state. Several groups have proposed shear wave propagation speed to quantify tissue mechanical properties.”

The news correspondents obtained a quote from the research by the authors from Mayo Clinic, “It is well known that biological tissues are viscoelastic materials; therefore, velocity dispersion resulting from material viscoelasticity is expected. A method called shearwave dispersion ultrasound vibrometry (SDUV) can be used to quantify tissue viscoelasticity by measuring dispersion of shear wave propagation speed. However, there is not a gold standard method for validation. In this study, we present an independent validation method of shear elastic modulus estimation by SDUV in three gelatin phantoms of differing stiffness. In addition, the indentation measurements are compared to estimates of elasticity derived from shear wave group velocities. The shear elastic moduli from indentation were 1.16, 3.40, and 5.6 kPa for a 7%, 10%, and 15% gelatin phantom, respectively. SDUV measurements were 1.61, 3.57, and 5.37 kPa for the gelatin phantoms, respectively. Shear elastic moduli derived from shear wave group velocities were 1.78, 5.2, and 7.18 kPa for the gelatin phantoms, respectively. The shear elastic modulus estimated from the SDUV, matched the elastic modulus measured by indentation. On the other hand, shear elastic modulus estimated by group velocity did not agree with indentation test estimations. These results suggest that shear elastic modulus estimation by group velocity will be bias when the medium being investigated is dispersive.”

According to the news reporters, the researchers concluded: “Therefore, a rheological model should be used in order to estimate mechanical properties of viscoelastic materials.”

For more information on this research see: Shear elastic modulus estimation from indentation and SDUV on gelatin phantoms. *Ieee Transactions On Bio-medical Engineering*, 2011;58(6):1706-14.

Our news journalists report that additional information may be obtained by contacting C. Amador, Dept. of Physiology and Biomedical Engineering, Mayo Clinic College of Medicine, Rochester, MN 55905, United States. (2012 Jun 06)

### **Montreal Heart Institute: A three-layer model for buckling of a human aortic segment under specific flow-pressure conditions**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Engineering are presented in a new report. According to news reporting from Montreal, Canada, by NewsRx journalists, researchers stated “Human aortas are subjected to large mechanical stresses because of blood flow pressurization and through contact with the surrounding tissue. It is essential that the aorta does not lose stability by buckling with deformation of the cross-section (shell-like buckling) (i) for its proper functioning to ensure blood flow and (ii) to avoid high stresses in the aortic wall.”



The news correspondents obtained a quote from the research by the authors from Montreal Heart Institute, “A numerical bifurcation analysis employs a refined reduced-order model to investigate the stability of a straight aorta segment conveying blood flow. The structural model assumes a nonlinear cylindrical orthotropic laminated composite shell composed of three layers representing the tunica intima, media and adventitia. Residual stresses because of pressurization are evaluated and included in the model. The fluid is formulated using a hybrid model that contains the unsteady effects obtained from linear potential flow theory and the steady viscous effects obtained from the time-averaged NavierStokes equations. The aortic segment loses stability by divergence with deformation of the cross-section at a critical flow velocity for a given static pressure, exhibiting a strong subcritical behaviour with partial or total collapse of the inner wall.”

According to the news reporters, the researchers concluded: “Preliminary results suggest directions for further study in relation to the appearance and growth of dissection in the aorta.”

For more information on this research see: A three-layer model for buckling of a human aortic segment under specific flow-pressure conditions. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(5):495-512. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, Commerce Place, 350 Main St, Malden 02148, MA, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news journalists report that additional information may be obtained by contacting M. Amabili, Montreal Heart Inst, Res Center, Montreal, PQ H1T 1C8, Canada. (2012 Jun 06)

### **Peking University, Beijing: Analysis of anti-inflammatory dehydrodiisoeugenol and metabolites excreted in rat feces and urine using HPLC-UV**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Metabolism. According to news reporting out of Beijing, People’s Republic of China, by NewsRx editors, researchers stated “Dehydrodiisoeugenol (DDIE) is a lignan in the fruit of *Myristica fragrans*. It can be converted into several metabolites in in vitro and in vivo metabolism.”

Our news journalists obtained a quote from the research by the authors from Peking University, “In this study, the excretion of DDIE in

urine and feces was investigated after intravenous (i.v.) and intragastric (i.g.) administration to rats. DDIE and its metabolites (M-1 and M-2) were measured using HPLC. The amount of DDIE and its metabolites excreted was higher in feces than in urine, suggesting that DDIE and its metabolites are eliminated primarily in the feces. Significant differences in the excretion levels of DDIE and its metabolites were seen between i.v. and i.g. administration. Greater amounts of DDIE and its metabolites were excreted following i.v. administration, suggesting that DDIE can exert a longer period of anti-inflammatory activity following i.g. administration. The accuracy, precision, recovery and stability of the analytical method in this study were satisfactory for the measurement of DDIE and its metabolites in rat urine and feces.”

According to the news editors, the researchers concluded: “Observations made in this study will contribute to understanding of the absorption, distribution, metabolism and excretion pathway of DDIE and will aid decision-making regarding the best mode of DDIE administration during treatment to maximize its anti-inflammatory effects.”

For more information on this research see: Analysis of anti-inflammatory dehydrodiisoeugenol and metabolites excreted in rat feces and urine using HPLC-UV. *Biomedical Chromatography*, 2012;26(6):703-707. *Biomedical Chromatography* can be contacted at: Wiley-Blackwell, Commerce Place, 350 Main St, Malden 02148, MA, USA. (Wiley-Blackwell - <http://www.wiley.com/>; Biomedical Chromatography - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-0801](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-0801))

Our news journalists report that additional information may be obtained by contacting F. Li, Peking University, Sch Pharmaceut Sci, Dept. of Nat Med, Beijing 100191, People’s Republic of China. (2012 Jun 06)

## **Stanford University: Fluid-structure interaction simulations of the Fontan procedure using variable wall properties**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating from Stanford, California, by NewsRx correspondents, researchers stated “Children born with single ventricle heart defects typically undergo a staged surgical procedure culminating in a total cavopulmonary connection (TCPC) or Fontan surgery. The goal of this work was to perform physiologic, patient-specific hemodynamic simulations of two post-operative TCPC patients by using fluidstructure interaction (FSI) simulations.”

Our news editors obtained a quote from the research by the authors from Stanford University, “Data from two patients are presented, and post-op anatomy is reconstructed from MRI data. Respiration rate,

heart rate, and venous pressures are obtained from catheterization data, and inflow rates are obtained from phase contrast MRI data and are used together with a respiratory model. Lumped parameter (Windkessel) boundary conditions are used at the outlets. We perform FSI simulations by using an arbitrary LagrangianEulerian finite element framework to account for motion of the blood vessel walls in the TCPC. This study is the first to introduce variable elastic properties for the different areas of the TCPC, including a Gore-Tex conduit. Quantities such as wall shear stresses and pressures at critical locations are extracted from the simulation and are compared with pressure tracings from clinical data as well as with rigid wall simulations. Hepatic flow distribution and energy efficiency are also calculated and compared for all cases. There is little effect of FSI on pressure tracings, hepatic flow distribution, and time-averaged energy efficiency.”

According to the news editors, the researchers concluded: “However, the effect of FSI on wall shear stress, instantaneous energy efficiency, and wall motion is significant and should be considered in future work, particularly for accurate prediction of thrombus formation.”

For more information on this research see: Fluid-structure interaction simulations of the Fontan procedure using variable wall properties. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(5):513-527. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, Commerce Place, 350 Main St, Malden 02148, MA, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *International Journal for Numerical Methods in Biomedical Engineering* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

The news editors report that additional information may be obtained by contacting C.C. Long, Stanford University, Stanford, CA 94305, United States. (2012 Jun 06)

### **University of Bordeaux: Feasibility of fast MR-thermometry during cardiac radiofrequency ablation**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedicine. According to news reporting originating in Bordeaux, France, by NewsRx journalists, researchers stated “Online MR temperature monitoring during radiofrequency (RF) ablation of cardiac arrhythmias may improve the efficacy and safety of the treatment. MR thermometry at 1.5 T using the proton resonance frequency (PRF) method was assessed in 10 healthy volunteers under normal breathing conditions, using a multi-slice, ECG-gated, echo planar imaging (EPI) sequence in combination with slice tracking.”

The news reporters obtained a quote from the research by the authors from the University of Bordeaux, “Temperature images were post-processed to remove residual motion-related artifacts. Using an MR-compatible steerable catheter and electromagnetic noise filter, RF ablation was performed in the ventricles of two sheep in vivo. The standard deviation of the temperature evolution in time (TSD) was computed. Temperature mapping of the left ventricle was achieved at an update rate of approximately 1 Hz with a mean TSD of  $3.6 \pm 0.9$  °C. TSD measurements at the septum showed a higher precision ( $2.8 \pm 0.9$  °C) than at the myocardial regions at the heart-lung and heart-liver interfaces ( $4.1 \pm 0.9$  °C). Temperature rose maximally by  $9 \pm 16$  °C and  $16 \pm 16$  °C during 5 W and 10 W RF applications, respectively, for 60 s each. Tissue temperature can be monitored at an update rate of approximately 1 Hz in five slices.”

According to the news reporters, the researchers concluded: “Typical temperature changes observed during clinical RF application can be monitored with an acceptable level of precision.”

For more information on this research see: Feasibility of fast MR-thermometry during cardiac radiofrequency ablation. *Nmr In Biomedicine*, 2012;25(4):556-62. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news correspondents report that additional information may be obtained by contacting B.D. de Senneville, Laboratory for Molecular and Functional Imaging: From Physiology to Therapy, FRE 3313 CNRS, Universite Bordeaux 2, Bordeaux, France. (2012 Jun 06)

### **University of California, San Francisco: Vascular patterning and permeability in prostate cancer models with differing osteogenic properties**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Prostate Cancer is now available. According to news reporting out of San Francisco, California, by NewsRx editors, researchers stated “Bone metastasis is a major cause of morbidity and mortality in prostate cancer. However, the lack of clinically relevant models hinders our understanding of the disease as well as development of effective therapies and imaging approaches.”

Our news journalists obtained a quote from the research by the authors from the University of California, “We used noninvasive MRI, histology and micro CT to further characterize the newly established prostate cancer bone metastases-derived model MDA-PCa-118b, and to compare it to the well-established PC-3MM2 model with regard to bone

structure and vascular patterning. The PC-3MM2 model is highly osteolytic whereas the MDA-PCa-118b model shows a robust osteoblastic reaction, as often seen in clinical cases. Macromolecular contrast enhanced MRI revealed differences in vascular permeability patterns, which appeared peripheral for PC-3MM2 and nodular for MDA-PCa-118b, matching the microscopic cellular composition of each model: PC-3MM2 exclusively recruits endothelial cells to form thin tumor-core blood vessels and enlarged, leaky peripheral vessels, whereas MDA-PCa-118b also recruits bone-forming cells and pericytes such that small tumor nests are encircled with leaky vessels and embedded in bone-like tissue dotted with pericyte-covered vessels. Despite these structural differences, vascular permeability was reduced in both tumor models by either imatinib or SU10944 treatment.”

According to the news editors, the researchers concluded: “This study highlights the importance of clinically relevant osteogenic models of human prostate cancer and the value of such models not only in enhancing our understanding of tumorigenesis, metastasis and response to therapy, but also for development of appropriate methods for noninvasive imaging of these processes.”

For more information on this research see: Vascular patterning and permeability in prostate cancer models with differing osteogenic properties. *Nmr In Biomedicine*, 2012;25(6):843-51. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news journalists report that additional information may be obtained by contacting H. Dafni, Radiology and Biomedical Imaging, University of California, San Francisco, CA, United States. (2012 Jun 06)

### **University of Florida, Gainesville: Personalized neuromusculoskeletal modeling to improve treatment of mobility impairments: a perspective from European research sites**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting originating in Gainesville, Florida, by NewsRx journalists, researchers stated “Mobility impairments due to injury or disease have a significant impact on quality of life. Consequently, development of effective treatments to restore or replace lost function is an important societal challenge.”

The news reporters obtained a quote from the research by the authors from the University of Florida, “In current clinical practice, a treatment plan is often selected from a standard menu of options rather

than customized to the unique characteristics of the patient. Furthermore, the treatment selection process is normally based on subjective clinical experience rather than objective prediction of post-treatment function. The net result is treatment methods that are less effective than desired at restoring lost function. This paper discusses the possible use of personalized neuromusculoskeletal computer models to improve customization, objectivity, and ultimately effectiveness of treatments for mobility impairments. The discussion is based on information gathered from academic and industrial research sites throughout Europe, and both clinical and technical aspects of personalized neuromusculoskeletal modeling are explored. On the clinical front, we discuss the purpose and process of personalized neuromusculoskeletal modeling, the application of personalized models to clinical problems, and gaps in clinical application. On the technical front, we discuss current capabilities of personalized neuromusculoskeletal models along with technical gaps that limit future clinical application.”

According to the news reporters, the researchers concluded: “We conclude by summarizing recommendations for future research efforts that would allow personalized neuromusculoskeletal models to make the greatest impact possible on treatment design for mobility impairments.”

For more information on this research see: Personalized neuromusculoskeletal modeling to improve treatment of mobility impairments: a perspective from European research sites. *Journal of Neuroengineering and Rehabilitation*, 2012;9(0):18. (BioMed Central - <http://www.biomedcentral.com/>; *Journal of Neuroengineering and Rehabilitation* - [www.jneuroengrehab.com](http://www.jneuroengrehab.com))

Our news correspondents report that additional information may be obtained by contacting B.J. Fregly, Departments of Mechanical & Aerospace Engineering, Biomedical Engineering and Orthopaedics & Rehabilitation, University of Florida, 231 MAE-A Building, PO, Box 116250, Gainesville, FL 32611-6250, United States. (2012 Jun 06)

### **University of Sydney: Measuring changes in muscle stiffness after eccentric exercise using elastography**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Biomedical Engineering is now available. According to news originating from Sydney, Australia, by NewsRx correspondents, researchers stated “Muscle stiffness has been reported to increase following eccentric muscle exercise, but to date only indirect methods have been used to measure it. This study aimed to use Magnetic Resonance Elastography (MRE), a noninvasive imaging technique, to assess the time-course of passive elasticity changes in the medial gastrocnemius and soleus muscles before and after a bout of eccentric exercise.”

Our news journalists obtained a quote from the research by the authors from the University of Sydney, “Shear storage modulus (G') and loss modulus (G'') measurements were made in eight healthy subjects for both muscles in vivo before, one hour after, 48 hours after and 1?week after eccentric exercise. The results show a 21% increase in medial gastrocnemius storage modulus following eccentric exercise with a peak occurring similar to 48 hours after exercise (before exercise 1.15 +/- 0.23?kPa, 48 hours after 1.38 +/- 0.27?kPa). No significant changes in soleus muscle storage modulus were measured for the exercise protocol used in this study, and no significant changes in loss modulus were observed.”

According to the news editors, the researchers concluded: “This study provides the first direct measurements in skeletal muscle before and after eccentric exercise damage and suggests that MRE can be used to detect the time course of changes to muscle properties.”

For more information on this research see: Measuring changes in muscle stiffness after eccentric exercise using elastography. *NMR in Biomedicine*, 2012;25(6):852-858. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, Commerce Place, 350 Main St, Malden 02148, MA, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

The news correspondents report that additional information may be obtained from M.A. Green, University of Sydney, George Inst Global Hlth, Sydney, NSW 2006, Australia. (2012 Jun 06)

### **Case Western Reserve University, Cleveland: Assessing mitochondrial respiration in isolated hearts using 17O MRS**

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on Biomedical Engineering have been presented. According to news reporting originating in Cleveland, Ohio, by NewsRx journalists, researchers stated “The application of 17O MRI and MRS for the evaluation of cardiac mitochondrial function has been limited because of the challenge of detecting metabolic H217O in the vast background of naturally abundant H217O. In this study, we have developed a direct 17O MRS approach to examine the feasibility and sensitivity of detecting metabolically produced H217O in isolated rat hearts perfused with 17O2-enriched KrebsHenseleit buffer containing normal (1.5?mm) and high (2.5?mm) calcium (Ca2+) concentrations to induce high workload.”

The news reporters obtained a quote from the research by the authors from Case Western Reserve University, “Consistent with increased workload at high Ca2+ concentration, the measured myocardial oxygen consumption rate (MVO2) increased by 82%. Dynamic 17O MRS

showed an accelerated increase in the H217O signal at high Ca<sup>2+</sup> concentration, suggesting increased mitochondrial production of H217O in concordance with the increased workload. A compartment model was developed to describe the kinetics of H217O production as a function of MVO<sub>2</sub>. The myocardial 17O<sub>2</sub> consumption rate (MV17O<sub>2</sub>) was determined by least-squares fitting of the model to the NMR-measured H217O concentration. Consistent with the measured MVO<sub>2</sub>, the model-determined MV17O<sub>2</sub> showed a 92% increase at high Ca<sup>2+</sup> concentration. The increase in metabolic activity at high workload allowed the balance between ATP production and utilization to be maintained, leading to a similar phosphocreatine to ATP ratio.”

According to the news reporters, the researchers concluded: “These results demonstrate that dynamic 17O MRS can provide a valuable tool for the detection of an altered metabolic rate associated with a change in cardiac workload.”

For more information on this research see: Assessing mitochondrial respiration in isolated hearts using 17O MRS. *NMR in Biomedicine*, 2012;25(6):883-889. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, Commerce Place, 350 Main St, Malden 02148, MA, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news correspondents report that additional information may be obtained by contacting M. Lu, Case Western Reserve University, Dept. of Physiol & Biophys, Cleveland, OH 44106, United States. (2012 Jun 05)

### **Indian Institute of Technology, Roorkee: HPLC enantioresolution of (R,S)-baclofen using three newly synthesized dichloro-s-triazine reagents having amines and five others having amino acids as chiral auxiliaries**

By a News Reporter-Staff News Editor at Life Science Weekly – New research on Amines is the subject of a report. According to news reporting out of Roorkee, India, by NewsRx editors, researchers stated “Enantioresolution of (R,S)-baclofen was accomplished using a newly synthesized set of three chiral derivatizing reagents (CDRs) having amines [(S)-(-)-a,4-dimethylbenzylamine, (-)-cis-myrtanylamine and (-)-1-cyclohexylethylamine] as chiral auxiliaries in cyanuric chloride and another set of five CDRs having amino acids (l-Leu, d-Phg, l-Val, l-Met and l-Ala) as chiral auxiliaries. These eight CDRs were used for synthesis of diastereomers of (R,S)-baclofen under microwave irradiation.”

Our news journalists obtained a quote from the research by the authors from the Indian Institute of Technology, “The diastereomers



were separated on a reversed-phase C(18) column using mixtures of methanol with aqueous trifluoroacetic acid with UV detection at 230?nm. Chromatographic data obtained for the two sets of diastereomers were compared among themselves and among the two groups.”

According to the news editors, the researchers concluded: “The method was validated for limit of detection, linearity, accuracy and precision.”

For more information on this research see: HPLC enantioresolution of (R,S)-baclofen using three newly synthesized dichloro-s-triazine reagents having amines and five others having amino acids as chiral auxiliaries. *Biomedical Chromatography*, 2012;26(6):743-8. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news journalists report that additional information may be obtained by contacting R. Bhushan, Dept. of Chemistry, Indian Institute of Technology Roorkee, Roorkee, 247667, India. (2012 Jun 05)

### **Medical University, Vienna: Quantitative analysis of lumbar intervertebral disc abnormalities at 3.0 Tesla: value of T(2) texture features and geometric parameters**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Biomedical Engineering have been published. According to news reporting from Vienna, Austria, by NewsRx journalists, researchers stated “T(2) relaxation time mapping provides information about the biochemical status of intervertebral discs. The present study aimed to determine whether texture features extracted from T(2) maps or geometric parameters are sensitive to the presence of abnormalities at the posterior aspect of lumbar intervertebral discs, i.e. bulging and herniation.”

The news correspondents obtained a quote from the research by the authors from Medical University, “Thirty-one patients (21 women and 10 men; age range 18-51?years) with low back pain were enrolled. MRI of the lumbar spine at 3.0 Tesla included morphological T(1) -and T(2) -weighted fast spin-echo sequences, and multi-echo spin-echo sequences that were used to construct T(2) maps. On morphological MRI, discs were visually graded into ‘normal’, ‘bulging’ or ‘herniation’. On T(2) maps, texture analysis (based on the co-occurrence matrix and wavelet transform) and geometry analysis of the discs were performed. The three T(2) texture features and geometric parameters best-suited for distinguishing between normal discs and discs with bulging or herniation were determined using Fisher coefficients. Statistical analysis comprised ANCOVA and post hoc t-tests. Eighty-two discs were classified as ‘normal’, 49 as ‘bulging’ and 20 showed ‘herniation.’ The T(2)

texture features Entropy and Difference Variance, and all three pre-selected geometric parameters differed significantly between normal and bulging, normal and herniated, and bulging and herniated discs ( $p < 0.05$ )."

According to the news reporters, the researchers concluded: "These findings suggest that T(2) texture features and geometric parameters are sensitive to the presence of abnormalities at the posterior aspect of lumbar intervertebral discs, and may thus be useful as quantitative biomarkers that predict disease."

For more information on this research see: Quantitative analysis of lumbar intervertebral disc abnormalities at 3.0 Tesla: value of T(2) texture features and geometric parameters. *Nmr In Biomedicine*, 2012;25(6):866-72. (Wiley-Blackwell - <http://www.wiley.com/>; *Nmr In Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news journalists report that additional information may be obtained by contacting M.E. Mayerhoefer, Dept. of Radiology, Medical University of Vienna, Lazarettgasse 14, 1090, Vienna, Austria. (2012 Jun 05)

## **Siemens, New York City: An evaluation of motion compensation strategies and repeatability for abdominal 1H MR spectroscopy measurements in volunteer studies and clinical trials**

By a News Reporter-Staff News Editor at Life Science Weekly – Researchers detail new data in Biomedical Engineering. According to news reporting out of New York City, New York, by NewsRx editors, researchers stated "Increased expression of choline kinase has frequently been shown in tumours and is thought to be associated with disease progression. Studies using magnetic resonance spectroscopy have shown an increase in total choline-containing metabolites (tCho) in tumour compared with healthy tissue."

Our news journalists obtained a quote from the research by the authors from Siemens, "Subsequent reductions in tCho following successful treatment support the use of tCho as a biomarker of disease and response. However, accurate measurement of tCho using MRS in abdominal tumours is complicated by respiratory motion, blurring the acquisition volume and degrading the lineshape and signal-to-noise ratio (SNR) of metabolites. Motion compensation using prospectively gated acquisitions or offline correction of phase and frequency distortions can help restore the SNR and linewidth of metabolites. Prospectively gated acquisitions have the advantage of confining the volume of acquisition to the prescribed volume but are constrained by the repetition time (TR)

of the respiratory motion. In contrast, data acquired for offline correction may use a shorter repetition time and therefore yield an increased SNR per unit time. In this study abdominal spectra acquired from single-voxel free-breathing measurements in liver of healthy volunteers and in abdominal tumours of cancer patients were compared with those of prospective gating and with an implementation of offline correction. The two motion compensation methodologies were assessed in terms of SNR, linewidth and repeatability. Our experiments show that prospective gating and offline correction result in a 1222% reduction in median tCho linewidth, while offline correction also provides a significant increase in SNR. The repeatability coefficient (the expected interval for 95% of repeat measurements) for tCho/water ratio was reduced by 37% (prospective gating) and 41% (offline correction). Both methods of motion compensation substantially improved the reproducibility of the tCho/water measurement and the tCho linewidth."

According to the news editors, the researchers concluded: "While offline correction also leads to a significant improvement in SNR, it may suffer more from out-of-voxel contamination."

For more information on this research see: An evaluation of motion compensation strategies and repeatability for abdominal  $^1\text{H}$  MR spectroscopy measurements in volunteer studies and clinical trials. *NMR in Biomedicine*, 2012;25(6):859-865. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, Commerce Place, 350 Main St, Malden 02148, MA, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

Our news journalists report that additional information may be obtained by contacting M. Germuska, Siemens Med Solut, New York, NY, United States. (2012 Jun 05)

### **University of Milan: Ethidium bromide as a marker of mtDNA replication in living cells**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Science. According to news reporting originating from Milan, Italy, by NewsRx correspondents, researchers stated "Mitochondrial DNA (mtDNA) in tumor cells was found to play an important role in maintaining the malignant phenotype. Using laser scanning confocal fluorescence microscopy (LSCFM) in a recent work, we reported a variable fluorescence intensity of ethidium bromide (EB) in mitochondria nucleoids of living carcinoma cells."

Our news editors obtained a quote from the research by the authors from the University of Milan, "Since when EB is bound to nucleic acids its fluorescence is intensified; a higher EB fluorescence intensity could reflect a higher DNA accessibility to EB, suggesting a higher mtDNA

replication activity. To prove this hypothesis, in the present work we studied, by LSCFM, the EB fluorescence in mitochondria nucleoids of living neuroblastoma cells, a model system in which differentiation affects the level of mtDNA replication. A drastic decrease of fluorescence was observed after differentiation. To correlate EB fluorescence intensity to the mtDNA replication state, we evaluated the mtDNA nascent strands content by ligation-mediated real-time PCR, and we found a halved amount of replicating mtDNA molecules in differentiating cells. A similar result was obtained by BrdU incorporation.”

According to the news editors, the researchers concluded: “These results indicate that the low EB fluorescence of nucleoids in differentiated cells is correlated to a low content of replicating mtDNA, suggesting that EB may be used as a marker of mtDNA replication in living cells.”

For more information on this research see: Ethidium bromide as a marker of mtDNA replication in living cells. *Journal of Biomedical Optics*, 2012;17(4):046001.

The news editors report that additional information may be obtained by contacting A.M. Villa, University of Milano-Bicocca, Dept. of Biotechnology e Biosciences, Pza della Scienza 2, 20126 Milan, Italy. (2012 Jun 05)

## **University of Queensland, Brisbane: An orthogonal-based decoupling method for MRI phased array coil design**

By a News Reporter-Staff News Editor at Life Science Weekly – Research findings on Biomedical Engineering are discussed in a new report. According to news reporting out of Brisbane, Australia, by NewsRx editors, researchers stated “A new 2?T 3-element orthogonal knee coil array based on the three-dimensional orthogonality principle was designed, constructed and used in a series of pilot magnetic resonance imaging (MRI) studies on a standardized phantom, and human and pig knees. The coil elements within this new coil array are positioned orthogonal to one another allowing problematic mutual coupling effects to be minimized without the use of any passive mutual decoupling schemes.”

Our news journalists obtained a quote from the research by the authors from the University of Queensland, “The proposed method is appropriate for the design of transmit, receive and/or transceive radiofrequency (RF) coil arrays for applications in animal/human MRI and spectroscopic studies. Experimental results demonstrated that the 3-element orthogonal knee coil array could be angled arbitrarily, including at 90 degrees, relative to the main static magnetic field (B0) whilst maintaining normal operation with minimal loss of efficiency and functionality.”

According to the news editors, the researchers concluded: "Initial trials with a pig knee specimen further showed that the greatest signal intensity in the patellar ligament (parallel collagen fibres) was observed when the orthogonal knee coil array and the pig knee specimen were angled at similar to 55 degrees to B0, which may have potential uses in magic angle MR applications."

For more information on this research see: An orthogonal-based decoupling method for MRI phased array coil design. *NMR in Biomedicine*, 2012;25(6):835-842. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, Commerce Place, 350 Main St, Malden 02148, MA, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-1492](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-1492))

Our news journalists report that additional information may be obtained by contacting B.K. Li, University of Queensland, Sch Informat Technol & Elect Engn, Brisbane, Qld 4072, Australia. (2012 Jun 05)

### **University of Valencia: HPLC-UV analytical method for determination of pizotifen after in vitro transdermal diffusion studies**

By a News Reporter-Staff News Editor at Life Science Weekly – A new study on Biomedical Engineering is now available. According to news reporting from Valencia, Spain, by NewsRx journalists, researchers stated "Pizotifen malate is an antihistamine and serotonin inhibitor used in the preventive treatment of migraine and eating disorders. A simple, rapid, accurate and precise high-performance liquid chromatography (HPLC) method involving ultraviolet detection was validated for the quantitative analysis of pizotifen malate in samples from in vitro transdermal diffusion studies."

The news correspondents obtained a quote from the research by the authors from the University of Valencia, "The method was validated for specificity, linearity, accuracy, precision, limit of detection, limit of quantification and robustness. Drug stability in the solution was also determined under different conditions. Separation was carried out using a 250 x 4.0 mm Kromasil &#174; C18 column at room temperature. The detector response, fitted at 254 nm, was found to be linear in a concentration range between 0.24 and 24.0  $\mu\text{g/mL}$ . The limit of detection was 0.02  $\mu\text{g/mL}$  and the limit of quantification was 0.07  $\mu\text{g/mL}$ ."

According to the news reporters, the researchers concluded: "Finally, in vitro transdermal diffusion of pizotifen malate was characterized using the validated HPLC method."

For more information on this research see: HPLC-UV analytical method for determination of pizotifen after in vitro transdermal diffusion studies. *Biomedical Chromatography*, 2012;26(6):769-774.

*Biomedical Chromatography* can be contacted at: Wiley-Blackwell, Commerce Place, 350 Main St, Malden 02148, MA, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Biomedical Chromatography* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-0801)

Our news journalists report that additional information may be obtained by contacting C.E. Serna-Jimenez, University of Valencia, Dept. of Farm & Tecnol Farmaceut, Valencia Polytechnic University, Center MixtoInst Reconocimiento Mol & Desarrollo Te, E-46100 Valencia, Spain. (2012 Jun 05)

### **Institute of Neurology, London: Extracranial measurements of amide proton transfer using exchange-modulated point-resolved spectroscopy (EXPRESS)**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators publish new report on Biomedical Engineering. According to news reporting originating in London, United Kingdom, by NewsRx journalists, researchers stated “Chemical exchange saturation transfer (CEST) imaging has been used experimentally in a large range of applications. However, full quantification of CEST effects in?vivo using standard imaging sequences is time consuming as a large number of saturation frequency offsets, each followed by an imaging readout, are required to define a z spectrum.”

The news reporters obtained a quote from the research by the authors from the Institute of Neurology, “Furthermore, outside the brain, the presence of fat can confound the interpretation of z spectra. A novel acquisition and post-processing technique is presented in this study, named exchange-modulated point-resolved spectroscopy (EXPRESS), which aims to address these limitations and to enable spatially localised, high signal-to-noise measurements of CEST effects in?vivo.”

According to the news reporters, the researchers concluded: “Using amide proton exchange (APT) measurements in tumours, it is demonstrated that the acquisition of two-dimensional EXPRESS spectra composed of chemical shift and saturation frequency offset dimensions allows the correction of CEST data containing both fat and water signals, which is a common confounding property of tissues found outside the brain.”

For more information on this research see: Extracranial measurements of amide proton transfer using exchange-modulated point-resolved spectroscopy (EXPRESS). *NMR in Biomedicine*, 2012;25(6):829-834. *NMR in Biomedicine* can be contacted at: Wiley-Blackwell, Commerce Place, 350 Main St, Malden 02148, MA, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *NMR in Biomedicine* -

[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1099-1492](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-1492))

Our news correspondents report that additional information may be obtained by contacting S. Walker-Samuel, UCL, Inst Neurol, London WC1E 6DD, United Kingdom. (2012 Jun 04)

### **Polytechnic University, Barcelona: Robust discrimination of glioblastomas from metastatic brain tumors on the basis of single-voxel (1) H MRS**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Current study results on Glioblastomas have been published. According to news originating from Barcelona, Spain, by NewsRx correspondents, researchers stated “This article investigates methods for the accurate and robust differentiation of metastases from glioblastomas on the basis of single-voxel (1) H MRS information. Single-voxel (1) H MR spectra from a total of 109 patients (78 glioblastomas and 31 metastases) from the multicenter, international INTERPRET database, plus a test set of 40 patients (30 glioblastomas and 10 metastases) from three different centers in the Barcelona (Spain) metropolitan area, were analyzed using a robust method for feature (spectral frequency) selection coupled with a linear-in-the-parameters single-layer perceptron classifier.”

Our news journalists obtained a quote from the research by the authors from Polytechnic University, “For the test set, a parsimonious selection of five frequencies yielded an area under the receiver operating characteristic curve of 0.86, and an area under the convex hull of the receiver operating characteristic curve of 0.91. Moreover, these accurate results for the discrimination between glioblastomas and metastases were obtained using a small number of frequencies that are amenable to metabolic interpretation, which should ease their use as diagnostic markers. Importantly, the prediction can be expressed as a simple formula based on a linear combination of these frequencies. As a result, new cases could be straightforwardly predicted by integrating this formula into a computer-based medical decision support system.”

According to the news editors, the researchers concluded: “This work also shows that the combination of spectra acquired at different TEs (short TE, 20-32?ms; long TE, 135-144?ms) is key to the successful discrimination between glioblastomas and metastases from single-voxel (1) H MRS.”

For more information on this research see: Robust discrimination of glioblastomas from metastatic brain tumors on the basis of single-voxel (1) H MRS. *Nmr In Biomedicine*, 2012;25(6):819-28. (Wiley-Blackwell - <http://www.wiley.com/>; Nmr In Biomedicine

- <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1099-1492)

The news correspondents report that additional information may be obtained from A. Vellido, Departamento de Llenguatges i Sistemes Informatics, Universitat Politecnica de Catalunya, Barcelona, Spain. (2012 Jun 04)

### **Technical University, Garching: A novel formulation for Neumann inflow boundary conditions in biomechanics**

By a News Reporter-Staff News Editor at Respiratory Therapeutics Week – A new study on Biomedical Engineering is now available. According to news reporting from Garching, Germany, by NewsRx journalists, researchers stated “Neumann boundary conditions prescribing the total momentum flux at inflow boundaries of biomechanical problems are proposed in this study. This approach enables the simultaneous application of velocity/flow rate and pressure curves at inflow boundaries.”

The news correspondents obtained a quote from the research by the authors from Technical University, “As the basic numerical method, a residual-based variational multiscale (or stabilized) finite element method is presented. The focus of the numerical examples in this work is on respiratory flows with complete flow reversals. However, the proposed formulation is just as well suited for cardiovascular flow problems with partial retrograde flow. Instabilities, which were reported for such problems in the literature, are resolved by the present approach without requiring the additional consideration of a Lagrange multiplier technique. The suitability of the approach is demonstrated for two respiratory flow examples, a rather simple tube and complex tracheobronchial airways (up to the fourth generation, segmented from end-expiratory CT images). For the latter example, the boundary conditions are generated from mechanical ventilation data obtained from an intensive care unit patient suffering from acute lung injury.”

According to the news reporters, the researchers concluded: “For the tube, analytical pressure profiles can be replicated, and for the tracheobronchial airways, a correct distribution of the prescribed total momentum flux at the inflow boundary into velocity and pressure part is observed.”

For more information on this research see: A novel formulation for Neumann inflow boundary conditions in biomechanics. *International Journal for Numerical Methods in Biomedical Engineering*, 2012;28(5):560-573. *International Journal for Numerical Methods in Biomedical Engineering* can be contacted at: Wiley-Blackwell, Commerce Place, 350 Main St, Malden 02148, MA, USA. (Wiley-Blackwell -



<http://www.wiley.com/>; International Journal for Numerical Methods in Biomedical Engineering - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 2040-7947)

Our news journalists report that additional information may be obtained by contacting V. Gravemeier, Technical University of Munich, Inst Computat Mech, D-85747 Garching, Germany. (2012 Jun 04)

### **The quasi-linear viscoelastic properties of diabetic and non-diabetic plantar soft tissue**

By a News Reporter-Staff News Editor at Diabetes Week – Current study results on Diabetes have been published. According to news reporting out of Seattle, Washington, by NewsRx editors, researchers stated “The purpose of this study was to characterize the viscoelastic behavior of diabetic and non-diabetic plantar soft tissue at six ulcer-prone/load-bearing locations beneath the foot to determine any changes that may play a role in diabetic ulcer formation and subsequent amputation in this predisposed population. Four older diabetic and four control fresh frozen cadaveric feet were each dissected to isolate plantar tissue specimens from the hallux, first, third, and fifth metatarsals, lateral midfoot, and calcaneus.”

Our news journalists obtained a quote from the research by the authors, “Stress relaxation experiments were used to quantify the viscoelastic tissue properties by fitting the data to the quasi-linear viscoelastic (QLV) theory using two methods, a traditional frequency-insensitive approach and an indirect frequency-sensitive approach, and by measuring several additional parameters from the raw data including the rate and amount of overall relaxation. The stress relaxation response of both diabetic and non-diabetic specimens was unexpectedly similar and accordingly few of the QLV parameters for either fit approach and none of raw data parameters differed. Likewise, no differences were found between plantar locations. The accuracy of both fit methods was comparable, however, neither approach predicted the ramp behavior. Further, fit coefficients varied considerably from one method to the other, making it hard to discern meaningful trends.”

According to the news editors, the researchers concluded: “Future testing using alternate loading modes and intact feet may provide more insight into the role that time-dependent properties play in diabetic foot ulceration.”

For more information on this research see: The quasi-linear viscoelastic properties of diabetic and non-diabetic plantar soft tissue. *Annals of Biomedical Engineering*, 2011;39(5):1517-27. (Springer - [www.springer.com](http://www.springer.com); *Annals of Biomedical Engineering* - <http://www.springerlink.com/content/0090-6964/>)

Our news journalists report that additional information may be obtained by contacting S. Pai, VA RR&D Center of Excellence for Limb Loss Prevention and Prosthetic Engineering, Seattle, WA 98108, United States. (2012 Jun 04)

## Chapter 2

# Biomedical Informatics

### **National Institutes of Health, Bethesda: Identifying well-formed biomedical phrases in MEDLINE text**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Informatics have been presented. According to news reporting out of Bethesda, Maryland, by NewsRx editors, research stated, “In the modern world people frequently interact with retrieval systems to satisfy their information needs. Humanly understandable well-formed phrases represent a crucial interface between humans and the web, and the ability to index and search with such phrases is beneficial for human-web interactions.”

Our news journalists obtained a quote from the research from the National Institutes of Health, “In this paper we consider the problem of identifying humanly understandable, well formed, and high quality biomedical phrases in MEDLINE documents. The main approaches used previously for detecting such phrases are syntactic, statistical, and a hybrid approach combining these two. In this paper we propose a supervised learning approach for identifying high quality phrases. First we obtain a set of known well-formed useful phrases from an existing source and label these phrases as positive. We then extract from MEDLINE a large set of multiword strings that do not contain stop words or punctuation. We believe this unlabeled set contains many well-formed phrases. Our goal is to identify these additional high quality phrases. We examine various feature combinations and several machine learning strategies designed to solve this problem. A proper choice of machine learning methods and features identifies in the large collection strings that are likely to be high quality phrases. We evaluate our approach by making human judgments on multiword strings extracted from MEDLINE using our methods.”

According to the news editors, the research concluded: “We find that over 85% of such extracted phrase candidates are humanly judged to be of high quality.”

For more information on this research see: Identifying well-formed biomedical phrases in MEDLINE; text. *Journal of Biomedical Informatics*, 2012;45(6):1035-41. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting W. Kim, National Library of Medicine, National Institutes of Health, Bethesda, MD 20894, United States. (2013 Jan 30)

### **Columbia University, New York City: A new clustering method for detecting rare senses of abbreviations in clinical notes**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Informatics have been presented. According to news originating from New York City, New York, by NewsRx correspondents, research stated, “Abbreviations are widely used in clinical documents and they are often ambiguous. Building a list of possible senses (also called sense inventory) for each ambiguous abbreviation is the first step to automatically identify correct meanings of abbreviations in given contexts.”

Our news journalists obtained a quote from the research from Columbia University, “Clustering based methods have been used to detect senses of abbreviations from a clinical corpus [1]. However, rare senses remain challenging and existing algorithms are not good enough to detect them. In this study, we developed a new two-phase clustering algorithm called Tight Clustering for Rare Senses (TCRS) and applied it to sense generation of abbreviations in clinical text. Using manually annotated sense inventories from a set of 13 ambiguous clinical abbreviations, we evaluated and compared TCRS with the existing Expectation Maximization (EM) clustering algorithm for sense generation, at two different levels of annotation cost (10 vs. 20 instances for each abbreviation). Our results showed that the TCRS-based method could detect 85% senses on average: while the EM-based method found only 75% senses, when similar annotation effort (about 20 instances) was used.”

According to the news editors, the research concluded: “Further analysis demonstrated that the improvement by the TCRS method was mainly from additionally detected rare senses, thus indicating its usefulness for building more complete sense inventories of clinical abbreviations.”

For more information on this research see: A new clustering method for detecting rare senses of abbreviations in clinical notes. *Journal of Biomedical Informatics*, 2012;45(6):1075-1083. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news correspondents report that additional information may be obtained from H. Xu, Columbia University, Dept. of Med, New York, NY, United States. (2013 Jan 23)

### **Delft University of Technology: Workflow mining and outlier detection from clinical activity logs**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Informatics. According to news originating from Delft, Netherlands, by NewsRx correspondents, research stated, “The purpose of this study is twofold: (1) to derive a workflow consensus from multiple clinical activity logs and (2) to detect workflow outliers automatically and without prior knowledge from experts. Workflow mining is used in this paper to derive consensus workflow from multiple surgical activity logs using tree-guided multiple sequence alignment.”

Our news journalists obtained a quote from the research from the Delft University of Technology, “To detect outliers, a global pair-wise sequence alignment (Needleman-Wunsch) algorithm is used. The proposed method is validated for Laparoscopic Cholecystectomy (LAP-CHOL). An activity log is directly derived for each LAPCHOL surgery from laparoscopic video using an already developed instrument tracking tool. We showed that a generic consensus can be derived from surgical activity logs using multi-alignment. In total 26 surgery logs are used to derive the consensus for laparoscopic cholecystectomy. The derived consensus conforms to the main steps of laparoscopic cholecystectomy as described in best practices. Using global pair-wise alignment, we showed that outliers can be detected from surgeries using the consensus and the surgical activity log. Alignment techniques can be used to derive consensus and to detect outliers from clinical activity logs.”

According to the news editors, the research concluded: “Detecting outliers particularly in surgery is a main step to automatically mine and analyse the underlying cause of these outliers and improve surgical practices.”

For more information on this research see: Workflow mining and outlier detection from clinical activity logs. *Journal of Biomedical Informatics*, 2012;45(6):1185-1190. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste

1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news correspondents report that additional information may be obtained from L. Bouarfa, Delft University of Technology, Dept. of Biomech Engr, NL-2628 CD Delft, Netherlands. (2013 Jan 23)

### Discovering discovery patterns with predication-based Semantic Indexing

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Informatics. According to news reporting originating from Bethesda, Maryland, by NewsRx correspondents, research stated, “In this paper we utilize methods of hyperdimensional computing to mediate the identification of therapeutically useful connections for the purpose of literature-based discovery. Our approach, named Predication-based Semantic Indexing, is utilized to identify empirically sequences of relationships known as ‘discovery patterns’, such as ‘drug x INHIBITS substance y, substance y CAUSES disease z’ that link pharmaceutical substances to diseases they are known to treat.”

Our news editors obtained a quote from the research, “These sequences are derived from semantic predications extracted from the biomedical literature by the SemRep system, and subsequently utilized to direct the search for known treatments for a held out set of diseases. Rapid and efficient inference is accomplished through the application of geometric operators in PSI space, allowing for both the derivation of discovery patterns from a large set of known TREATS relationships, and the application of these discovered patterns to constrain search for therapeutic relationships at scale. Our results include the rediscovery of discovery patterns that have been constructed manually by other authors in previous research, as well as the discovery of a set of previously unrecognized patterns. The application of these patterns to direct search through PSI space results in better recovery of therapeutic relationships than is accomplished with models based on distributional statistics alone. These results demonstrate the utility of efficient approximate inference in geometric space as a means to identify therapeutic relationships, suggesting a role of these methods in drug repurposing efforts.”

According to the news editors, the research concluded: “In addition, the results provide strong support for the utility of the discovery pattern approach pioneered by Hristovski and his colleagues.”

For more information on this research see: Discovering discovery patterns with predication-based Semantic Indexing. *Journal of*

*Biomedical Informatics*, 2012;45(6):1049-1065. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting T. Cohen, Natl Lib Med, Bethesda, MD, United States. (2013 Jan 23)

### **Interface design principles for usable decision support: A targeted review of best practices for clinical prescribing interventions**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Informatics. According to news reporting from Cambridge, Massachusetts, by NewsRx journalists, research stated, “Developing effective clinical decision support (CDS) systems for the highly complex and dynamic domain of clinical medicine is a serious challenge for designers. Poor usability is one of the core barriers to adoption and a deterrent to its routine use.”

The news correspondents obtained a quote from the research, “We reviewed reports describing system implementation efforts and collected best available design conventions, procedures, practices and lessons learned in order to provide developers a short compendium of design goals and recommended principles. This targeted review is focused on CDS related to medication prescribing. Published reports suggest that important principles include consistency of design concepts across networked systems, use of appropriate visual representation of clinical data, use of controlled terminology, presenting advice at the time and place of decision making and matching the most appropriate CDS interventions to clinical goals. Specificity and contextual relevance can be increased by periodic review of trigger rules, analysis of performance logs and maintenance of accurate allergy, problem and medication lists in health records in order to help avoid excessive alerting. Developers need to adopt design practices that include user-centered, iterative design and common standards based on human-computer interaction (HCI) research methods rooted in ethnography and cognitive science. Suggestions outlined in this report may help clarify the goals of optimal CDS design but larger national initiatives are needed for systematic application of human factors in health information technology (HIT) development.”

According to the news reporters, the research concluded: “Appropriate design strategies are essential for developing meaningful decision support systems that meet the grand challenges of high-quality health-care.”

For more information on this research see: Interface design principles for usable decision support: A targeted review of best practices for clinical prescribing interventions. *Journal of Biomedical Informatics*, 2012;45(6):1202-1216. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting J. Horsky, WESTAT Corp, Cambridge, MA, United States. (2013 Jan 23)

### **University of Bologna: Efficient management of multi-version clinical guidelines**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Informatics are presented in a new report. According to news reporting from Bologna, Italy, by NewsRx journalists, research stated, “Clinical medicine and health-care developments in recent years testified a tremendous increase in the number of available guidelines, i.e., ‘best practices’ encoding and standardizing care procedures for a given disease. Clinical guidelines are subject to continuous development and revision by committees of expert physicians and health authorities and, thus, multiple versions coexist as a consequence of the clinical and healthcare activities.”

The news correspondents obtained a quote from the research from the University of Bologna, “Moreover, several alternatives are usually included in order to make the guidelines as general as possible, making them difficult to handle both in manual and automated fashions. In this work, we will introduce techniques to model and to provide efficient personalized access to very large collections of multi-version clinical guidelines, which can be stored both in textual and in executable format in an XML repository.”

According to the news reporters, the research concluded: “In this way, multiple temporal perspectives, patient profile and context information can be used by an automated personalization service to efficiently build on demand a guideline version tailored to a specific use case.”

For more information on this research see: Efficient management of multi-version clinical guidelines. *Journal of Biomedical Informatics*, 2012;45(6):1120-1136. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))



Our news journalists report that additional information may be obtained by contacting F. Grandi, University of Bologna, DEIS, Bologna, Italy. (2013 Jan 23)

### **Ajou University, Suwon: Synergistic effect of different levels of genomic data for cancer clinical outcome prediction**

By a News Reporter-Staff News Editor at Cancer Weekly – Investigators discuss new findings in Biomedical Informatics. According to news reporting originating from Suwon, South Korea, by NewsRx correspondents, research stated, “There have been many attempts in cancer clinical-type classification by using a dataset from a number of molecular layers of biological system. Despite these efforts, however, it still remains difficult to elucidate the cancer phenotypes because the cancer genome is neither simple nor independent but rather complicated and dysregulated by multiple molecular mechanisms.”

Our news editors obtained a quote from the research from Ajou University, “Recently, heterogeneous types of data, generated from all molecular levels of ‘omic’ dimensions from genome to phenome, for instance, copy number variants at the genome level, DNA methylation at the epigenome level, and gene expression and microRNA at the transcriptome level, have become available. In this paper, we propose an integrated framework that uses multi-level genomic data for prediction of clinical outcomes in brain cancer (glioblastoma multiforme, GBM) and ovarian cancer (serous cystadenocarcinoma, OV). From empirical comparison results on individual genomic data, we provide some preliminary insights about which level of data is more informative to a given clinical-type classification problem and justify these perceptions with the corresponding biological implications for each type of cancer. For GBM, all clinical outcomes had a better the area under the curve (AUC) of receiver operating characteristic when integrating multi-layers of genomic data, 0.876 for survival to 0.832 for recurrence. Moreover, the better AUCs were achieved from the integration approach for all clinical outcomes in OV as well, ranging from 0.787 to 0.893. We found that the opportunity for success in prediction of clinical outcomes in cancer was increased when the prediction was based on the integration of multi-layers of genomic data.”

According to the news editors, the research concluded: “This study is expecting to improve comprehension of the molecular pathogenesis and underlying biology of both cancer types.”

For more information on this research see: Synergistic effect of different levels of genomic data for cancer clinical outcome prediction. *Journal of Biomedical Informatics*, 2012;45(6):1191-1198. *Journal of*

*Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting D. Kim, Ajou University, Dept. of Ind & Informat Syst Engn, Suwon 443749, South Korea. (2013 Jan 22)

### University of Milan: Continuous time Bayesian network classifiers

By a News Reporter-Staff News Editor at Journal of Robotics & Machine Learning – New research on Bayesian Analysis is the subject of a report. According to news reporting originating from Milan, Italy, by VerticalNews correspondents, research stated, “The class of continuous time Bayesian network classifiers is defined; it solves the problem of supervised classification on multivariate trajectories evolving in continuous time. The trajectory consists of the values of discrete attributes that are measured in continuous time, while the predicted class is expected to occur in the future.”

Our news editors obtained a quote from the research from the University of Milan, “Two instances from this class, namely the continuous time naive Bayes classifier and the continuous time tree augmented naive Bayes classifier, are introduced and analyzed. They implement a trade-off between computational complexity and classification accuracy. Learning and inference for the class of continuous time Bayesian network classifiers are addressed, in the case where complete data are available. A learning algorithm for the continuous time naive Bayes classifier and an exact inference algorithm for the class of continuous time Bayesian network classifiers are described.”

According to the news editors, the research concluded: “The performance of the continuous time naive Bayes classifier is assessed in the case where real-time feedback to neurological patients undergoing motor rehabilitation must be provided.”

For more information on this research see: Continuous time Bayesian network classifiers. *Journal of Biomedical Informatics*, 2012;45(6):1108-1119. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting F. Stella, Univ Milano Bicocca, Dept. of Informat Syst & Commun, I-20126 Milan, Italy. (2013 Jan 21)

**University of Rochester Medical Center: An enhancement of the Role-Based Access Control model to facilitate information access management in context of team collaboration and workflow**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Informatics have been published. According to news reporting originating from Rochester, New York, by NewsRx correspondents, research stated, “Although information access control models have been developed and applied to various applications, few of the previous works have addressed the issue of managing information access in the combined context of team collaboration and workflow. To facilitate this requirement, we have enhanced the Role-Based Access Control (RBAC) model through formulating universal constraints, defining bridging entities and contributing attributes, extending access permissions to include workflow contexts, synthesizing a role-based access delegation model to target on specific objects, and developing domain ontologies as instantiations of the general model to particular applications.”

Our news editors obtained a quote from the research from the University of Rochester Medical Center, “We have successfully applied this model to the New York State HIV Clinical Education Initiative (CEI) project to address the specific needs of information management in collaborative processes. An initial evaluation has shown this model achieved a high level of agreement with an existing system when applied to 4576 cases ( $\kappa=0.801$ ). Comparing to a reference standard, the sensitivity and specificity of the enhanced RBAC model were at the level of 97-100%. These results indicate that the enhanced RBAC model can be effectively used for information access management in context of team collaboration and workflow to coordinate clinical education programs.”

According to the news editors, the research concluded: “Future research is required to incrementally develop additional types of universal constraints, to further investigate how the workflow context and access delegation can be enriched to support the various needs on information access management in collaborative processes, and to examine the generalizability of the enhanced RBAC model for other applications in clinical education, biomedical research, and patient care.”

For more information on this research see: An enhancement of the Role-Based Access Control model to facilitate information access management in context of team collaboration and workflow. *Journal of Biomedical Informatics*, 2012;45(6):1084-107. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting X.H. Le, University of Rochester Medical Center, Rochester, NY 14642, United States. (2012 Dec 26)

### **A knowledge-driven conditional approach to extract pharmacogenomics specific drug-gene relationships from free text**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Informatics have been published. According to news reporting from Palo Alto, California, by NewsRx journalists, research stated, “An important task in pharmacogenomics (PGx) studies is to identify genetic variants that may impact drug response. The success of many systematic and integrative computational approaches for PGx studies depends on the availability of accurate, comprehensive and machine understandable drug-gene relationship knowledge bases.”

The news correspondents obtained a quote from the research, “Scientific literature is one of the most comprehensive knowledge sources for PGx-specific drug-gene relationships. However, the major barrier in accessing this information is that the knowledge is buried in a large amount of free text with limited machine understandability. Therefore there is a need to develop automatic approaches to extract structured PGx-specific drug-gene relationships from unstructured free text literature. In this study, we have developed a conditional relationship extraction approach to extract PGx-specific drug-gene pairs from 20 million MEDLINE abstracts using known drug-gene pairs as prior knowledge. We have demonstrated that the conditional drug-gene relationship extraction approach significantly improves the precision and F1 measure compared to the unconditioned approach (precision: 0.345 vs. 0.11; recall: 0.481 vs. 1.00; F1: 0.402 vs. 0.201). In this study, a method based on co-occurrence is used as the underlying relationship extraction method for its simplicity. It can be replaced by or combined with more advanced methods such as machine learning or natural language processing approaches to further improve the performance of the drug-gene relationship extraction from free text.”

According to the news reporters, the research concluded: “Our method is not limited to extracting a drug-gene relationship; it can be generalized to extract other types of relationships when related background knowledge bases exist.”

For more information on this research see: A knowledge-driven conditional approach to extract pharmacogenomics specific drug-gene relationships from free text. *Journal of Biomedical Informatics*, 2012;45(5):827-834. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900,

San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting R. Xu, ThinTek LLC, Palo Alto, CA, United States. (2012 Nov 07)

### **Department of Veterans Affairs, Boston: Implementations of the HL7 Context-Aware Knowledge Retrieval (“Infobutton”) Standard: Challenges, strengths, limitations, and uptake**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Informatics. According to news reporting out of Boston, Massachusetts, by NewsRx editors, research stated, “To support clinical decision-making, computerized information retrieval tools known as ‘infobuttons’ deliver contextually-relevant knowledge resources into clinical information systems. The Health Level Seven International (HL7) Context-Aware Knowledge Retrieval (Infobutton) Standard specifies a standard mechanism to enable infobuttons on a large scale.”

Our news journalists obtained a quote from the research from the Department of Veterans Affairs, “To examine the experience of organizations in the course of implementing the HL7 Infobutton Standard. Cross-sectional online survey and in-depth phone interviews. A total of 17 organizations participated in the study. Analysis of the in-depth interviews revealed 20 recurrent themes. Implementers underscored the benefits, simplicity, and flexibility of the HL7 Infobutton Standard. Yet, participants voiced the need for easier access to standard specifications and improved guidance to beginners. Implementers predicted that the Infobutton Standard will be widely or at least fairly well adopted in the next 5 years, but uptake will depend largely on adoption among electronic health record (EHR) vendors. To accelerate EHR adoption of the Infobutton Standard, implementers recommended HL7-compliant infobutton capabilities to be included in the United States Meaningful Use Certification Criteria for EHR systems. Opinions and predictions should be interpreted with caution, since all the participant organizations have successfully implemented the standard and over half of the organizations were actively engaged in the development of the standard. Overall, implementers reported a very positive experience with the HL7 Infobutton Standard. Despite indications of increasing uptake, measures should be taken to stimulate adoption of the Infobutton Standard among EHR vendors.”

According to the news editors, the research concluded: “Widespread adoption of the Infobutton Standard has the potential to bring contextually relevant clinical decision support content into the healthcare provider workflow.”

For more information on this research see: Implementations of the HL7 Context-Aware Knowledge Retrieval (“Infobutton”) Standard: Challenges, strengths, limitations, and uptake. *Journal of Biomedical Informatics*, 2012;45(4):726-735. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting G. Del Fiol, Dept. of Vet Affairs, Boston, MA, United States. (2012 Nov 07)

### **Harvard University, Boston: Mapping Partners Master Drug Dictionary to RxNorm using an NLP-based approach**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Informatics have been published. According to news originating from Boston, Massachusetts, by NewsRx correspondents, research stated, “To develop an automated method based on natural language processing (NLP) to facilitate the creation and maintenance of a mapping between RxNorm and a local medication terminology for interoperability and meaningful use purposes. We mapped 5961 terms from Partners Master Drug Dictionary (MDD) and 99 of the top prescribed medications to RxNorm.”

Our news journalists obtained a quote from the research from Harvard University, “The mapping was conducted at both term and concept levels using an NLP tool, called MTERMS, followed by a manual review conducted by domain experts who created a gold standard mapping. The gold standard was used to assess the overall mapping between MDD and RxNorm and evaluate the performance of mTERMS. Overall, 74.7% of MDD terms and 82.8% of the top 99 terms had an exact semantic match to RxNorm. Compared to the gold standard, MTERMS achieved a precision of 99.8% and a recall of 73.9% when mapping all MDD terms, and a precision of 100% and a recall of 72.6% when mapping the top prescribed medications. The challenges and gaps in mapping MDD to RxNorm are mainly due to unique user or application requirements for representing drug concepts and the different modeling approaches inherent in the two terminologies.”

According to the news editors, the research concluded: “An automated approach based on NLP followed by human expert review is an efficient and feasible way for conducting dynamic mapping.”

For more information on this research see: Mapping Partners Master Drug Dictionary to RxNorm using an NLP-based approach. *Journal of Biomedical Informatics*, 2012;45(4):626-633. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news correspondents report that additional information may be obtained from L. Zhou, Harvard University, Brigham & Women's Hospital, Div Gen Med & Primary Care, Sch Med, Boston, MA 02115, United States. (2012 Nov 07)

### **Johannes Gutenberg-University, Mainz: Active learning strategies for the deduplication of electronic patient data using classification trees**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Informatics are presented in a new report. According to news originating from Mainz, Germany, by NewsRx correspondents, research stated, “Supervised record linkage methods often require a clerical review to gain informative training data. Active learning means to actively prompt the user to label data with special characteristics in order to minimise the review costs.”

Our news journalists obtained a quote from the research from Johannes Gutenberg-University, “We conducted an empirical evaluation to investigate whether a simple active learning strategy using binary comparison patterns is sufficient or if string metrics together with a more sophisticated algorithm are necessary to achieve high accuracies with a small training set. Based on medical registry data with different numbers of attributes, we used active learning to acquire training sets for classification trees, which were then used to classify the remaining data. Active learning for binary patterns means that every distinct comparison pattern represents a stratum from which one item is sampled. Active learning for patterns consisting of the Levenshtein string metric values uses an iterative process where the most informative and representative examples are added to the training set. In this context, we extended the active learning strategy by Sarawagi and Bhamidipaty (2002) [6]. On the original data set, active learning based on binary comparison patterns leads to the best results. When dropping four or six attributes, using string metrics leads to better results. In both cases, not more than 200 manually reviewed training examples are necessary. In record linkage applications where only forename, name and birthday are available as attributes, we suggest the sophisticated active’ learning strategy based on string metrics in order to achieve highly accurate

results. We recommend the simple strategy if more attributes are available, as in our study.”

According to the news editors, the research concluded: “In both cases, active learning significantly reduces the amount of manual involvement in training data selection compared to usual record linkage settings.”

For more information on this research see: Active learning strategies for the deduplication of electronic patient data using classification trees. *Journal of Biomedical Informatics*, 2012;45(5):893-900. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news correspondents report that additional information may be obtained from M. Sariyar, Johannes Gutenberg Univ Mainz, University Medical Center, Inst Med Biostat Epidemiol & Informat, D-6500 Mainz, Germany. (2012 Nov 07)

### **University of Amsterdam: Translating standards into practice - One Semantic Web API for Gene Expression**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Informatics is the subject of a report. According to news reporting originating from Amsterdam, Netherlands, by NewsRx correspondents, research stated, “Sharing and describing experimental results unambiguously with sufficient detail to enable replication of results is a fundamental tenet of scientific research. In today’s cluttered world of ‘-omics’ sciences, data standards and standardized use of terminologies and ontologies for biomedical informatics play an important role in reporting high-throughput experiment results in formats that can be interpreted by both researchers and analytical tools.”

Our news editors obtained a quote from the research from the University of Amsterdam, “Increasing adoption of Semantic Web and Linked Data technologies for the integration of heterogeneous and distributed health care and life sciences (HCLSs) datasets has made the reuse of standards even more pressing; dynamic semantic query federation can be used for integrative bioinformatics when ontologies and identifiers are reused across data instances. We present here a methodology to integrate the results and experimental context of three different representations of microarray-based transcriptomic experiments: the Gene Expression Atlas, the W3C BioRDF task force approach to reporting Provenance of Microarray Experiments, and the HSCI blood genomics project. Our approach does not attempt to improve the expressivity of existing standards for genomics but, instead, to enable



integration of existing datasets published from microarray-based transcriptomic experiments. SPARQL Construct is used to create a posteriori mappings of concepts and properties and linking rules that match entities based on query constraints.”

According to the news editors, the research concluded: “We discuss how our integrative approach can encourage reuse of the Experimental Factor Ontology (EFO) and the Ontology for Biomedical Investigations (OBIs) for the reporting of experimental context and results of gene expression studies.”

For more information on this research see: Translating standards into practice - One Semantic Web API for Gene Expression. *Journal of Biomedical Informatics*, 2012;45(4):782-794. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting H.F. Deus, University of Amsterdam, Inst Informat, NL-1012 WX Amsterdam, Netherlands. (2012 Nov 07)

### **University of California, Los Angeles: Predictive combinations of monitor alarms preceding in-hospital code blue events**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Informatics are discussed in a new report. According to news reporting from Los Angeles, California, by NewsRx journalists, research stated, “Bedside monitors are ubiquitous in acute care units of modern healthcare enterprises. However, they have been criticized for generating an excessive number of false positive alarms causing alarm fatigue among care givers and potentially compromising patient safety.”

The news correspondents obtained a quote from the research from the University of California, “We hypothesize that combinations of regular monitor alarms denoted as SuperAlarm set may be more indicative of ongoing patient deteriorations and hence predictive of in-hospital code blue events. The present work develops and assesses an alarm mining approach based on finding frequent combinations of single alarms that are also specific to code blue events to compose a SuperAlarm set. We use 4-way analysis of variance (ANOVA) to investigate the influence of four algorithm parameters on the performance of the data mining approach. The results are obtained from millions of monitor alarms from a cohort of 223 adult code blue and 1768 control patients using a multiple 10-fold cross-validation experiment setup. Using the optimal setting of parameters determined in the cross-validation experiment, final SuperAlarm sets are mined from the training data

and used on an independent test data set to simulate running a SuperAlarm set against live regular monitor alarms. The ANOVA shows that the content of a SuperAlarm set is influenced by a subset of key algorithm parameters. Simulation of the extracted SuperAlarm set shows that it can predict code blue events one hour ahead with sensitivity between 66.7% and 90.9% while producing false SuperAlarms for control patients that account for between 2.2% and 11.2% of regular monitor alarms depending on user-supplied acceptable false positive rate.”

According to the news reporters, the research concluded: “We conclude that even though the present work is still preliminary due to the usage of a moderately-sized database to test our hypothesis it represents an effort to develop algorithms to alleviate the alarm fatigue issue in a unique way.”

For more information on this research see: Predictive combinations of monitor alarms preceding in-hospital code blue events. *Journal of Biomedical Informatics*, 2012;45(5):913-921. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting X. Hu, UCLA Ronald Reagan Univ Med Center, Qual Management Serv, Los Angeles, CA, United States. (2012 Nov 07)

### **University of Sheffield: Development of a benchmark corpus to support the automatic extraction of drug-related adverse effects from medical case reports**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Informatics is the subject of a report. According to news reporting from Sheffield, United Kingdom, by NewsRx journalists, research stated, “A significant amount of information about drug-related safety issues such as adverse effects are published in medical case reports that can only be explored by human readers due to their unstructured nature. The work presented here aims at generating a systematically annotated corpus that can support the development and validation of methods for the automatic extraction of drug-related adverse effects from medical case reports.”

The news correspondents obtained a quote from the research from the University of Sheffield, “The documents are systematically double annotated in various rounds to ensure consistent annotations. The annotated documents are finally harmonized to generate representative consensus annotations. In order to demonstrate an example use case

scenario, the corpus was employed to train and validate models for the classification of informative against the non-informative sentences.”

According to the news reporters, the research concluded: “A Maximum Entropy classifier trained with simple features and evaluated by 10-fold cross-validation resulted in the F-1 score of 0.70 indicating a potential useful application of the corpus.”

For more information on this research see: Development of a benchmark corpus to support the automatic extraction of drug-related adverse effects from medical case reports. *Journal of Biomedical Informatics*, 2012;45(5):885-892. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting H. Gurulingappa, University of Sheffield, Dept. of Comp Sci, Sheffield S1 4DP, S Yorkshire, United Kingdom. (2012 Nov 07)

### **University of Washington, Seattle: A Query Integrator and Manager for the Query Web**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Informatics have been presented. According to news reporting originating in Seattle, Washington, by NewsRx journalists, research stated, “We introduce two concepts: the Query Web as a layer of interconnected queries over the document web and the semantic web, and a Query Web Integrator and Manager (QI) that enables the Query Web to evolve. QI permits users to write, save and reuse queries over any web accessible source, including other queries saved in other installations of QI.”

The news reporters obtained a quote from the research from the University of Washington, “The saved queries may be in any language (e.g. SPARQL, XQuery); the only condition for interconnection is that the queries return their results in some form of XML. This condition allows queries to chain off each other, and to be written in whatever language is appropriate for the task. We illustrate the potential use of QI for several biomedical use cases, including ontology view generation using a combination of graph-based and logical approaches, value set generation for clinical data management, image annotation using terminology obtained from an ontology web service, ontology-driven brain imaging data integration, small-scale clinical data integration, and wider-scale clinical data integration. Such use cases illustrate the current range of

applications of QI and lead us to speculate about the potential evolution from smaller groups of interconnected queries into a larger query network that layers over the document and semantic web.”

According to the news reporters, the research concluded: “The resulting Query Web could greatly aid researchers and others who now have to manually navigate through multiple information sources in order to answer specific questions.”

For more information on this research see: A Query Integrator and Manager for the Query Web. *Journal of Biomedical Informatics*, 2012;45(5):975-991. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news correspondents report that additional information may be obtained by contacting J.F. Brinkley, University of Washington, Dept. of Biomed Informat & Med Educ, Seattle, WA 98195, United States. (2012 Nov 07)

### **University of Wisconsin, Milwaukee: Development of the nursing problem list subset of SNOMED CT &#174;**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Informatics is the subject of a report. According to news reporting originating in Milwaukee, Wisconsin, by NewsRx journalists, research stated, “To create an interoperable set of nursing diagnoses for use in the patient problem list in the EHR to support interoperability. Queries for nursing diagnostic concepts were executed against the UMLS Metathesaurus to retrieve all nursing diagnoses across four nursing terminologies where the concept was also represented in SNOMED CT.”

The news reporters obtained a quote from the research from the University of Wisconsin, “A candidate data set was retrieved and included the nursing diagnoses and corresponding SNOMED a concepts from the UMLS Metathesaurus. The team members identified the concepts that met the semantic selection criteria for inclusion in the nursing problem list. 1320 concepts were returned in the initial UMLS Metathesaurus query of nursing diagnostic concepts. Further analysis was conducted to identify those nursing diagnostic concepts mapped to SNOMED CT and duplicate concepts were removed resulting in 591 unique UMLS Metathesaurus concepts. The query extracted all concepts from two of the nursing terminologies that contained interventions and outcomes. After cleaning the dataset, the final count of SNOMED CT concepts in the nursing problem list subset is 369. The problem list is a key component of the patient care and has been acknowledged as critical by the

EHR Meaningful Use criteria. Nursing diagnoses on the problem list are foundational for constructing a nursing care plan.”

According to the news reporters, the research concluded: “A multi-disciplinary patient problem list will facilitate communication and evaluation of the contribution of nursing care to the patient’s clinical care experiences and outcomes.”

For more information on this research see: Development of the nursing problem list subset of SNOMED CT &#174;. *Journal of Biomedical Informatics*, 2012;45(4):683-688. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news correspondents report that additional information may be obtained by contacting S.A. Matney, Univ Wisconsin Milwaukee, Milwaukee, WI, United States. (2012 Nov 07)

### **Design for risk control: the role of usability engineering in the management of use-related risks**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedical Informatics. According to news reporting from Lubeck, Germany, by NewsRx journalists, research stated, “The majority of medical device incident reports can primarily be attributed to use error. Greater attention to human factors and usability during development of a medical device could improve this situation.”

The news correspondents obtained a quote from the research, “However, recent studies have shown that companies do not find the application of a sound usability engineering process according to international standards a simple task. The purpose of this collaborative research project between a medical device company, two universities and a university hospital was to study the practical application of the International Standard for Application of Usability Engineering to Medical Devices, IEC 62366, by means of a case study in industrial practice. This paper describes the user studies in the case and reveals the factors important to success. Also, the paper demonstrates how to apply an iterative usability engineering process within a linear product development process in industry. Management support and careful planning of resources and activities proved essential. To control use-related risks, the usability engineer should ‘design for risk control’ in a structured manner, while the risk manager should remain responsible for acceptable levels of residual risk.”

According to the news reporters, the research concluded: “The paper concludes with recommendations for the improvement of IEC 62366 and ISO 14971, the standard for the risk management of medical devices.”

For more information on this research see: Design for risk control: the role of usability engineering in the management of use-related risks. *Journal of Biomedical Informatics*, 2012;45(4):795-812. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting J. van der Peijl, Drager Medical GmbH, Moislinger Allee 53-55, 23558 Lubeck, Germany. (2012 Oct 31)

### **Medical University, Vienna: The Arden Syntax standard for clinical decision support: experiences and directions**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Informatics have been published. According to news reporting originating from Vienna, Austria, by NewsRx correspondents, research stated, “Arden Syntax is a widely recognized standard for representing clinical and scientific knowledge in an executable format. It has a history that reaches back until 1989 and is currently maintained by the Health Level 7 (HL7) organization.”

Our news editors obtained a quote from the research from Medical University, “We created a production-ready development environment, compiler, rule engine and application server for Arden Syntax. Over the course of several years, we have applied this Arden -Syntax -based CDS system in a wide variety of clinical problem domains, such as hepatitis serology interpretation, monitoring of nosocomial infections or the prediction of metastatic events in melanoma patients. We found the Arden Syntax standard to be very suitable for the practical implementation of CDS systems. Among the advantages of Arden Syntax are its status as an actively developed HL7 standard, the readability of the syntax, and various syntactic features such as flexible list handling. A major challenge we encountered was the technical integration of our CDS systems in existing, heterogeneous health information systems. To address this issue, we are currently working on incorporating the HL7 standard GELLO, which provides a standardized interface and query language for accessing data in health information systems.”

According to the news editors, the research concluded: “We hope that these planned extensions of the Arden Syntax might eventually help in realizing the vision of a global, interoperable and shared library of clinical decision support knowledge.”

For more information on this research see: The Arden Syntax standard for clinical decision support: experiences and directions. *Journal of Biomedical Informatics*, 2012;45(4):711-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting M. Samwald, Section for Medical Expert and Knowledge-Based Systems, Center for Medical Statistics, Informatics and Intelligent Systems, Medical University of Vienna, Spitalgasse 23, A-1090 Vienna, Austria. (2012 Oct 31)

### **Regenstrief Institute, Indianapolis: Enabling international adoption of LOINC through translation**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Informatics are discussed in a new report. According to news reporting out of Indianapolis, Indiana, by NewsRx editors, research stated, “Interoperable health information exchange depends on adoption of terminology standards, but international use of such standards can be challenging because of language differences between local concept names and the standard terminology. To address this important barrier, we describe the evolution of an efficient process for constructing translations of LOINC terms names, the foreign language functions in RELMA, and the current state of translations in LOINC.”

Our news journalists obtained a quote from the research from Regenstrief Institute, “We also present the development of the Italian translation to illustrate how translation is enabling adoption in international contexts. We built a tool that finds the unique list of LOINC Parts that make up a given set of LOINC terms. This list enables translation of smaller pieces like the core component ‘hepatitis c virus’ separately from all the suffixes that could appear with it, such ‘Ab.IgG’, ‘DNA’, and ‘RNA’. We built another tool that generates a translation of a full LOINC name from all of these atomic pieces. As of version 2.36 (June 2011), LOINC terms have been translated into nine languages from 15 linguistic variants other than its native English. The five largest linguistic variants have all used the Part-based translation mechanism. However, even with efficient tools and processes, translation of standard terminology is a complex undertaking. Two of the prominent linguistic challenges that translators have faced include: the approach to handling acronyms and abbreviations, and the differences in linguistic syntax (e.g. word order) between languages. LOINC’s open and customizable approach has enabled many different groups to create translations that met their needs and matched their resources.”

According to the news editors, the research concluded: “Distributing the standard and its many language translations at no cost worldwide accelerates LOINC adoption globally, and is an important enabler of interoperable health information exchange.”

For more information on this research see: Enabling international adoption of LOINC through translation. *Journal of Biomedical Informatics*, 2012;45(4):667-73. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting D.J. Vreeman, Regenstrief Institute Inc, 410 West 10th Street, Suite 2000, Indianapolis, IN 46202, United States. (2012 Oct 31)

### **University of California, Torrance: The impact of emerging standards adoption on automated quality reporting**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Informatics have been published. According to news reporting originating from Torrance, California, by NewsRx correspondents, research stated, “Current quality measurement processes are labor-intensive, involving manual chart reviews and use of paper-based quality measures that vary in format and definitions from measure to measure. Automated quality reporting is considered by many to be an important tool that will help close the gaps in the quality of US health by increasing the timeliness, effectiveness, and use of quality assessment.”

Our news editors obtained a quote from the research from the University of California, “In 2007, the US Department of Health and Human Services Office of the National Coordinator for Health Information Technology (ONC) funded three Nationwide Health Information Network (NHIN) health information exchanges (HIE) to demonstrate the feasibility of automated quality reporting by using existing or emerging standards to aggregate information from multiple providers, transmit patient-level quality data in standardized formats, perform an automated quality assessment, and generate a quality report document for electronic transmission. Long Beach Network for Health (LBNH), a NHIN Cooperative HIE, developed a web-based, real-time quality assessment service that calculates quality of care measure using clinical data aggregated through a HIE. LBNH used a set of draft standards to demonstrate automated quality reporting, but noted three important recommendations for future work. First, greater coordination is needed around initiatives that address the gaps in electronic quality measurement standards and processes, including strong Federal involvement and guidance. Second, a harmonized, evergreen quality use case is needed to provide stakeholders with a common understanding on the constantly evolving approaches towards automated quality measurement and reporting.”



According to the news editors, the research concluded: “Finally, there needs to be substantial investment in building on existing work and developing a comprehensive set of data and messaging standards to preserve semantic interoperability of quality measure data.”

For more information on this research see: The impact of emerging standards adoption on automated quality reporting. *Journal of Biomedical Informatics*, 2012;45(4):772-81. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting P.C. Fu, Harbor-UCLA Medical Center, Torrance, CA 90502, United States. (2012 Oct 31)

### **University of Utah, Salt Lake City: Common data model for natural language processing based on two existing standard information models: CDA+GrAF**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Informatics. According to news reporting originating from Salt Lake City, Utah, by NewsRx correspondents, research stated, “An increasing need for collaboration and resources sharing in the Natural Language Processing (NLP) research and development community motivates efforts to create and share a common data model and a common terminology for all information annotated and extracted from clinical text. We have combined two existing standards: the HL7 Clinical Document Architecture (CDA), and the ISO Graph Annotation Format (GrAF; in development), to develop such a data model entitled ‘CDA+GrAF’.”

Our news editors obtained a quote from the research from the University of Utah, “We experimented with several methods to combine these existing standards, and eventually selected a method wrapping separate CDA and GrAF parts in a common standoff annotation (i.e., separate from the annotated text) XML document. Two use cases, clinical document sections, and the 2010 i2b2/VA NLP Challenge (i.e., problems, tests, and treatments, with their assertions and relations), were used to create examples of such standoff annotation documents, and were successfully validated with the XML schemata provided with both standards. We developed a tool to automatically translate annotation documents from the 2010 i2b2/VA NLP Challenge format to GrAF, and automatically generated 50 annotation documents using this tool, all successfully validated. Finally, we adapted the XSL stylesheet provided with HL7 CDA to allow viewing annotation XML documents in a web browser, and plan to adapt existing tools for translating annotation documents between CDA+GrAF and the UIMA and GATE frameworks.”

According to the news editors, the research concluded: “This common data model may ease directly comparing NLP tools and applications, combining their output, transforming and ‘translating’ annotations between different NLP applications, and eventually ‘plug-and-play’ of different modules in NLP applications.”

For more information on this research see: Common data model for natural language processing based on two existing standard information models: CDA+GrAF. *Journal of Biomedical Informatics*, 2012;45(4):703-10. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting S.M. Meystre, Dept. of Biomedical Informatics, University of Utah, School of Medicine, Salt Lake City, UT 84112, United States. (2012 Oct 31)

### **Research Institute, Nashville: Utilizing RxNorm to support practical computing applications: capturing medication history in live electronic health records**

By a News Reporter-Staff News Editor at Telemedicine Week – A new study on Biomedical Informatics is now available. According to news originating from Nashville, Tennessee, by NewsRx editors, the research stated, “RxNorm was utilized as the basis for direct-capture of medication history data in a live EHR system deployed in a large, multi-state outpatient behavioral healthcare provider in the United States serving over 75,000 distinct patients each year across 130 clinical locations. This tool incorporated auto-complete search functionality for medications and proper dosage identification assistance.”

Our news journalists obtained a quote from the research from Research Institute, “The overarching goal was to understand if and how standardized terminologies like RxNorm can be used to support practical computing applications in live EHR systems. We describe the stages of implementation, approaches used to adapt RxNorm’s data structure for the intended EHR application, and the challenges faced. We evaluate the implementation using a four-factor framework addressing flexibility, speed, data integrity, and medication coverage. RxNorm proved to be functional for the intended application, given appropriate adaptations to address high-speed input/output (I/O) requirements of a live EHR and the flexibility required for data entry in multiple potential clinical scenarios.”

According to the news editors, the research concluded: “Future research around search optimization for medication entry, user profiling,

and linking RxNorm to drug classification schemes holds great potential for improving the user experience and utility of medication data in EHRs.”

For more information on this research see: Utilizing RxNorm to support practical computing applications: capturing medication history in live electronic health records. *Journal of Biomedical Informatics*, 2012;45(4):634-41. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news correspondents report that additional information may be obtained from C.C. Bennett, Dept. of Informatics, Centerstone Research Institute, Nashville, TN 37208, United States. (2012 Oct 30)

### **University of Minnesota, Minneapolis: Feasibility of encoding the Institute for Clinical Systems Improvement Depression Guideline using the Omaha System**

By a News Reporter-Staff News Editor at Mental Health Weekly Digest – Investigators discuss new findings in Biomedical Informatics. According to news reporting originating in Minneapolis, Minnesota, by NewsRx journalists, research stated, “Evidence-based clinical guidelines are being developed to bridge the gap between research and practice with the goals of improving health care quality and population health. However, disseminating, implementing, and ensuring ongoing use of clinical guidelines in practice settings is challenging.”

The news reporters obtained a quote from the research from the University of Minnesota, “The purpose of this study was to demonstrate the feasibility of encoding evidence-based clinical guidelines using the Omaha System. Clinical documentation with Omaha System-encoded guidelines generates individualized, meaningful data suitable for program evaluation and health care quality research. The use of encoded guidelines within the electronic health record has potential to reinforce use of guidelines, and thus improve health care quality and population health.”

According to the news reporters, the research concluded: “Research using Omaha System data generated by clinicians has potential to discover new knowledge related to guideline use and effectiveness.”

For more information on this research see: Feasibility of encoding the Institute for Clinical Systems Improvement Depression Guideline using the Omaha System. *Journal of Biomedical Informatics*, 2012;45(4):719-25. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news correspondents report that additional information may be obtained by contacting K.A. Monsen, University of Minnesota, School of

Nursing, Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455, United States. (2012 Oct 29)

### **City University, London: Lexical patterns, features and knowledge resources for coreference resolution in clinical notes**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Informatics is the subject of a report. According to news reporting originating in London, United Kingdom, by NewsRx journalists, research stated, “Generation of entity coreference chains provides a means to extract linked narrative events from clinical notes, but despite being a well-researched topic in natural language processing, general-purpose coreference tools perform poorly on clinical texts. This paper presents a knowledge-centric and pattern-based approach to resolving coreference across a wide variety of clinical records from two corpora (Ontology Development and Information Extraction (ODIE) and i2b2/VA), and describes a method for generating coreference chains using progressively pruned linked lists that reduces the search space and facilitates evaluation by a number of metrics.”

The news reporters obtained a quote from the research from City University, “Independent evaluation results give an F-measure for each corpus of 79.2% and 87.5%, respectively. A baseline of blind coreference of mentions of the same class gives F-measures of 65.3% and 51.9% respectively. For the ODIE corpus, recall is significantly improved over the baseline ( $p < 0.05$ ) but overall there was no statistically significant improvement in F-measure ( $p > 0.05$ ). For the i2b2/VA corpus, recall, precision, and F-measure are significantly improved over the baseline ( $p < 0.05$ ). Overall, our approach offers performance at least as good as human annotators and greatly increased performance over general-purpose tools.”

According to the news reporters, the researchers concluded: “The system uses a number of open-source components that are available to download.”

For more information on this research see: Lexical patterns, features and knowledge resources for coreference resolution in clinical notes. *Journal of Biomedical Informatics*, 2012;45(5):901-12. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wnps/product/cws\\_home/622857](http://www.elsevier.com/wnps/product/cws_home/622857))

Our news correspondents report that additional information may be obtained by contacting P. Gooch, Centre for Health Informatics, City University, London, UK. (2012 Sep 26)

### **Erasmus University Medical Center, Rotterdam: The EU-ADR corpus: Annotated drugs, diseases, targets, and their relationships**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Informatics. According to news reporting originating in Rotterdam, Netherlands, by NewsRx journalists, research stated, “Corpora with specific entities and relationships annotated are essential to train and evaluate text-mining systems that are developed to extract specific structured information from a large corpus. In this paper we describe an approach where a named-entity recognition system produces a first annotation and annotators revise this annotation using a web-based interface.”

The news reporters obtained a quote from the research from Erasmus University Medical Center, “The agreement figures achieved show that the inter-annotator agreement is much better than the agreement with the system provided annotations. The corpus has been annotated for drugs, disorders, genes and their inter-relationships. For each of the drug-disorder, drug-target, and target-disorder relations three experts have annotated a set of 100 abstracts.”

According to the news reporters, the researchers concluded: “These annotated relationships will be used to train and evaluate text-mining software to capture these relationships in texts.”

For more information on this research see: The EU-ADR corpus: Annotated drugs, diseases, targets, and their relationships. *Journal of Biomedical Informatics*, 2012;45(5):879-84. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news correspondents report that additional information may be obtained by contacting E.M. van Mulligen, Dept. of Medical Informatics, Erasmus University Medical Center, Rotterdam, Netherlands. (2012 Sep 26)

### **Keimyung University, Daegu: Decision-making model for early diagnosis of congestive heart failure using rough set and decision tree approaches**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Informatics have been published. According to news reporting from Daegu, South Korea, by NewsRx journalists, research stated, “The accurate diagnosis of heart failure in emergency room patients is quite important, but can also be quite difficult due to our insufficient understanding of the characteristics of heart failure. The purpose of this study is to design a decision-making model that provides critical factors and knowledge associated with congestive heart

failure (CHF) using an approach that makes use of rough sets (RSs) and decision trees.”

The news correspondents obtained a quote from the research from Keimyung University, “Among 72 laboratory findings, it was determined that two subsets (RBC, EOS, Protein, O2SAT, Pro BNP) in an RS-based model, and one subset (Gender, MCHC, Direct bilirubin, and Pro BNP) in a logistic regression (LR)-based model were indispensable factors for differentiating CHF patients from those with dyspnea, and the risk factor Pro BNP was particularly so. To demonstrate the usefulness of the proposed model, we compared the discriminatory power of decision-making models that utilize RS-and LR-based decision models by conducting 10-fold cross-validation. The experimental results showed that the RS-based decision-making model (accuracy: 97.5%, sensitivity: 97.2%, specificity: 97.7%, positive predictive value: 97.2%, negative predictive value: 97.7%, and area under ROC curve: 97.5%) consistently outperformed the LR-based decision-making model (accuracy: 88.7%, sensitivity: 90.1%, specificity: 87.5%, positive predictive value: 85.3%, negative predictive value: 91.7%, and area under ROC curve: 88.8%).”

According to the news reporters, the researchers concluded: “In addition, a pairwise comparison of the ROC curves of the two models showed a statistically significant difference ( $p < 0.01$ ; 95% CI: 2.”

For more information on this research see: Decision-making model for early diagnosis of congestive heart failure using rough set and decision tree approaches. *Journal of Biomedical Informatics*, 2012;45(5):999-1008. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting C.S. Son, Dept. of Medical Informatics, School of Medicine, Keimyung University, Daegu, South Korea. (2012 Sep 26)

### **Rutgers University, Piscataway: Introducing RFID technology in dynamic and time-critical medical settings: Requirements and challenges**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Emergency Treatment is now available. According to news reporting out of Piscataway, New Jersey, by NewsRx editors, research stated, “We describe the process of introducing RFID technology in the trauma bay of a trauma center to support fast-paced and complex teamwork during resuscitation. We analyzed trauma resuscitation tasks, photographs of medical tools, and videos of simulated resuscitations to gain insight into resuscitation tasks, work practices and procedures.”

Our news journalists obtained a quote from the research from Rutgers University, “Based on these data, we discuss strategies for placing RFID tags on medical tools and for placing antennas in the environment for optimal tracking and activity recognition. Results from our preliminary RFID deployment in the trauma bay show the feasibility of our approach for tracking tools and for recognizing trauma team activities.”

According to the news editors, the researchers concluded: “We conclude by discussing implications for and challenges to introducing RFID technology in other similar settings characterized by dynamic and collocated collaboration.”

For more information on this research see: Introducing RFID technology in dynamic and time-critical medical settings: Requirements and challenges. *Journal of Biomedical Informatics*, 2012;45(5):958-74. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting S. Parlak, Electrical and Computer Engineering Department, Rutgers University, 94 Brett Road, Piscataway, NJ 08854, United States. (2012 Sep 26)

### **University of California, La Jolla: Argumentation logic for the flexible enactment of goal-based medical guidelines**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Informatics. According to news reporting from La Jolla, California, by NewsRx journalists, research stated, “RESEARCH PURPOSE: We have designed a prototype clinical workflow system that allows the specification and enactment of medical guidelines in terms of clinical goals to be achieved, maintained or avoided depending on the patient’s disease and treatment evolution. The prototype includes: (1) an argumentation-based decision support system which can be used both to represent medical decisions within guidelines, and to dynamically choose the most suitable plans to achieve clinical goals, and (2) mechanisms to specify a health organization’s facilities and health workers skills and roles, which can be taken into account during the decision process in order to improve quality of care.”

The news correspondents obtained a quote from the research from the University of California, “The framework has been fully implemented in the COGENT formal modeling system. The prototype has been evaluated implementing a hypertension guideline.”

According to the news reporters, the researchers concluded: “The framework has shown flexibility and adaptability in (1) advising and tailoring health care based on a health organization’s resources and a

patient's particular medical condition, (2) delegating health care, and (3) replanning when unexpected situations arise."

For more information on this research see: Argumentation logic for the flexible enactment of goal-based medical guidelines. *Journal of Biomedical Informatics*, 2012;45(5):938-49. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting M.A. Grando, Division of Biomedical Informatics, School of Medicine, University of California San Diego, 9500 Gilman Drive #0728, La Jolla, CA 92093-0728, United States. (2012 Sep 26)

### **University of Zurich: Relation mining experiments in the pharmacogenomics domain**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Informatics. According to news reporting originating from Zurich, Switzerland, by NewsRx correspondents, research stated, "The mutual interactions among genes, diseases, and drugs are at the heart of biomedical research, and are especially important for the pharmacological industry. The recent trend towards personalized medicine makes it increasingly relevant to be able to tailor drugs to specific genetic makeups."

Our news editors obtained a quote from the research from the University of Zurich, "The pharmacogenetics and pharmacogenomics knowledge base (PharmGKB) aims at capturing relevant information about such interactions from several sources, including curation of the biomedical literature. Advanced text mining tools which can support the process of manual curation are increasingly necessary in order to cope with the deluge of new published results. However, effective evaluation of those tools requires the availability of manually curated data as gold standard. In this paper we discuss how the existing PharmGKB database can be used for such an evaluation task in a way similar to the usage of gold standard data derived from protein-protein interaction databases in one of the recent BioCreative shared tasks."

According to the news editors, the researchers concluded: "Additionally, we present our own considerations and results on the feasibility and difficulty of such a task."

For more information on this research see: Relation mining experiments in the pharmacogenomics domain. *Journal of Biomedical Informatics*, 2012;45(5):851-61. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting F. Rinaldi, Institute of Computational Linguistics,



University of Zurich, Binzmuhlestrasse 14, 8050 Zurich, Switzerland.  
(2012 Sep 26)

### Usability of a novel clinician interface for genetic results

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Informatics have been published. According to news reporting originating in Wellesley, Massachusetts, by NewsRx journalists, research stated, “The complexity and rapid growth of genetic data demand investment in information technology to support effective use of this information. Creating infrastructure to communicate genetic information to healthcare providers and enable them to manage that data can positively affect a patient’s care in many ways.”

The news reporters obtained a quote from the research, “However, genetic data are complex and present many challenges. We report on the usability of a novel application designed to assist providers in receiving and managing a patient’s genetic profile, including ongoing updated interpretations of the genetic variants in those patients. Because these interpretations are constantly evolving, managing them represents a challenge. We conducted usability tests with potential users of this application and reported findings to the application development team, many of which were addressed in subsequent versions. Clinicians were excited about the value this tool provides in pushing out variant updates to providers and overall gave the application high usability ratings, but had some difficulty interpreting elements of the interface. Many issues identified required relatively little development effort to fix suggesting that consistently incorporating this type of analysis in the development process can be highly beneficial. For genetic decision support applications, our findings suggest the importance of designing a system that can deliver the most current knowledge and highlight the significance of new genetic information for clinical care.”

According to the news reporters, the researchers concluded: “Our results demonstrate that using a development and design process that is user focused helped optimize the value of this application for personalized medicine.”

For more information on this research see: Usability of a novel clinician interface for genetic results. *Journal of Biomedical Informatics*, 2012;45(5):950-7. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news correspondents report that additional information may be obtained by contacting P.M. Neri, Partners HealthCare System Inc, 93 Worcester Street, Wellesley, MA 02481, United States. (2012 Sep 26)

## **National Institutes of Health, Bethesda: Systematic identification of pharmacogenomics information from clinical trials**

By a News Reporter-Staff News Editor at Clinical Trials Week – Researchers detail new data in Drugs and Therapies. According to news reporting originating from Bethesda, Maryland, by NewsRx correspondents, research stated, “Recent progress in high-throughput genomic technologies has shifted pharmacogenomic research from candidate gene pharmacogenetics to clinical pharmacogenomics (PGx). Many clinical related questions may be asked such as ‘what drug should be prescribed for a patient with mutant alleles?’ Typically, answers to such questions can be found in publications mentioning the relationships of the gene-drug-disease of interest.”

Our news editors obtained a quote from the research from the National Institutes of Health, “In this work, we hypothesize that ClinicalTrials.gov is a comparable source rich in PGx related information. In this regard, we developed a systematic approach to automatically identify PGx relationships between genes, drugs and diseases from trial records in ClinicalTrials.gov. In our evaluation, we found that our extracted relationships overlap significantly with the curated factual knowledge through the literature in a PGx database and that most relationships appear on average 5years earlier in clinical trials than in their corresponding publications, suggesting that clinical trials may be valuable for both validating known and capturing new PGx related information in a more timely manner. Furthermore, two human reviewers judged a portion of computer-generated relationships and found an overall accuracy of 74% for our text-mining approach.”

According to the news editors, the researchers concluded: “This work has practical implications in enriching our existing knowledge on PGx gene-drug-disease relationships as well as suggesting crosslinks between ClinicalTrials.gov and other PGx knowledge bases.”

For more information on this research see: Systematic identification of pharmacogenomics information from clinical trials. *Journal of Biomedical Informatics*, 2012;45(5):870-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - <http://www.elsevier.com/locate/jbiomed>)

The news editors report that additional information may be obtained by contacting J. Li, National Library of Medicine, National Institutes of Health, Bethesda, MD 20894, United States. (2012 Sep 24)

## **Lister Hill National Center for Biomedical Communications, Bethesda: Standardizing clinical laboratory data for secondary use**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Biomedical Informatics are presented in a new report. According to news reporting originating from Bethesda, Maryland, by NewsRx correspondents, research stated, “Clinical databases provide a rich source of data for answering clinical research questions. However, the variables recorded in clinical data systems are often identified by local, idiosyncratic, and sometimes redundant and/or ambiguous names (or codes) rather than unique, well-organized codes from standard code systems.”

Our news editors obtained a quote from the research from Lister Hill National Center for Biomedical Communications, “This reality discourages research use of such databases, because researchers must invest considerable time in cleaning up the data before they can ask their first research question. Researchers at MIT developed MIMIC-II, a nearly complete collection of clinical data about intensive care patients. Because its data are drawn from existing clinical systems, it has many of the problems described above. In collaboration with the MIT researchers, we have begun a process of cleaning up the data and mapping the variable names and codes to LOINC codes. Our first step, which we describe here, was to map all of the laboratory test observations to LOINC codes. We were able to map 87% of the unique laboratory tests that cover 94% of the total number of laboratory tests results. Of the 13% of tests that we could not map, nearly 60% were due to test names whose real meaning could not be discerned and 29% represented tests that were not yet included in the LOINC table. These results suggest that LOINC codes cover most of laboratory tests used in critical care.”

According to the news editors, the researchers concluded: “We have delivered this work to the MIMIC-II researchers, who have included it in their standard MIMIC-II database release so that researchers who use this database in the future will not have to do this work.”

For more information on this research see: Standardizing clinical laboratory data for secondary use. *Journal of Biomedical Informatics*, 2012;45(4):642-50. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting S. Abhyankar, Lister Hill National Center for Biomedical Communications, National Library of Medicine, 8600 Rockville Pike, Building 38A, 7N707, Bethesda, MD 20894, United States. (2012 Sep 05)

### **University of California, La Jolla: An approach to improve LOINC mapping through augmentation of local test names**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Informatics is the subject of a report. According to news originating from La Jolla, California, by NewsRx correspondents, research stated, “Mapping medical test names into a standardized vocabulary is a prerequisite to sharing test-related data between health care entities. One major barrier in this process is the inability to describe tests in sufficient detail to assign the appropriate name in Logical Observation Identifiers, Names, and Codes (LOINC&#174;).”

Our news journalists obtained a quote from the research from the University of California, “Approaches to address mapping of test names with incomplete information have not been well described. We developed a process of ‘enhancing’ local test names by incorporating information required for LOINC mapping into the test names themselves. When using the Regenstrief LOINC Mapping Assistant (RELMA) we found that 73/198 (37%) of ‘enhanced’ test names were successfully mapped to LOINC, compared to 41/191 (21%) of original names ( $p=0.001$ ).”

According to the news editors, the researchers concluded: “Our approach led to a significantly higher proportion of test names with successful mapping to LOINC, but further efforts are required to achieve more satisfactory results.”

For more information on this research see: An approach to improve LOINC mapping through augmentation of local test names. *Journal of Biomedical Informatics*, 2012;45(4):651-7. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news correspondents report that additional information may be obtained from H. Kim, Division of Biomedical Informatics, University of California, San Diego, La Jolla, CA, United States. (2012 Sep 05)

### **University of New Mexico, Albuquerque: Using LOINC to link 10 terminology standards to one unified standard in a specialized domain**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Informatics. According to news reporting out of Albuquerque, New Mexico, by NewsRx editors, research stated, “Despite the existence of multiple standards for the coding of biomedical data and the known benefits of doing so, there remain a myriad of biomedical information domain spaces that are essentially un-coded and unstandardized. Perhaps a worse situation is when the

same or similar information in a given domain is coded to a variety of different standards.”

Our news journalists obtained a quote from the research from the University of New Mexico, “Such is the case with cephalometrics - standardized measurements of angles and distances between specified landmarks on X-ray film used for orthodontic treatment planning and a variety of research applications. We describe how we unified the existing cephalometric definitions from 10 existing cephalometric standards to one unifying terminology set using an existing standard (LOINC).”

According to the news editors, the researchers concluded: “Using our example of an open and web-based orthodontic case file system, we describe how this work benefited our project and discuss how adopting or expanding established standards can benefit other similar projects in specialized domains.”

For more information on this research see: Using LOINC to link 10 terminology standards to one unified standard in a specialized domain. *Journal of Biomedical Informatics*, 2012;45(4):674-82. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting P.J. Kroth, University of New Mexico, Health Sciences Library and Informatics Center, MSC09 5010, Albuquerque, NM 87131-0001, United States. (2012 Sep 05)

### **Using the ResearchEHR platform to facilitate the practical application of the EHR standards**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Informatics have been published. According to news originating from Valencia, Spain, by NewsRx correspondents, research stated, “Possibly the most important requirement to support cooperative work among health professionals and institutions is the ability of sharing EHRs in a meaningful way, and it is widely acknowledged that standardization of data and concepts is a prerequisite to achieve semantic interoperability in any domain. Different international organizations are working on the definition of EHR architectures but the lack of tools that implement them hinders their broad adoption.”

Our news journalists obtained a quote from the research, “In this paper we present ResearchEHR, a software platform whose objective is to

facilitate the practical application of EHR standards as a way of reaching the desired semantic interoperability. This platform is not only suitable for developing new systems but also for increasing the standardization of existing ones. The work reported here describes how the platform allows for the edition, validation, and search of archetypes, converts legacy data into normalized, archetypes extracts, is able to generate applications from archetypes and finally, transforms archetypes and data extracts into other EHR standards.”

According to the news editors, the researchers concluded: “We also include in this paper how ResearchEHR has made possible the application of the CEN/ISO 13606 standard in a real environment and the lessons learnt with this experience.”

For more information on this research see: Using the ResearchEHR platform to facilitate the practical application of the EHR standards. *Journal of Biomedical Informatics*, 2012;45(4):746-62. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news correspondents report that additional information may be obtained from J.A. Maldonado, ITACA Institute, Universitat Politècnica de Valencia, CP 46022 Valencia, Spain. (2012 Sep 05)

### **Implementing standards for the interoperability among healthcare providers in the public regionalized Healthcare Information System of the Lombardy Region**

By a News Reporter-Staff News Editor at Information Technology Newsweekly – Researchers detail new data in Biomedical Informatics. According to news reporting originating in Milan, Italy, by Vertical-News journalists, research stated, “Information technologies (ITs) have now entered the everyday workflow in a variety of healthcare providers with a certain degree of independence. This independence may be the cause of difficulty in interoperability between information systems and it can be overcome through the implementation and adoption of standards.”

The news reporters obtained a quote from the research, “Here we present the case of the Lombardy Region, in Italy, that has been able, in the last 10 years, to set up the Regional Social and Healthcare Information System, connecting all the healthcare providers within the region, and providing full access to clinical and health-related documents independently from the healthcare organization that generated the document itself. This goal, in a region with almost 10 millions citizens, was achieved through a twofold approach: first, the political and operative push towards the adoption of the Health Level 7 (HL7) standard

within single hospitals and, second, providing a technological infrastructure for data sharing based on interoperability specifications recognized at the regional level for messages transmitted from healthcare providers to the central domain. The adoption of such regional interoperability specifications enabled the communication among heterogeneous systems placed in different hospitals in Lombardy. Integrating the Healthcare Enterprise (IHE) integration profiles which refer to HL7 standards are adopted within hospitals for message exchange and for the definition of integration scenarios. The IHE patient administration management (PAM) profile with its different workflows is adopted for patient management, whereas the Scheduled Workflow (SWF), the Laboratory Testing Workflow (LTW), and the Ambulatory Testing Workflow (ATW) are adopted for order management. At present, the system manages 4,700,000 pharmacological e-prescriptions, and 1,700,000 e-prescriptions for laboratory exams per month. It produces, monthly, 490,000 laboratory medical reports, 180,000 radiology medical reports, 180,000 first aid medical reports, and 58,000 discharge summaries.”

According to the news reporters, the researchers concluded: “Hence, despite there being still work in progress, the Lombardy Region healthcare system is a fully interoperable social healthcare system connecting patients, healthcare providers, healthcare organizations, and healthcare professionals in a large and heterogeneous territory through the implementation of international health standards.”

For more information on this research see: Implementing standards for the interoperability among healthcare providers in the public regionalized Healthcare Information System of the Lombardy Region. *Journal of Biomedical Informatics*, 2012;45(4):736-45. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news correspondents report that additional information may be obtained by contacting F. Barbarito, Direzione Generale CRS-SISS, Lombardia Informatica SpA, Milan, Italy. (2012 Sep 04)

### **National Institutes of Health, Bethesda: Evaluation of alternative standardized terminologies for medical conditions within a network of observational healthcare databases**

By a News Reporter-Staff News Editor at Telemedicine Week – Current study results on Biomedical Informatics have been published. According to news reporting originating from Bethesda, Maryland, by NewsRx correspondents, research stated, “Large electronic databases of health care information, such as administrative claims and electronic health records, are available and are being used in a number of public health

settings, including drug safety surveillance. However, because of a lack of standardization, clinical terminologies may differ across databases.”

Our news editors obtained a quote from the research from the National Institutes of Health, “With the aid of existing resources and expert coders, we have developed mapping tables to convert ICD-9-CM diagnosis codes used in some existing databases to SNOMED-CT and MedDRA. In addition, previously developed definitions for specific health outcomes of interest were mapped to the same standardized vocabularies. We evaluated how vocabulary mapping affected (1) the retention of clinical data from two test databases, (2) the semantic space of outcome definitions, (3) the prevalence of each outcome in the test databases, and (4) the reliability of analytic methods designed to detect drug-outcome associations in the test databases. Although vocabulary mapping affected the semantic space of some outcome definitions, as well as the prevalence of some outcomes in the test databases, it had only minor effects on the analysis of drug-outcome associations.”

According to the news editors, the researchers concluded: “Furthermore, both SNOMED-CT and MedDRA were viable for use as standardized vocabularies in systems designed to perform active medical product surveillance using disparate sources of observational data.”

For more information on this research see: Evaluation of alternative standardized terminologies for medical conditions within a network of observational healthcare databases. *Journal of Biomedical Informatics*, 2012;45(4):689-96. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting C. Reich, Observational Medical Outcomes Partnership, Foundation for the National Institutes of Health, 9650 Rockville Pike, Bethesda, MD 20814, United States. (2012 Sep 04)

### **University of Texas, Houston: Cross-terminology mapping challenges: A demonstration using medication terminological systems**

By a News Reporter-Staff News Editor at Telemedicine Week – Data detailed on Biomedical Informatics have been presented. According to news originating from Houston, Texas, by NewsRx correspondents, research stated, “Standardized terminological systems for biomedical information have provided considerable benefits to biomedical applications and research. However, practical use of this information often requires mapping across terminological systems-a complex and time-consuming process.”



Our news journalists obtained a quote from the research from the University of Texas, “This paper demonstrates the complexity and challenges of mapping across terminological systems in the context of medication information. It provides a review of medication terminological systems and their linkages, then describes a case study in which we mapped proprietary medication codes from an electronic health record to SNOMED CT and the UMLS Metathesaurus. The goal was to create a polyhierarchical classification system for querying an i2b2 clinical data warehouse. We found that three methods were required to accurately map the majority of actively prescribed medications. Only 62.5% of source medication codes could be mapped automatically. The remaining codes were mapped using a combination of semi-automated string comparison with expert selection, and a completely manual approach. Compound drugs were especially difficult to map: only 7.5% could be mapped using the automatic method.”

According to the news editors, the researchers concluded: “General challenges to mapping across terminological systems include (1) the availability of up-to-date information to assess the suitability of a given terminological system for a particular use case, and to assess the quality and completeness of cross-terminology links; (2) the difficulty of correctly using complex, rapidly evolving, modern terminologies; (3) the time and effort required to complete and evaluate the mapping; (4) the need to address differences in granularity between the source and target terminologies; and (5) the need to continuously update the mapping as terminological systems evolve.”

For more information on this research see: Cross-terminology mapping challenges: A demonstration using medication terminological systems. *Journal of Biomedical Informatics*, 2012;45(4):613-25. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news correspondents report that additional information may be obtained from H. Saitwal, The University of Texas School of Biomedical Informatics at Houston, 7000 Fannin Suite 600, Houston, TX 77030, United States. (2012 Sep 04)

### **Veterans Affairs Medical Center, Washington: Translating standards into practice: Experience and lessons learned at the Department of Veterans Affairs**

By a News Reporter-Staff News Editor at Information Technology Newsweekly – A new study on Biomedical Informatics is now available. According to news reporting out of Washington, District of Columbia, by VerticalNews editors, research stated, “The increased need for interoperable electronic health records in health care organizations underscores the importance of standards. The US Department of Veterans

Affairs (VA) has a long history of developing and adopting various types of health care data standards.”

Our news journalists obtained a quote from the research from Veterans Affairs Medical Center, “The authors present in detail their experience in this domain. A formal organization within VA is responsible for helping to develop and implement standards. This group has produced a Standards Life Cycle (SLC) process endorsed by VA key business and information technology (IT) stakeholders. It coordinates the identification, description, and implementation of standards aligned with VA business requirements. In this paper, we review the adoption of four standards in the categories of security and privacy, terminology, health information exchange, and modeling tools; emphasizing the implementation approach used in each. In our experience, adoption is facilitated by internal staff with expertise in standards development and adoption. Use of processes such as an SLC and tools such as an enterprise requirement repository help formally track and ensure that IT development and acquisition incorporate these standards. An organization should adopt standards that are aligned with its business priorities and favor those that are more readily implementable.”

According to the news editors, the researchers concluded: “To assist with this final point, we offer a standard ‘Likelihood of Adoption Scale,’ which changes as standards specifications evolve from PDF documents only, to PDF documents with construction and testing tools, to fully functional reference implementations.”

For more information on this research see: Translating standards into practice: Experience and lessons learned at the Department of Veterans Affairs. *Journal of Biomedical Informatics*, 2012;45(4):813-23. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting O. Bouhaddou, US Dept. of Veterans Affairs, Washington, DC, United States. (2012 Sep 04)

### **Columbia University, New York City: Health literacy screening instruments for eHealth applications: A systematic review**

By a News Reporter-Staff News Editor at Information Technology Newsweekly – A new study on Biomedical Informatics is now available. According to news reporting originating in New York City, New York, by VerticalNews journalists, researchers stated “To systematically review current health literacy (HL) instruments for use in consumer-facing and mobile health information technology screening and evaluation tools. The databases, PubMed, OVID, Google Scholar, Cochrane Library and Science Citation Index, were searched for health literacy assessment

instruments using the terms ‘health’, ‘literacy’, ‘computer-based,’ and ‘psychometrics.’”

The news reporters obtained a quote from the research by the authors from Columbia University, “All instruments identified by this method were critically appraised according to their reported psychometric properties and clinical feasibility. Eleven different health literacy instruments were found. Screening questions, such as asking a patient about his/her need for assistance in navigating health information, were evaluated in seven different studies and are promising for use as a valid, reliable, and feasible computer-based approach to identify patients that struggle with low health literacy. However, there was a lack of consistency in the types of screening questions proposed. There is also a lack of information regarding the psychometric properties of computer-based health literacy instruments. Limitations: Only English language health literacy assessment instruments were reviewed and analyzed. Current health literacy screening tools demonstrate varying benefits depending on the context of their use. In many cases, it seems that a single screening question may be a reliable, valid, and feasible means for establishing health literacy. A combination of screening questions that assess health literacy and technological literacy may enable tailoring eHealth applications to user needs.”

According to the news reporters, the researchers concluded: “Further research should determine the best screening question(s) and the best synthesis of various instruments’ content and methodologies for computer-based health literacy screening and assessment.”

For more information on this research see: Health literacy screening instruments for eHealth applications: A systematic review. *Journal of Biomedical Informatics*, 2012;45(3):598-607. *Journal of Biomedical Informatics* can be contacted at: Academic Press Inc Elsevier Science, 525 B St, Ste 1900, San Diego, CA 92101-4495, USA. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news correspondents report that additional information may be obtained by contacting S.A. Collins, Columbia University, Sch Nursing, New York, NY, United States. (2012 Jul 24)

### **Aristotle University, Thessaloniki: Knowledge engineering for adverse drug event prevention: On the design and development of a uniform, contextualized and sustainable knowledge-based framework**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Informatics have been published. According to

news reporting from Thessaloniki, Greece, by NewsRx journalists, researchers stated “The primary aim of this work was the development of a uniform, contextualized and sustainable knowledge-based framework to support adverse drug event (ADE) prevention via Clinical Decision Support Systems (CDSSs). In this regard, the employed methodology involved first the systematic analysis and formalization of the knowledge sources elaborated in the scope of this work, through which an application-specific knowledge model has been defined.”

The news correspondents obtained a quote from the research by the authors from Aristotle University, “The entire framework architecture has been then specified and implemented by adopting Computer Interpretable Guidelines (CIGs) as the knowledge engineering formalism for its construction. The framework integrates diverse and dynamic knowledge sources in the form of rule-based ADE signals, all under a uniform Knowledge Base (KB) structure, according to the defined knowledge model. Equally important, it employs the means to contextualize the encapsulated knowledge, in order to provide appropriate support considering the specific local environment (hospital, medical department, language, etc.), as well as the mechanisms for knowledge querying, inference, sharing, and management.”

According to the news reporters, the researchers concluded: “In this paper, we present thoroughly the establishment of the proposed knowledge framework by presenting the employed methodology and the results obtained as regards implementation, performance and validation aspects that highlight its applicability and virtue in medication safety.”

For more information on this research see: Knowledge engineering for adverse drug event prevention: On the design and development of a uniform, contextualized and sustainable knowledge-based framework. *Journal of Biomedical Informatics*, 2012;45(3):495-506. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting V. Koutkias, Lab of Medical Informatics, Medical School, Aristotle University, Thessaloniki, Greece. (2012 Jul 11)

### **Cameron University, Lawton: Oscillablastic model, a new model for oscillatory dynamics, applied to the analysis of Hes1 gene expression and Ehrlich ascites tumor growth**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedical Informatics. According to news reporting from Lawton, Oklahoma, by NewsRx journalists, researchers stated “This paper introduces a new dynamical model, called the oscillablastic model, to analyze the dynamical behavior of biomedical data when one observes oscillatory behavior. The proposed oscillablastic

model is sufficiently flexible to represent various types of oscillatory behavior.”

The news correspondents obtained a quote from the research by the authors from Cameron University, “The oscillabolastic model is applied to two sets of data. The first data set deals with the oscillabolastic modeling of Ehrlich ascites tumor cells and the second one is the oscillabolastic modeling of the mean signal intensity of Hes1 gene expression in response to serum stimulation.”

According to the news reporters, the researchers concluded: “A generalized oscillabolastic model is also suggested to accommodate cases in which predictor variables other than time are also involved.”

For more information on this research see: Oscillabolastic model, a new model for oscillatory dynamics, applied to the analysis of Hes1 gene expression and Ehrlich ascites tumor growth. *Journal of Biomedical Informatics*, 2012;45(3):401-7. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting M.A. Tabatabai, Dept. of Mathematical Sciences, Cameron University, 2800 W Gore Blvd, Lawton, OK 73505, United States. (2012 Jul 11)

### **Dublin Institute of Technology: Clinical coverage of an archetype repository over SNOMED-CT**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedical Informatics are discussed in a new report. According to news reporting out of Dublin, Ireland, by NewsRx editors, researchers stated “Clinical archetypes provide a means for health professionals to design what should be communicated as part of an Electronic Health Record (EHR). An ever-growing number of archetype definitions follow this health information modelling approach, and this international archetype resource will eventually cover a large number of clinical concepts.”

Our news journalists obtained a quote from the research by the authors from the Dublin Institute of Technology, “On the other hand, clinical terminology systems that can be referenced by archetypes also have a wide coverage over many types of health-care information. No existing work measures the clinical content coverage of archetypes using terminology systems as a metric. Archetype authors require guidance to identify under-covered clinical areas that may need to be the focus of further modelling effort according to this paradigm. This paper develops a first map of SNOMED-CT concepts covered by archetypes in a repository by creating a so-called terminological Shadow. This is achieved by mapping appropriate SNOMED-CT concepts from all nodes

that contain archetype terms, finding the top two category levels of the mapped concepts in the SNOMED-CT hierarchy, and calculating the coverage of each category. A quantitative study of the results compares the coverage of different categories to identify relatively under-covered as well as well-covered areas. The results show that the coverage of the well-known National Health Service (NHS) Connecting for Health (CfH) archetype repository on all categories of SNOMED-CT is not equally balanced.”

According to the news editors, the researchers concluded: “Categories worth investigating emerged at different points on the coverage spectrum, including well-covered categories such as Attributes, Qualifier value, under-covered categories such as Microorganism, Kingdom animalia, and categories that are not covered at all such as Cardiovascular drug (product).”

For more information on this research see: Clinical coverage of an archetype repository over SNOMED-CT. *Journal of Biomedical Informatics*, 2012;45(3):408-18. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting S. Yu, Dublin Institute of Technology, School Elect Eng Systems, Dublin, Ireland. (2012 Jul 11)

### **Erasmus University Medical Center, Rotterdam: Using an ensemble system to improve concept extraction from clinical records**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedical Informatics have been published. According to news reporting originating from Rotterdam, Netherlands, by NewsRx correspondents, researchers stated “Recognition of medical concepts is a basic step in information extraction from clinical records. We wished to improve on the performance of a variety of concept recognition systems by combining their individual results.”

Our news editors obtained a quote from the research by the authors from Erasmus University Medical Center, “We selected two dictionary-based systems and five statistical-based systems that were trained to annotate medical problems, tests, and treatments in clinical records. Manually annotated clinical records for training and testing were made available through the 2010 i2b2/VA (Informatics for Integrating Biology and the Bedside) challenge. Results of individual systems were combined by a simple voting scheme. The statistical systems were trained on a set of 349 records. Performance (precision, recall, F-score) was assessed on a test set of 477 records, using varying voting thresholds. The combined annotation system achieved a best F-score of 82.2% (recall

81.2%, precision 83.3%) on the test set, a score that ranks third among 22 participants in the i2b2/VA concept annotation task. The ensemble system had better precision and recall than any of the individual systems, yielding an F-score that is 4.6% point higher than the best single system. Changing the voting threshold offered a simple way to obtain a system with high precision (and moderate recall) or one with high recall (and moderate precision). The ensemble-based approach is straightforward and allows the balancing of precision versus recall of the combined system.”

According to the news editors, the researchers concluded: “The ensemble system is freely available and can easily be extended, integrated in other systems, and retrained.”

For more information on this research see: Using an ensemble system to improve concept extraction from clinical records. *Journal of Biomedical Informatics*, 2012;45(3):423-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting N. Kang, Dept. of Medical Informatics, Erasmus University Medical Center, Rotterdam, Netherlands. (2012 Jul 11)

### **System engineering approach to documentation: An evaluation of the documentation process in a gastroenterology laboratory**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Informatics is the subject of a report. According to news reporting out of Dallas, Texas, by NewsRx editors, researchers stated “Documentation processes are an indispensable part of patient care. Timely access to complete and accurate documentation is crucial to patient safety.”

Our news journalists obtained a quote from the research by the authors, “However, there is no sufficient tool to help health care professionals effectively manage documentation processes. In this study, we developed an evaluation methodology, including a documentation matrix, a documentation process flow diagram, and a document value tool, to analyze the necessity and redundancy of the documentation processes.”

According to the news editors, the researchers concluded: “We applied this methodology in a gastrointestinal lab and improved the transparency of the documentation processes among providers.”

For more information on this research see: System engineering approach to documentation: An evaluation of the documentation process in a gastroenterology laboratory. *Journal of Biomedical Informatics*,

2012;45(3):591-7. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting B. Zhang, Office of Patient Safety, Baylor Health Care System, 8080 N Central Expressway, Suite 500, Dallas, TX 75206, United States. (2012 Jul 11)

### **University College London: Understanding infusion administration in the ICU through Distributed Cognition**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Informatics have been presented. According to news reporting originating in London, United Kingdom, by NewsRx journalists, researchers stated “To understand how healthcare technologies are used in practice and evaluate them, researchers have argued for adopting the theoretical framework of Distributed Cognition (DC). This paper describes the methods and results of a study in which a DC methodology, Distributed Cognition for Teamwork (DiCoT), was applied to study the use of infusion pumps by nurses in an Intensive Care Unit (ICU).”

The news reporters obtained a quote from the research by the authors from University College London, “Data was gathered through ethnographic observations and interviews. Data analysis consisted of constructing the representational models of DiCoT, focusing on information flows, physical layouts, social structures and artefacts. The findings show that there is significant distribution of cognition in the ICU: socially, among nurses; physically, through the material environment; and through technological artefacts.”

According to the news reporters, the researchers concluded: “The DiCoT methodology facilitated the identification of potential improvements that could increase the safety and efficiency of nurses’ interactions with infusion technology.”

For more information on this research see: Understanding infusion administration in the ICU through Distributed Cognition. *Journal of Biomedical Informatics*, 2012;45(3):580-90. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news correspondents report that additional information may be obtained by contacting A. Rajkomar, University College London Interaction Centre (UCLIC), London, UK. (2012 Jul 11)



## **University Rovira i Virgili, Tarragona: An ontology-based personalization of health-care knowledge to support clinical decisions for chronically ill patients**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedical Informatics. According to news reporting out of Tarragona, Spain, by NewsRx editors, researchers stated “Chronically ill patients are complex health care cases that require the coordinated interaction of multiple professionals. A correct intervention of these sort of patients entails the accurate analysis of the conditions of each concrete patient and the adaptation of evidence-based standard intervention plans to these conditions.”

Our news journalists obtained a quote from the research by the authors from University Rovira i Virgili, “There are some other clinical circumstances such as wrong diagnoses, unobserved comorbidities, missing information, unobserved related diseases or prevention, whose detection depends on the capacities of deduction of the professionals involved. In this paper, we introduce an ontology for the care of chronically ill patients and implement two personalization processes and a decision support tool. The first personalization process adapts the contents of the ontology to the particularities observed in the health-care record of a given concrete patient, automatically providing a personalized ontology containing only the clinical information that is relevant for health-care professionals to manage that patient. The second personalization process uses the personalized ontology of a patient to automatically transform intervention plans describing health-care general treatments into individual intervention plans. For comorbid patients, this process concludes with the semi-automatic integration of several individual plans into a single personalized plan. Finally, the ontology is also used as the knowledge base of a decision support tool that helps health-care professionals to detect anomalous circumstances such as wrong diagnoses, unobserved comorbidities, missing information, unobserved related diseases, or preventive actions. Seven health-care centers participating in the K4CARE project, together with the group SAGESA and the Local Health System in the town of Pollença have served as the validation platform for these two processes and tool.”

According to the news editors, the researchers concluded: “Health-care professionals participating in the evaluation agree about the average quality 84% (5.9/7.0) and utility 90% (6.3/7.0) of the tools and also about the correct reasoning of the decision support tool, according to clinical standards.”

For more information on this research see: An ontology-based personalization of health-care knowledge to support clinical decisions for chronically ill patients. *Journal of Biomedical Informatics*,

2012;45(3):429-46. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news journalists report that additional information may be obtained by contacting D. Riano, Research Group on Artificial Intelligence, Universitat Rovira i Virgili, Tarragona, Spain. (2012 Jul 11)

### **Columbia University, New York City: A hybrid knowledge-based and data-driven approach to identifying semantically similar concepts**

By a News Reporter-Staff News Editor at Information Technology Newsweekly – Investigators publish new report on Biomedical Informatics. According to news reporting originating in New York City, New York, by VerticalNews journalists, researchers stated “An open research question when leveraging ontological knowledge is when to treat different concepts separately from each other and when to aggregate them. For instance, concepts for the terms ‘paroxysmal cough’ and ‘nocturnal cough’ might be aggregated in a kidney disease study, but should be left separate in a pneumonia study.”

The news reporters obtained a quote from the research by the authors from Columbia University, “Determining whether two concepts are similar enough to be aggregated can help build better datasets for data mining purposes and avoid signal dilution. Quantifying the similarity among concepts is a difficult task, however, in part because such similarity is context-dependent. We propose a comprehensive method, which computes a similarity score for a concept pair by combining data-driven and ontology-driven knowledge. We demonstrate our method on concepts from SNOMED-CT and on a corpus of clinical notes of patients with chronic kidney disease. By combining information from usage patterns in clinical notes and from ontological structure, the method can prune out concepts that are simply related from those which are semantically similar.”

According to the news reporters, the researchers concluded: “When evaluated against a list of concept pairs annotated for similarity, our method reaches an AUC (area under the curve) of 92%.”

For more information on this research see: A hybrid knowledge-based and data-driven approach to identifying semantically similar concepts. *Journal of Biomedical Informatics*, 2012;45(3):471-81. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

Our news correspondents report that additional information may be obtained by contacting R. Pivovarov, Dept. of Biomedical Informatics, Columbia University, 622 W 168th Street, VC-5, New York, NY 10032, United States. (2012 Jul 10)

## **Soochow University, Suzhou: Tree kernel-based protein-protein interaction extraction from biomedical literature**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedical Informatics. According to news originating from Suzhou, People’s Republic of China, by NewsRx correspondents, researchers stated “There is a surge of research interest in protein-protein interaction (PPI) extraction from biomedical literature. While most of the state-of-the-art PPI extraction systems focus on dependency-based structured information, the rich structured information inherent in constituent parse trees has not been extensively explored for PPI extraction.”

Our news journalists obtained a quote from the research by the authors from Soochow University, “In this paper, we propose a novel approach to tree kernel-based PPI extraction, where the tree representation generated from a constituent syntactic parser is further refined using the shortest dependency path between two proteins derived from a dependency parser. Specifically, all the constituent tree nodes associated with the nodes on the shortest dependency path are kept intact, while other nodes are removed safely to make the constituent tree concise and precise for PPI extraction. Compared with previously used constituent tree setups, our dependency-motivated constituent tree setup achieves the best results across five commonly used PPI corpora.”

According to the news editors, the researchers concluded: “Moreover, our tree kernel-based method outperforms other single kernel-based ones and performs comparably with some multiple kernel ones on the most commonly tested AIMed corpus.”

For more information on this research see: Tree kernel-based protein-protein interaction extraction from biomedical literature. *Journal of Biomedical Informatics*, 2012;45(3):535-43. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Journal of Biomedical Informatics* - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news correspondents report that additional information may be obtained from L. Qian, NLP Lab, School of Computer Science and Technology, Soochow University, 1 Shizi Street, Suzhou 215006, People’s Taiwan. (2012 Jul 10)

**University of Pittsburgh: Ranked Levels of Influence model: selecting influence techniques to minimize IT resistance**

By a News Reporter-Staff News Editor at Physician Law Weekly – Investigators publish new report on Biomedical Informatics. According to news reporting originating from Pittsburgh, Pennsylvania, by NewsRx correspondents, researchers stated “Implementation of electronic health records (EHR), particularly computerized physician/provider order entry systems (CPOE), is often met with resistance. Influence presented at the right time, in the right manner, may minimize resistance or at least limit the risk of complete system failure.”

Our news editors obtained a quote from the research by the authors from the University of Pittsburgh, “Combining established theories on power, influence tactics, and resistance, we developed the Ranked Levels of Influence model. Applying it to documented examples of EHR/CPOE failures at Cedars-Sinai and Kaiser Permanente in Hawaii, we evaluated the influence applied, the resistance encountered, and the resulting risk to the system implementation. Using the Ranked Levels of Influence model as a guideline, we demonstrate that these system failures were associated with the use of hard influence tactics that resulted in higher levels of resistance.”

According to the news editors, the researchers concluded: “We suggest that when influence tactics remain at the soft tactics level, the level of resistance stabilizes or de-escalates and the system can be saved.”

For more information on this research see: Ranked Levels of Influence model: selecting influence techniques to minimize IT resistance. *Journal of Biomedical Informatics*, 2011;44(3):497-504. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Journal of Biomedical Informatics - [http://www.elsevier.com/wps/product/cws\\_home/622857](http://www.elsevier.com/wps/product/cws_home/622857))

The news editors report that additional information may be obtained by contacting C.E. Bartos, Health and Community Systems, University of Pittsburgh School of Nursing, 3500 Victoria Street, Pittsburgh, PA 15261, United States. (2012 Jul 04)

# Chapter 3

## Biomedicine

### **University of Perugia: The administration of anesthetic in the thyroid pericapsular region increases the possibility of side effects during percutaneous laser photocoagulation of thyroid nodules**

By a News Reporter-Staff News Editor at Biotech Business Week – Data detailed on Biomedicine have been presented. According to news originating from Perugia, Italy, by NewsRx correspondents, research stated, “Nodular thyroid disease is very frequent in iodine-deficient areas affecting at least 50% of the population. Percutaneous laser ablation (LA) represents an effective method and an alternative to conventional surgery.”

Our news journalists obtained a quote from the research from the University of Perugia, “Since the first description of the LA methodology for thyroid nodules, various studies have suggested some modifications to increase the percentage of volume reduction of the nodules. One of these alternatives involves the injection of anesthetic in the pericapsular thyroid space with detachment of the capsule itself from the surrounding tissue.”

According to the news editors, the research concluded: “The aim of this study was to retrospectively evaluate whether using local anesthetic during LA is more effective in reducing volume size of treated nodules, and whether it causes fewer side effects than using no local anesthesia.”

For more information on this research see: The administration of anesthetic in the thyroid pericapsular region increases the possibility of side effects during percutaneous laser photocoagulation of thyroid nodules. *Lasers In Surgery and Medicine*, 2013;45(1):34-7. (Wiley-Blackwell - <http://www.wiley.com/>; *Lasers In Surgery*

and Medicine - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1096-9101)

The news correspondents report that additional information may be obtained from G. Gambelunghé, Dept. of Internal Medicine, Section of Internal Medicine and Metabolic and Endocrine Diseases, University of Perugia, 06100 Perugia, Italy. (2013 Feb 18)

### **Stowers Institute for Medical Research, Kansas City: Gene profiling in the avian embryo using laser capture microdissection and RT-qPCR**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedicine. According to news reporting out of Kansas City, Missouri, by NewsRx editors, research stated, “The dynamic nature of the developing embryo makes it challenging to understand complex morphogenetic events using information from large-scale gene expression patterns. What would be more insightful is molecular profiling of small numbers of cells selectively surveyed at specific developmental stages.”

Our news journalists obtained a quote from the research from Stowers Institute for Medical Research, “However, detecting gene expression profile information from small numbers of cells (<10) in homogeneous tissue has remained a major challenge. Here, we describe the use of laser capture microdissection (LCM), immunohistochemistry (IHC), and RT-qPCR to extract gene profile information in distinct embryo tissue more precisely than is possible with any other method. We use the chick embryo model system and combine electroporation and dual-label IHC to specifically identify cells for harvest by LCM without significant degradation of total RNA. We describe the development of a pre-amplification protocol for small subpopulations of cells to produce sensitive RT-qPCR results. The gene-specific pre-amplification efficiently and linearly amplifies only gene transcripts of interest from the harvested material without the need for RNA isolation. By combining the above techniques with microfluidic RT-qPCR, we robustly analyze the expression of ~300 genes from as few as 10 cells harvested by LCM.”

According to the news editors, the research concluded: “Together, this protocol presents a confident isolation and means of sensitive expression analysis of small cell numbers from tissues and overcomes a technical hurdle that limits gene profiling.”

For more information on this research see: Gene profiling in the avian embryo using laser capture microdissection and RT-qPCR. *Cold Spring Harbor Protocols*, 2012;2012(12):.

Our news journalists report that additional information may be obtained by contacting J.A. Morrison, Stowers Institute for Medical Research, Kansas City, Missouri 64110, United States. (2013 Feb 13)

### **BTK: An open-source toolkit for fetal brain MR image processing**

By a News Reporter-Staff News Editor at Computer Weekly News – Fresh data on Computer Research are presented in a new report. According to news originating from Strasbourg, France, by VerticalNews correspondents, research stated, “Studies about brain maturation aim at providing a better understanding of brain development and links between brain changes and cognitive development. Such studies are of great interest for diagnosis help and clinical course of development and treatment of illnesses.”

Our news journalists obtained a quote from the research, “However, the processing of fetal brain MR images remains complicated which limits the translation from the research to the clinical domain. In this article, we describe an open-source image processing toolkit dedicated to these images. In this toolkit various tools are included such as: denoising, image reconstruction, super-resolution and tractography.”

According to the news editors, the research concluded: “The BTK resource program (distributed under CeCILL-B license) is developed in C++ and relies on common medical imaging libraries such as Insight Toolkit (ITK), Visualization Toolkit (VTK) and Open Multi-Processing (OpenMP).”

For more information on this research see: BTK: An open-source toolkit for fetal brain MR image processing. *Computer Methods and Programs in Biomedicine*, 2013;109(1):65-73. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from F. Rousseau, Hopital Hautepierre, Serv Radiopediat, Strasbourg, France. (2013 Jan 31)

### **Royal Melbourne Institute of Technology University: Enhancement of low sampling frequency recordings for ECG biometric matching using interpolation**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news reporting originating from Melbourne, Australia, by VerticalNews correspondents, research stated, “Electrocardiogram (ECG) based biometric matching suffers from high misclassification error with

lower sampling frequency data. This situation may lead to an unreliable and vulnerable identity authentication process in high security applications.”

Our news editors obtained a quote from the research from the Royal Melbourne Institute of Technology University, “In this paper, quality enhancement techniques for ECG data with low sampling frequency has been proposed for person identification based on piecewise cubic Hermite interpolation (PCHIP) and piecewise cubic spline interpolation (SPLINE). A total of 70 ECG recordings from 4 different public ECG databases with 2 different sampling frequencies were applied for development and performance comparison purposes. An analytical method was used for feature extraction. The ECG recordings were segmented into two parts: the enrolment and recognition datasets. Three biometric matching methods, namely, Cross Correlation (CC), Percent Root-Mean-Square Deviation (PRD) and Wavelet Distance Measurement (WDM) were used for performance evaluation before and after applying interpolation techniques. Results of the experiments suggest that biometric matching with interpolated ECG data on average achieved higher matching percentage value of up to 4% for CC, 3% for PRD and 94% for WDM. These results are compared with the existing method when using ECG recordings with lower sampling frequency. Moreover, increasing the sample size from 56 to 70 subjects improves the results of the experiment by 4% for CC, 14.6% for PRD and 0.3% for WDM.”

According to the news editors, the research concluded: “Furthermore, higher classification accuracy of up to 99.1% for PCHIP and 99.2% for SPLINE with interpolated ECG data as compared of up to 97.2% without interpolation ECG data verifies the study claim that applying interpolation techniques enhances the quality of the ECG data.”

For more information on this research see: Enhancement of low sampling frequency recordings for ECG biometric matching using interpolation. *Computer Methods and Programs in Biomedicine*, 2013;109(1):13-25. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting K.A. Sidek, RMIT Univ, Sch Comp Sci & Informat Technol, Melbourne, Vic 3001, Australia. (2013 Jan 31)



### **Shanghai Jiao-Tong University: An improved method of automatic colon segmentation for virtual colon unfolding**

By a News Reporter-Staff News Editor at Computer Weekly News – Investigators discuss new findings in Computer Research. According to news reporting originating in Shanghai, People’s Republic of China, by VerticalNews journalists, research stated, “The technique of virtual colon unfolding (VU) is a non-invasive procedure to detect polyps on the colon inner wall. Compared with conventional virtual colonoscopy, VU is faster and results in fewer uninspected regions.”

The news reporters obtained a quote from the research from Shanghai Jiao-Tong University, “However, the performance of VU is more vulnerable to the quality of colon segmentation. In this paper, an improved colon segmentation method is proposed to enhance the performance of VU. The improved method is with the use of a novel post-processing scheme, which is composed of two parts: attain more accurate centerlines with the help of scalar complementary geodesic distance field and compensate gap-like artifacts based on local morphological information. We validated the improved method on twenty colon cases via two widely used VU techniques, the ray-casting technique and the conformal-mapping technique.”

According to the news reporters, the research concluded: “Experimental results indicated that with the use of the improved method, the rates of correct response via ray-casting and conformal-mapping techniques were respectively elevated by 14.9% and 13.1%, while the rates of false response were respectively reduced by 8.4% and 10.8%.”

For more information on this research see: An improved method of automatic colon segmentation for virtual colon unfolding. *Computer Methods and Programs in Biomedicine*, 2013;109(1):1-12. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting L. Lu, Shanghai Jiao Tong University, Sch Biomed Engrn, Shanghai 200240, People’s Republic of China. (2013 Jan 31)

### **University of Bedfordshire, Luton: Aneurysm identification by analysis of the blood-vessel skeleton**

By a News Reporter-Staff News Editor at Computer Weekly News – Investigators publish new report on Computer Research. According to news reporting from Luton, United Kingdom, by VerticalNews journalists, research stated, “At least 1% of the general population have an aneurysm (or possibly more) in their cerebral blood vessels. If an aneurysm ruptures, it kills the patient in up to 60% of cases.”

The news correspondents obtained a quote from the research from the University of Bedfordshire, “In order to choose the optimal treatment, clinicians have to monitor the development of the aneurysm in time. Nowadays, aneurysms are typically identified manually, which means that the monitoring is often imprecise since the identification is observer dependent. As a result, the number of misdiagnosed cases may be large. This paper proposes a fast semiautomatic method for the identification of aneurysms which is based on the analysis of the skeleton of blood vessels.”

According to the news reporters, the research concluded: “Provided that the skeleton is accurate, the results achieved by our method have been deemed acceptable by expert clinicians.”

For more information on this research see: Aneurysm identification by analysis of the blood-vessel skeleton. *Computer Methods and Programs in Biomedicine*, 2013;109(1):32-47. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting J. Kohout, Univ Bedfordshire, Dept. of Comp Sci & Technol, Luton, Beds, United Kingdom. (2013 Jan 31)

### **Walter Reed National Military Medical Center, Bethesda: QAIT: A quality assurance issue tracking tool to facilitate the improvement of clinical data quality**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news reporting out of Bethesda, Maryland, by VerticalNews editors, research stated, “In clinical and translational research as well as clinical trial projects, clinical data collection is prone to errors such as missing data, and misinterpretation or inconsistency of the data. A good quality assurance (QA) program can resolve many such errors

though this requires efficient communications between the QA staff and data collectors.”

Our news journalists obtained a quote from the research from Walter Reed National Military Medical Center, “Managing such communications is critical to resolving QA problems but imposes a major challenge for a project involving multiple clinical and data processing sites. We have developed a QA issue tracking (QAiT) system to support clinical data QA in the Clinical Breast Care Project (CBCP). This web-based application provides centralized management of QA issues with role-based access privileges. It has greatly facilitated the QA process and enhanced the overall quality of the CBCP clinical data.”

According to the news editors, the research concluded: “As a stand-alone system, QAiT can supplement any other clinical data management systems and can be adapted to support other projects.”

For more information on this research see: QAiT: A quality assurance issue tracking tool to facilitate the improvement of clinical data quality. *Computer Methods and Programs in Biomedicine*, 2013;109(1):86-91. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting Y.H. Zhang, Walter Reed Natl Military Med Center, Bethesda, MD 20889, United States. (2013 Jan 31)

### **Brno University of Technology: Automatically designed machine vision system for the localization of CCA transverse section in ultrasound images**

By a News Reporter-Staff News Editor at Journal of Engineering – A new study on Computer Research is now available. According to news reporting from Brno, Czech Republic, by VerticalNews journalists, research stated, “The common carotid artery (CCA) is a source of important information that doctors can use to evaluate the patients’ health. The most often measured parameters are arterial stiffness, lumen diameter, wall thickness, and other parameters where variation with time is usually measured.”

The news correspondents obtained a quote from the research from the Brno University of Technology, “Unfortunately, the manual measurement of dynamic parameters of the CCA is time consuming, and therefore, for practical reasons, the only alternative is automatic approach. The initial localization of artery is important and must precede the main measurement. This article describes a novel method for the localization of CCA in the transverse section of a B-mode ultrasound

image. The novel method was designed automatically by using the grammar-guided genetic programming (GGGP). The GGGP searches for the best possible combination of simple image processing tasks (independent building blocks). The best possible solution is represented with the highest detection precision. The method is tested on a validation database of CCA images that was specially created for this purpose and released for use by other scientists. The resulting success of the proposed solution was 82.7%, which exceeded the current state of the art by 4% while the computation time requirements were acceptable. The paper also describes an automatic method that was used in designing the proposed solution.”

According to the news reporters, the research concluded: “This automatic method provides a universal approach to designing complex solutions with the support of evolutionary algorithms.”

For more information on this research see: Automatically designed machine vision system for the localization of CCA transverse section in ultrasound images. *Computer Methods and Programs in Biomedicine*, 2013;109(1):92-103. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting R. Benes, Brno Univ Technol, Dept. of Telecommun, Brno, Czech Republic. (2013 Jan 30)

### **University of Wurzburg: Mapping immune processes in intact tissues at cellular resolution**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedicine have been published. According to news reporting originating in Wurzburg, Germany, by NewsRx journalists, research stated, “Understanding the spatiotemporal changes of cellular and molecular events within an organism is crucial to elucidate the complex immune processes involved in infections, autoimmune disorders, transplantation, and neoplastic transformation and metastasis. Here we introduce a novel multicolor light sheet fluorescence microscopy (LSFM) approach for deciphering immune processes in large tissue specimens on a single-cell level in 3 dimensions.”

The news reporters obtained a quote from the research from the University of Wurzburg, “We combined and optimized antibody penetration, tissue clearing, and triple-color illumination to create a method for analyzing intact mouse and human tissues. This approach allowed us to successfully quantify changes in expression patterns of mucosal

vascular addressin cell adhesion molecule-1 (MAdCAM-1) and T cell responses in Peyer's patches following stimulation of the immune system. In addition, we employed LSFM to map individual T cell subsets after hematopoietic cell transplantation and detected rare cellular events."

According to the news reporters, the research concluded: "Thus, we present a versatile imaging technology that should be highly beneficial in biomedical research."

For more information on this research see: Mapping immune processes in intact tissues at cellular resolution. *The Journal of Clinical Investigation*, 2012;122(12):4439-46.

Our news correspondents report that additional information may be obtained by contacting C. Brede, Dept. of Medicine II, Wurzburg University Hospital, Wurzburg, Germany. (2013 Jan 30)

### **University of South Queensland, Toowoomba: Numerical investigation of white matter anisotropic conductivity in defining current distribution under tDCS**

By a News Reporter-Staff News Editor at Journal of Mathematics – New research on Computer Research is the subject of a report. According to news reporting out of Toowoomba, Australia, by VerticalNews editors, research stated, "The study investigates the impact of white matter directional conductivity on brain current density under the influence of Transcranial direct current stimulation (tDCS). The study employed different conductivity estimation algorithms to represent conductivity distribution in the white matter (WM) of the brain."

Our news journalists obtained a quote from the research from the University of South Queensland, "Two procedures, one mathematically driven and the second one based on the Diffusion tensor imaging (DTI) are considered. The finite element method has been applied to estimate the current density distribution across the head models. Strengths and weaknesses of these algorithms have been compared by analyzing the variation in current density magnitude and distribution patterns with respect to the isotropic case. Results indicate that anisotropy has a profound influence on the strength of current density (up to approximate to 50% in WM) as it causes current flow to deviate from its isotropically defined path along with diffused distribution patterns across the gray and WM. The extent of this variation is highly correlated with the degree of the anisotropy of the regions. Regions of high anisotropy and models of fixed anisotropic ratio displayed higher and wider degree of variations across the structures (topographic variations up to 48%), respectively. In contrast, models, which are correlated with the magnitude of local diffusion tensor behaved in a less exacerbated manner (approximate to 10% topographic changes in WM). Anisotropy increased the current density strength across the cortical gyri under and between the

stimulating electrodes, whereas a significant drop has been recorded in deeper regions of the GM (max % difference approximate to +/- 10)."

According to the news editors, the research concluded: "In addition, it has been observed that Equivalent isotropic trace algorithm is more suitable to incorporate directional conductivity under tDCS paradigm, than other considered approaches, as this algorithm is computationally less expensive and insensitive to the limiting factor imposed by the volume constraint."

For more information on this research see: Numerical investigation of white matter anisotropic conductivity in defining current distribution under tDCS. *Computer Methods and Programs in Biomedicine*, 2013;109(1):48-64. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting S. Shahid, University of South Queensland, Fac Engr & Surveying, Toowoomba, Qld 4350, Australia. (2013 Jan 29)

### **Baylor University College of Medicine, Houston: GSK3 $\beta$ ; mediates muscle pathology in myotonic dystrophy**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – New research on Pathology is the subject of a report. According to news reporting originating in Houston, Texas, by NewsRx journalists, research stated, "Myotonic dystrophy type 1 (DM1) is a complex neuromuscular disease characterized by skeletal muscle wasting, weakness, and myotonia. DM1 is caused by the accumulation of CUG repeats, which alter the biological activities of RNA-binding proteins, including CUG-binding protein 1 (CUGBP1)."

The news reporters obtained a quote from the research from the Baylor University College of Medicine, "CUGBP1 is an important skeletal muscle translational regulator that is activated by cyclin D3-dependent kinase 4 (CDK4). Here we show that mutant CUG repeats suppress Cdk4 signaling by increasing the stability and activity of glycogen synthase kinase 3 $\beta$ ; (GSK3 $\beta$ ). Using a mouse model of DM1 (HSA(LR)), we found that CUG repeats in the 3' untranslated region (UTR) of human skeletal actin increase active GSK3 $\beta$ ; in skeletal muscle of mice, prior to the development of skeletal muscle weakness. Inhibition of GSK3 $\beta$ ; in both DM1 cell culture and mouse models corrected cyclin D3 levels and reduced muscle weakness and myotonia in DM1 mice."

According to the news reporters, the research concluded: “Our data predict that compounds normalizing GSK3 $\beta$ ; activity might be beneficial for improvement of muscle function in patients with DM1.”

For more information on this research see: GSK3 $\beta$ ; mediates muscle pathology in myotonic dystrophy. *The Journal of Clinical Investigation*, 2012;122(12):4461-72.

Our news correspondents report that additional information may be obtained by contacting K. Jones, Dept. of Molecular Physiology and Biophysics, Baylor College of Medicine, Houston, Texas 77030, United States. (2013 Jan 28)

### **Singapore National University: An analytical drilling force model and GPU-accelerated haptics-based simulation framework of the pilot drilling procedure for micro-implants surgery training**

By a News Reporter-Staff News Editor at Medical Devices & Surgical Technology Week – Fresh data on Computer Research are presented in a new report. According to news originating from Singapore, Singapore, by NewsRx correspondents, research stated, “The placement of micro-implants is a common but relatively new surgical procedure in clinical dentistry. This paper presents a haptics-based simulation framework for the pilot drilling of micro-implants surgery to train orthodontists to successfully perform this essential procedure by tactile sensation, without damaging tooth roots.”

Our news journalists obtained a quote from the research from Singapore National University, “A voxel-based approach was employed to model the inhomogeneous oral tissues. A preprocessing pipeline was designed to reduce imaging noise, smooth segmentation results and construct an anatomically correct oral model from patient-specific data. In order to provide a physically based haptic feedback, an analytical drilling force model based on metal cutting principles was developed and adapted for the voxel-based approach. To improve the real-time response, the parallel computing power of Graphics Processing Units is exploited through extra efforts for data structure design, algorithms parallelization, and graphic memory utilization. A prototype system has been developed based on the proposed framework.”

According to the news editors, the research concluded: “Preliminary results show that, by using this framework, proper drilling force can be rendered at different tissue layers with reduced cycle time, while the visual display has also been enhanced.”

For more information on this research see: An analytical drilling force model and GPU-accelerated haptics-based simulation framework of the pilot drilling procedure for micro-implants surgery training.

*Computer Methods and Programs in Biomedicine*, 2012;108(3):1170-1184. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from F. Zheng, Singapore National University, Fac Dental, Singapore 119083, Singapore. (2013 Jan 27)

### **Assessing bone loss in micro-gravity: A fuzzy approach**

By a News Reporter-Staff News Editor at Health & Medicine Week – Research findings on Computer Research are discussed in a new report. According to news reporting originating from Rome, Italy, by NewsRx correspondents, research stated, “A prolonged stay in microgravity has various negative effects on the human body; one of these problems is a noticeable demineralization of bone tissues. Such effects are quite similar to those experienced by subjects on earth affected by osteoporosis; therefore it seems quite straightforward to adopt a similar pharmacological therapy during the stay in the space.”

Our news editors obtained a quote from the research, “In this paper a first step in the identification of a monitoring procedure for the bone demineralization in microgravity, as well as some guidelines for the choice of adequate therapies are given. Such a procedure is based on a mathematical model of the interaction of the most relevant blood and urine indicators of bone demineralization. Specifically, some bone metabolites have been identified, which are relevant to the phenomena and are feasible to be evaluated in the space. Moreover, a model to foresee the evolution of these parameters in the space, depending on the therapy chosen, is provided.”

According to the news editors, the research concluded: “The model is derived from the experience of doctors and experts, hence it is based mainly on linguistic information; such an information is codified by means of fuzzy numbers, in order to take into account their uncertainty.”

For more information on this research see: Assessing bone loss in micro-gravity: A fuzzy approach. *Computer Methods and Programs in Biomedicine*, 2012;108(3):910-921. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))



The news editors report that additional information may be obtained by contacting B.B. Zobel, Univ Campus BioMed Rome, Rome, Italy. (2013 Jan 25)

### **University of Zaragoza: Life prediction of different commercial dental implants as influence by uncertainties in their fatigue material properties and loading conditions**

By a News Reporter-Staff News Editor at Health & Medicine Week – Fresh data on Computer Research are presented in a new report. According to news originating from Zaragoza, Spain, by NewsRx editors, the research stated, “Probabilistic analyses allow the effect of uncertainty in system parameters to be determined. In the literature, many researchers have investigated static loading effects on dental implants.”

Our news journalists obtained a quote from the research from the University of Zaragoza, “However, the intrinsic variability and uncertainty of most of the main problem parameters are not accounted for. The objective of this research was to apply a probabilistic computational approach to predict the fatigue life of three different commercial dental implants considering the variability and uncertainty in their fatigue material properties and loading conditions. For one of the commercial dental implants, the influence of its diameter in the fatigue life performance was also studied. This stochastic technique was based on the combination of a probabilistic finite element method (PFEM) and a cumulative damage approach known as B-model. After 6 million of loading cycles, local failure probabilities of 0.3, 0.4 and 0.91 were predicted for the Lifecore, Avinent and GMI implants, respectively (diameter of 3.75 mm). The influence of the diameter for the GMI implant was studied and the results predicted a local failure probability of 0.91 and 0.1 for the 3.75 mm and 5 mm, respectively. In all cases the highest failure probability was located at the upper screw-threads.”

According to the news editors, the research concluded: “Therefore, the probabilistic methodology proposed herein may be a useful tool for performing a qualitative comparison between different commercial dental implants.”

For more information on this research see: Life prediction of different commercial dental implants as influence by uncertainties in their fatigue material properties and loading conditions. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1277-1286. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from M.A. Perez, University of Zaragoza, Aragon Inst Engn Res I3A, Zaragoza 50018, Spain. (2013 Jan 25)

### **Australian National University, Canberra: Objective measures, sensors and computational techniques for stress recognition and classification: A survey**

By a News Reporter-Staff News Editor at Computer Weekly News – Investigators publish new report on Computer Research. According to news reporting originating from Canberra, Australia, by VerticalNews correspondents, research stated, “Stress is a major growing concern in our day and age adversely impacting both individuals and society. Stress research has a wide range of benefits from improving personal operations, learning, and increasing work productivity to benefiting society - making it an interesting and socially beneficial area of research.”

Our news editors obtained a quote from the research from Australian National University, “This survey reviews sensors that have been used to measure stress and investigates techniques for modelling stress. It discusses non-invasive and unobtrusive sensors for measuring computed stress, a term we coin in the paper. Sensors that do not impede everyday activities that could be used by those who would like to monitor stress levels on a regular basis (e.g. vehicle drivers, patients with illnesses linked to stress) is the focus of the discussion. Computational techniques have the capacity to determine optimal sensor fusion and automate data analysis for stress recognition and classification. Several computational techniques have been developed to model stress based on techniques such as Bayesian networks, artificial neural networks, and support vector machines, which this survey investigates.”

According to the news editors, the research concluded: “The survey concludes with a summary and provides possible directions for further computational stress research.”

For more information on this research see: Objective measures, sensors and computational techniques for stress recognition and classification: A survey. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1287-1301. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting N. Sharma, Australian National University, Center Informat & Human Center Comp, Res Sch Comp Sci, Informat & Human Center Comp Res Grp, Canberra, ACT 0200, Australia. (2013 Jan 24)

## **Cartagena Polytechnic University: WIMP: Web server tool for missing data imputation**

By a News Reporter-Staff News Editor at Computer Weekly News – Data detailed on Computer Research have been presented. According to news reporting originating from Cartagena, Spain, by VerticalNews correspondents, research stated, “The imputation of unknown or missing data is a crucial task on the analysis of biomedical datasets. There are several situations where it is necessary to classify or identify instances given incomplete vectors, and the existence of missing values can much degrade the performance of the algorithms used for the classification/recognition.”

Our news editors obtained a quote from the research from Cartagena Polytechnic University, “The task of learning accurately from incomplete data raises a number of issues some of which have not been completely solved in machine learning applications. In this sense, effective missing value estimation methods are required. Different methods for missing data imputations exist but most of the times the selection of the appropriate technique involves testing several methods, comparing them and choosing the right one. Furthermore, applying these methods, in most cases, is not straightforward, as they involve several technical details, and in particular in cases such as when dealing with microarray datasets, the application of the methods requires huge computational resources. As far as we know, there is not a public software application that can provide the computing capabilities required for carrying the task of data imputation. This paper presents a new public tool for missing data imputation that is attached to a computer cluster in order to execute high computational tasks.”

According to the news editors, the research concluded: “The software WIMP (Web IMPutation) is a public available web site where registered users can create, execute, analyze and store their simulations related to missing data imputation.”

For more information on this research see: WIMP: Web server tool for missing data imputation. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1247-1254. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting D. Urda, Cartagena Polytechnic University, Dept. of Tecnol Informac & Comunicac, Cartagena, Spain. (2013 Jan 24)

## **Catholic University of Korea, Gyeonggi Do: An R-peak detection method that uses an SVD filter and a search back system**

By a News Reporter-Staff News Editor at Computer Weekly News – Data detailed on Computer Research have been presented. According to news reporting originating in Gyeonggi Do, South Korea, by Vertical-News journalists, research stated, “In this paper, we present a method for detecting the R-peak of an ECG signal by using an singular value decomposition (SVD) filter and a search back system. The ECG signal was detected in two phases: the pre-processing phase and the decision phase.”

The news reporters obtained a quote from the research from the Catholic University of Korea, “The preprocessing phase consisted of the stages for the SVD filter, Butterworth High Pass Filter (HPF), moving average (MA), and squaring, whereas the decision phase consisted of a single stage that detected the R-peak. In the pre-processing phase, the SVD filter removed noise while the Butterworth HPF eliminated baseline wander. The MA removed the remaining noise of the signal that had gone through the SVD filter to make the signal smooth, and squaring played a role in strengthening the signal. In the decision phase, the threshold was used to set the interval before detecting the R-peak. When the latest R-R interval (RRI), suggested by Hamilton et al., was greater than 150% of the previous RRI, the method of detecting the R-peak in such an interval was modified to be 150% or greater than the smallest interval of the two most latest RRIs. When the modified search back system was used, the error rate of the peak detection decreased to 0.29%, compared to 1.34% when the modified search back system was not used. Consequently, the sensitivity was 99.47%, the positive predictivity was 99.47%, and the detection error was 1.05%.”

According to the news reporters, the research concluded: “Furthermore, the quality of the signal in data with a substantial amount of noise was improved, and thus, the R-peak was detected effectively.”

For more information on this research see: An R-peak detection method that uses an SVD filter and a search back system. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1121-1132. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting W.H. Jung, Catholic University of Korea, Dept. of Multimedia Syst Engn, Puchon, Gyeonggi, South Korea. (2013 Jan 24)

### **Chiba University: Compressed sampling for heart rate monitoring**

By a News Reporter-Staff News Editor at Computer Weekly News – Research findings on Computer Research are discussed in a new report. According to news reporting originating in Chiba, Japan, by VerticalNews journalists, research stated, “For the first time compressed sampling (CS) has been applied to heart rate (HR) measurements.”

The news reporters obtained a quote from the research from Chiba University, “The signals can be reconstructed from samples far below the Nyquist rate with negligible small errors, a sampling reduction of 8 has been demonstrated in the paper. As a result, the bitrate of the CS sampler is half when compared to a normal sampler.”

According to the news reporters, the research concluded: “A lower bitrate leads to a reduction in power consumption for HR measurement devices.”

For more information on this research see: Compressed sampling for heart rate monitoring. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1191-1198. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting O. Faust, Chiba University, Dept. of Med Syst Engn, Chiba 2638522, Japan. (2013 Jan 24)

### **Department of Radiology, Ankara: Automatic segmentation of human facial tissue by MRI-CT fusion: A feasibility study**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news reporting from Ankara, Turkey, by VerticalNews journalists, research stated, “The aim of this study was to develop automatic image segmentation methods to segment human facial tissue which contains very thin anatomic structures. The segmentation output can be used to construct a more realistic human face model for a variety of purposes like surgery planning, patient specific prosthesis design and facial expression simulation.”

The news correspondents obtained a quote from the research from the Department of Radiology, “Segmentation methods developed were based on Bayesian and Level Set frameworks, which were applied

on three image types: magnetic resonance imaging (MRI), computerized tomography (CT) and fusion, in which case information from both modalities were utilized maximally for every tissue type. The results on human data indicated that fusion, thickness adaptive and postprocessing options provided the best muscle/fat segmentation scores in both Level Set and Bayesian methods. When the best Level Set and Bayesian methods were compared, scores of the latter were better.”

According to the news reporters, the research concluded: “Number of algorithm parameters (to be trained) and computer run time measured were also in favour of the Bayesian method.”

For more information on this research see: Automatic segmentation of human facial tissue by MRI-CT fusion: A feasibility study. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1106-1120. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting E.H. Kale, Gulhane Military Med Academy, Dept. of Radiol, Ankara, Turkey. (2013 Jan 24)

### **Idaho State University, Pocatello: Ultrasound IMT measurement on a multi-ethnic and multi-institutional database: Our review and experience using four fully automated and one semi-automated methods**

By a News Reporter-Staff News Editor at Computer Weekly News – Research findings on Computer Research are discussed in a new report. According to news reporting from Pocatello, Idaho, by Vertical-News journalists, research stated, “Automated and high performance carotid intima-media thickness (IMT) measurement is gaining increasing importance in clinical practice to assess the cardiovascular risk of patients. In this paper, we compare four fully automated IMT measurement techniques (CALEX, GAMES, CARES and CAUDLES) and one semi-automated technique (FOAM).”

The news correspondents obtained a quote from the research from Idaho State University, “We present our experience using these algorithms, whose lumen-intima and media-adventitia border estimation use different methods that can be: (a) edge-based; (b) training-based; &#169; feature-based; or (d) directional Edge-Flow based. Our database (DB) consisted of 665 images that represented a multi-ethnic group and was acquired using four OEM scanners. The performance evaluation protocol adopted error measures, reproducibility measures,

and Figure of Merit (FoM). FOAM showed the best performance, with an IMT bias equal to  $0.025 \pm 0.225$  mm, and a FoM equal to 96.6%. Among the four automated methods, CARES showed the best results with a bias of  $0.032 \pm 0.279$  mm, and a FoM to 95.6%, which was statistically comparable to that of FOAM performance in terms of accuracy and reproducibility.”

According to the news reporters, the research concluded: “This is the first time that completely automated and user-driven techniques have been compared on a multi-ethnic dataset, acquired using multiple original equipment manufacturer (OEM) machines with different gain settings, representing normal and pathologic cases.”

For more information on this research see: Ultrasound IMT measurement on a multi-ethnic and multi-institutional database: Our review and experience using four fully automated and one semi-automated methods. *Computer Methods and Programs in Biomedicine*, 2012;108(3):946-960. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting F. Molinari, Idaho State University, Dept. of Biomed Engn, Pocatello, ID 83209, United States. (2013 Jan 24)

### **Johannes Gutenberg-University, Mainz: Bagging, bumping, multiview, and active learning for record linkage with empirical results on patient identity data**

By a News Reporter-Staff News Editor at Computer Weekly News – New research on Computer Research is the subject of a report. According to news reporting out of Mainz, Germany, by VerticalNews editors, research stated, “Record linkage or deduplication deals with the detection and deletion of duplicates in and across files. For this task, this paper introduces and evaluates two new machine-learning methods (bumping and multiview) together with bagging, a tree-based ensemble-approach.”

Our news journalists obtained a quote from the research from Johannes Gutenberg-University, “Whereas bumping represents a tree-based approach as well, multiview is based on the combination of different methods and the semi-supervised learning principle. After providing a theoretical background of the methods, initial empirical results on patient identity data are given. In the empirical evaluation, we calibrate the methods on three different kinds of training data. The results show that the smallest training data set, which is obtained by a simple active learning strategy, leads to the best results. Multiview can

outperform the other methods only when all are calibrated on a randomly sampled training set; in all other cases, it performs worse. The results of bumping do not differ significantly from the overall best performing method bagging. We cautiously conclude that tree-based record linkage methods are likely to produce similar results because of the low-dimensionality ( $p \ll n$ ) and straightforwardness of the underlying problem.”

According to the news editors, the research concluded: “Multiview is possibly rather suitable for problems that are more sophisticated.”

For more information on this research see: Bagging, bumping, multiview, and active learning for record linkage with empirical results on patient identity data. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1160-1169. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting M. Sariyar, Johannes Gutenberg Univ Mainz, Inst Med Biostat Epidemiol & Informat, University Medical Center, Mainz, Germany. (2013 Jan 24)

### **Palacky University, Olomouc: Medical faculties educational network: Multidimensional quality assessment**

By a News Reporter-Staff News Editor at Computer Weekly News – Investigators publish new report on Computer Research. According to news reporting out of Olomouc, Czech Republic, by VerticalNews editors, research stated, “Today, World Wide Web technology provides many opportunities in the disclosure of electronic learning and teaching content. The MEFANET project (MEDical FACulties NEIWork) has initiated international, effective and open cooperation among all Czech and Slovak medical faculties in the medical education fields.”

Our news journalists obtained a quote from the research from Palacky University, “This paper introduces the original MEFANET educational web portal platform. Its main aim is to present the unique collaborative environment, which combines the sharing of electronic educational resources with the use tools for their quality evaluation. It is in fact a complex e-publishing system, which consists of ten standalone portal instances and one central gateway.”

According to the news editors, the research concluded: “The fundamental principles of the developed system and used technologies are reported here, as well as procedures of a new multidimensional quality assessment.”



For more information on this research see: Medical faculties educational network: Multidimensional quality assessment. *Computer Methods and Programs in Biomedicine*, 2012;108(3):900-909. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting M. Komenda, Palacky Univ Olomouc, Fac Med & Dental, Olomouc, Czech Republic. (2013 Jan 24)

### **Sabanci University, Istanbul: 3D hybrid wound devices for spatiotemporally controlled release kinetics**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news originating from Istanbul, Turkey, by VerticalNews correspondents, research stated, “This paper presents localized and temporal control of release kinetics over 3-dimensional (3D) hybrid wound devices to improve wound-healing process. Imaging study is performed to extract wound bed geometry in 3D.”

Our news journalists obtained a quote from the research from Sabanci University, “Non-Uniform Rational B-Splines (NURBS) based surface lofting is applied to generate functionally graded regions. Diffusion-based release kinetics model is developed to predict time-based release of loaded modifiers for functionally graded regions. Multi-chamber single nozzle solid freeform dispensing system is used to fabricate wound devices with controlled dispensing concentration.”

According to the news editors, the research concluded: “Spatiotemporal control of biological modifiers thus enables a way to achieve target delivery to improve wound healing.”

For more information on this research see: 3D hybrid wound devices for spatiotemporally controlled release kinetics. *Computer Methods and Programs in Biomedicine*, 2012;108(3):922-931. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from I.T. Ozbolat, Sabanci Univ, Fac Engn & Nat Sci, TR-34956 Istanbul, Turkey. (2013 Jan 24)

### **Sun Yat Sen University, Zhuhai: An approach towards realizing the intelligent sphygmogram sampling for e-home healthcare**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news reporting from Zhuhai, People’s Republic of China, by VerticalNews journalists, research stated, “Pulse wave transit time (PWTT) method has been widely used in continuous blood pressure estimation by simultaneously measuring electrocardiogram and pulse signals in most researches [1].”

The news correspondents obtained a quote from the research from Sun Yat Sen University, “Comparing with the morphological characteristic of photoplethysmograph (PPG) [2], the alternative sphygmogram (SPG) signal is much sharper and promising to improve the accuracy of onset point detection in PWTT estimation. Consequently, a hardware and software close-loop control scheme for SPG sampling with less distortion is proposed, through which the signal amplitude and baseline self-adjustment is realized such that the resulted SPG signal is more properly suitable for onset point detection.”

According to the news reporters, the research concluded: “Testing results show out its superior features for adapting PWTT in e-home healthcare.”

For more information on this research see: An approach towards realizing the intelligent sphygmogram sampling for e-home healthcare. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1199-1205. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting W.K. Lei, Sun Yat Sen University Affiliated Hosp 5, Zhuhai, People’s Republic of China. (2013 Jan 24)

### **University College Cork: Dynamic, location-based channel selection for power consumption reduction in EEG analysis**

By a News Reporter-Staff News Editor at Computer Weekly News – A new study on Computer Research is now available. According to news reporting originating from Cork, Ireland, by VerticalNews correspondents, research stated, “The objective of this Study is to develop methods to dynamically select EEG channels to reduce power consumption in seizure detection while maintaining detection accuracy. A method is

proposed whereby a number of primary screening channels are predefined.”

Our news editors obtained a quote from the research from University College Cork, “Depending on the classification results of those channels, further channels are selected for analysis. This method provides savings in computational complexity of 43%. A further method called idling is then proposed which increases the computational saving to 75%. The performance of a location-independent, decision-based method is used for comparison. The proposed method achieves better computational savings for the same performance than the decision-based method. The decision-based method was capable of higher overall computational savings, but with a reduction in seizure detection performance. Each method was also implemented with the REACT algorithm on a Blackfin microprocessor and the average power measured.”

According to the news editors, the research concluded: “The proposed methods gave a power saving of up to 47% with no reduction in detection performance.”

For more information on this research see: Dynamic, location-based channel selection for power consumption reduction in EEG analysis. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1206-1215. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting S. Faul, University College Cork, Dept. of Elect & Elect Engn, Cork, Ireland. (2013 Jan 24)

### **University of Bretagne Occidentale, Brest: Development framework for a patient-centered record**

By a News Reporter-Staff News Editor at Computer Weekly News – Investigators publish new report on Computer Research. According to news reporting originating in Brest, France, by VerticalNews journalists, research stated, “Patient records have been developed to support the physician-oriented medical activity scheme. One recommended yet rarely studied alternative, expected to improve healthcare, is the patient-centered record.”

The news reporters obtained a quote from the research from the University of Bretagne Occidentale, “We propose a development framework for such record, which includes domain-specific database models at the conceptual level, analyzing the fundamental role of complementary information destined to ensure proper patient understanding of related clinical situations. A patient-centered awareness field study of user

requirements and medical workflow was carried out in three medical services and two technical units to identify the most relevant elements of the framework, and compared to the definitions of a theoretical approach. Three core data models - centered on the patient, medical personnel, and complementary patient information, corresponding to the determined set of entities, information exchanges and actors roles, constitute the technical recommendations of the development framework. An open source proof of concept prototype was developed to show the model feasibility.”

According to the news reporters, the research concluded: “The resulting patient-centered record development framework implies particular medical personnel contributions to supply complementary information.”

For more information on this research see: Development framework for a patient-centered record. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1036-1051. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting J. Puentes, Univ Bretagne Occidentale, Lab Informat Coordinat Incitat, Brest, France. (2013 Jan 24)

### **University of Edinburgh, Midlothian: Parallel perfusion imaging processing using GPGPU**

By a News Reporter-Staff News Editor at Computer Weekly News – New research on Perfusion is the subject of a report. According to news reporting from Midlothian, United Kingdom, by VerticalNews journalists, research stated, “The objective of brain perfusion quantification is to generate parametric maps of relevant hemodynamic quantities such as cerebral blood flow (CBF), cerebral blood volume (CBV) and mean transit time (MTT) that can be used in diagnosis of acute stroke. These calculations involve deconvolution operations that can be very computationally expensive when using local Arterial Input Functions (AIF).”

The news correspondents obtained a quote from the research from the University of Edinburgh, “As time is vitally important in the case of acute stroke, reducing the analysis time will reduce the number of brain cells damaged and increase the potential for recovery. GPUs originated as graphics generation dedicated co-processors, but modern GPUs have evolved to become a more general processor capable of executing scientific computations. It provides a highly parallel computing environment due to its large number of computing cores and constitutes an affordable

high performance computing method. In this paper, we will present the implementation of a deconvolution algorithm for brain perfusion quantification on GPGPU (General Purpose Graphics Processor Units) using the CUDA programming model. We present the serial and parallel implementations of such algorithms and the evaluation of the performance gains using GPUs. Our method has gained a 5.56 and 3.75 speedup for CT and MR images respectively.”

According to the news reporters, the research concluded: “It seems that using GPGPU is a desirable approach in perfusion imaging analysis, which does not harm the quality of cerebral hemodynamic maps but delivers results faster than the traditional computation.”

For more information on this research see: Parallel perfusion imaging processing using GPGPU. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1012-1021. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting F. Zhu, University of Edinburgh, Div Clin Neurosci, SFC Brain Imaging Res Center, Edinburgh, Midlothian, United Kingdom. (2013 Jan 24)

### **University of Grenoble: Computer simulation of the activity of the elderly person living independently in a Health Smart Home**

By a News Reporter-Staff News Editor at Computer Weekly News – Researchers detail new data in Computer Research. According to news reporting from Grenoble, France, by VerticalNews journalists, research stated, “We propose a simulator of human activities collected with presence sensors in our experimental Health Smart Home ‘Habitat Intelligent pour la Sante (HIS)’. We recorded 1492 days of data on several experimental HIS during the French national project ‘AILISA.’”

The news correspondents obtained a quote from the research from the University of Grenoble, “On these real data, we built a mathematical model of the behavior of the data series, based on ‘Hidden Markov Models’ (HMM). The model is then played on a computer to produce simulated data series with added flexibility to adjust the parameters in various scenarios. We also tested several methods to measure the similarity between our real and simulated data.”

According to the news reporters, the research concluded: “Our simulator can produce large data base which can be further used to evaluate the algorithms to raise an alarm in case of loss in autonomy.”

For more information on this research see: Computer simulation of the activity of the elderly person living independently in a Health Smart Home. *Computer Methods and Programs in Biomedicine*, 2012;108(3):1216-1228. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting N. Noury, Univ Grenoble, Lab TIMC IMAG, Grenoble, France. (2013 Jan 24)

### **University of Sherbrooke: Simultaneous attenuation and scatter corrections from the projections in small animal PET imaging**

By a News Reporter-Staff News Editor at Computer Weekly News – Fresh data on Computer Research are presented in a new report. According to news reporting originating in Sherbrooke, Canada, by VerticalNews journalists, research stated, “Attenuation and scatter corrections are important in quantitative positron emission tomography (PET) imaging even in small animals such as mice and rats. In this work we describe a simple and efficient model to correct for both scatter and attenuation in a single operation.”

The news reporters obtained a quote from the research from the University of Sherbrooke, “The model aims to solve the equation  $M = (A + F)P$  for the primaries  $P$ , corrected for attenuation and scatter, based on the measured coincidences  $M$ , the matrix of compensation for attenuation  $A$  and on the scatter fractions  $F$  issued from all emitting sources and contributing to  $M$ . The scatter functions are analytically calculated using Klein-Nishina formula, the scanner geometry and the detection efficiencies. This method was applied in measured data of line sources and hot spots phantoms as well as in rat heart and tumors and compared to Monte Carlo based simulations and to the single scatter simulation model developed by Watson et al. The corrected data showed a quantitative contrast and signal to noise ratio enhancement with respect to the uncorrected data. In terms of results, our method is comparable to that of Watson et al.”

According to the news reporters, the research concluded: “The Monte Carlo simulations, where the primaries and the scattered events were separately registered, confirmed the accuracy of the new approach.”

For more information on this research see: Simultaneous attenuation and scatter corrections from the projections in small animal

PET imaging. *Computer Methods and Programs in Biomedicine*, 2012;108(3):889-899. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting O. Sarrhini, University of Sherbrooke, Fac Med & Hlth Sci, Dept. of Nucl Med & Radiobiol, Sherbrooke, PQ J1H 5N4, Canada. (2013 Jan 24)

### **Medical College of Wisconsin, Milwaukee: Teaching an old dog new tricks: potential antiatherothrombotic use for statins**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedicine. According to news reporting out of Milwaukee, Wisconsin, by NewsRx editors, the research stated, “Thrombotic complications represent a highly significant component of morbidity and mortality associated with hypercholesterolemia and atherosclerosis.”

Our news journalists obtained a quote from the research from the Medical College of Wisconsin, “In this issue of the JCI, Owens et al. report possible mechanisms underlying the prothrombotic, proinflammatory state accompanying hypercholesterolemia. Using rodent, monkey, and human subjects, they show that circulating oxidized LDL and circulating monocyte-derived tissue factor are important instigating factors driving the thrombotic, inflammatory phenotype and, surprisingly, that statin therapy ameliorated the phenotype even in the absence of lowering cholesterol levels.”

According to the news editors, the research concluded: “The studies raise the intriguing possibility that therapies directed at pathways generating oxidant stress or pathways involved in transmitting oxidized LDL-mediated signals in circulating platelets and monocytes could have antiatherothrombotic potential, probably with minimal anticoagulant and hemorrhagic potential.”

For more information on this research see: Teaching an old dog new tricks: potential antiatherothrombotic use for statins. *The Journal of Clinical Investigation*, 2012;122(2):478-81.

Our news journalists report that additional information may be obtained by contacting R.L. Silverstein, Medical College of Wisconsin, Milwaukee, Wisconsin, United States. (2013 Jan 23)

### **University of Cambridge: NPs – heart hormones that regulate brown fat?**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Biomedicine. According to news reporting originating from Cambridge, United Kingdom, by NewsRx correspondents, research stated, “Thermogenesis in brown adipose tissue (BAT) is well characterized as being under the control of the sympathetic nervous system. The energy-burning capacity of BAT makes it an attractive target for anti-obesity therapies.”

Our news editors obtained a quote from the research from the University of Cambridge, “However, previous attempts to manipulate BAT’s sympathetic activation have lacked specificity. In this issue of the JCI, Bordicchia et al. provide new data indicating that cardiac natriuretic peptides (NPs) are also able to activate thermogenic machinery in adipose tissue.”

According to the news editors, the research concluded: “Their findings suggest a novel strategy to increase energy dissipation in adipose tissue, independent of adrenergic receptors.”

For more information on this research see: NPs – heart hormones that regulate brown fat? *The Journal of Clinical Investigation*, 2012;122(3):804-7.

The news editors report that additional information may be obtained by contacting A.J. Whittle, University of Cambridge Metabolic Research Laboratories, Institute of Metabolic Science, Cambridge, UK. (2013 Jan 23)

### **City University of London: A new fibre optic pulse oximeter probe for monitoring splanchnic organ arterial blood oxygen saturation**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Biomedicine. According to news reporting originating in London, United Kingdom, by NewsRx journalists, research stated, “A new, continuous method of monitoring splanchnic organ oxygen saturation (SpO(2)) would make the early detection of inadequate tissue oxygenation feasible, reducing the risk of hypoperfusion, severe ischaemia, and, ultimately, death. In an attempt to provide such a device, a new fibre optic based reflectance pulse oximeter probe and processing system were developed followed by an in vivo evaluation of the technology on seventeen patients undergoing elective laparotomy.”

The news reporters obtained a quote from the research from the City University of London, “Photoplethysmographic (PPG) signals of good quality and high signal-to-noise ratio were obtained from the small bowel, large bowel, liver and stomach. Simultaneous peripheral



PPG signals from the finger were also obtained for comparison purposes. Analysis of the amplitudes of all acquired PPG signals indicated much larger amplitudes for those signals obtained from splanchnic organs than those obtained from the finger. Estimated SpO(2) values for splanchnic organs showed good agreement with those obtained from the finger fibre optic probe and those obtained from a commercial device.”

According to the news reporters, the research concluded: “These preliminary results suggest that a miniaturized ‘indwelling’ fibre optic sensor may be a suitable method for pre-operative and post-operative evaluation of splanchnic organ SpO(2) and their health.”

For more information on this research see: A new fibre optic pulse oximeter probe for monitoring splanchnic organ arterial blood oxygen saturation. *Computer Methods and Programs In Biomedicine*, 2012;108(3):883-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting M. Hickey, School of Engineering and Mathematical Sciences, City University London, London, UK. (2013 Jan 22)

### **University of Pittsburgh: Hemolysis and cell-free hemoglobin drive an intrinsic mechanism for human disease**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedicine. According to news reporting out of Pittsburgh, Pennsylvania, by NewsRx editors, research stated, “Blood transfusion represents the first and most prescribed cell-based therapy; however, clinical safety and efficacy trials are lacking. Clinical cohort studies have suggested that massive transfusion and/or transfusion of aged stored blood may contribute to multiorgan dysfunction in susceptible patients.”

Our news journalists obtained a quote from the research from the University of Pittsburgh, “In this issue of the JCI, Baek and colleagues report that aged stored blood hemolyzes after massive transfusion in a guinea pig model. Hemolysis led to vascular and kidney injury that was mediated by cell-free plasma hemoglobin and prevented by coinfusion of the specific hemoglobin scavenger protein, haptoglobin.”

According to the news editors, the research concluded: “These studies support an expanding body of research indicating that intravascular hemolysis is a pathological mechanism in several human diseases, including multiorgan dysfunction after either massive red blood cell transfusion or hemoglobin-based blood substitute therapy, the hemoglobinopathies, malaria, and other acquired and genetic hemolytic conditions.”

For more information on this research see: Hemolysis and cell-free hemoglobin drive an intrinsic mechanism for human disease. *The Journal of Clinical Investigation*, 2012;122(4):1205-8.

Our news journalists report that additional information may be obtained by contacting M.T. Gladwin, Vascular Medicine Institute and Pulmonary, Allergy and Critical Care Medicine, Dept. of Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania 15261, United States. (2013 Jan 22)

### **Vanderbilt University, Nashville: Hold tight or you'll fall off: CD151 helps podocytes stick in high-pressure situations**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Biomedicine. According to news reporting originating in Nashville, Tennessee, by NewsRx journalists, research stated, “Glomerulosclerosis is a general term for scarring of the kidney glomerulus. It cannot be reversed.”

The news reporters obtained a quote from the research from Vanderbilt University, “As glomerulosclerosis accumulates, the diseased kidney progresses to end-stage renal disease. Treatment with inhibitors of the renin-angiotensin system often decreases the rate of progression of glomerulosclerosis in chronic kidney diseases. Although the mechanisms by which these inhibitors mediate their beneficial effects are incompletely understood, it has been suggested that they act, at least in part, by reducing intraglomerular blood pressure and thereby shear stress-induced loss of podocytes, a key component of the glomerular filtration barrier.”

According to the news reporters, the research concluded: “In this issue of the JCI, Sachs and colleagues provide experimental confirmation of the critical role of tight adhesion of podocytes to the glomerular basement membrane for maintaining glomerular integrity and provide evidence that inhibition of the renin-angiotensin system reduces glomerulosclerosis in animals with less tightly adherent podocytes, presumably by reducing intraglomerular blood pressure.”

For more information on this research see: Hold tight or you'll fall off: CD151 helps podocytes stick in high-pressure situations. *The Journal of Clinical Investigation*, 2012;122(1):13-6.

Our news correspondents report that additional information may be obtained by contacting A. Pozzi, Division of Nephrology, Dept. of Medicine, Vanderbilt Medical Center and VA Medical Center, Nashville, Tennessee 37232-2372, United States. (2013 Jan 22)

**Virginia Commonwealth University, Richmond: The flip-flop HuR: part of the problem or the solution in fighting cancer?**

By a News Reporter-Staff News Editor at Cancer Weekly – Current study results on Digestive System Diseases and Conditions have been published. According to news originating from Richmond, Virginia, by NewsRx correspondents, research stated, “Chronic inflammation has long been appreciated to play a critical role in tumor development and maintenance. Among the mechanisms involved in coordinating the initiation and resolution of inflammation are those responsible for modifying mRNA stability and/or translation.”

Our news journalists obtained a quote from the research from Virginia Commonwealth University, “Several studies have linked the RNA-binding protein HuR, which increases mRNA stability, with malignant transformation. However, in this issue of the JCI, Yiakouvaki et al. compellingly demonstrate in mice that increased HuR activity in myeloid cells has a protective role in the onset of pathologic intestinal inflammation (i.e., colitis) and colitis-associated cancer (CAC).”

According to the news editors, the research concluded: “These observations highlight the need to understand the roles of HuR in distinct cell populations in vivo and suggest that enhancing HuR activity may be of clinical benefit in protecting against pathologic inflammation and cancer.”

For more information on this research see: The flip-flop HuR: part of the problem or the solution in fighting cancer? *The Journal of Clinical Investigation*, 2012;122(1):16-9.

The news correspondents report that additional information may be obtained from J.C. Shultz, Dept. of Biochemistry and Molecular Biology, Virginia Commonwealth University, Richmond, Virginia 23298-0614, United States. (2013 Jan 22)

**Wayne State University School of Medicine, Detroit: Texture analysis of poly-adenylated mRNA staining following global brain ischemia and reperfusion**

By a News Reporter-Staff News Editor at Life Science Weekly – New research on Biomedicine is the subject of a report. According to news reporting from Detroit, Michigan, by NewsRx journalists, research stated, “Texture analysis provides a means to quantify complex changes in microscope images. We previously showed that cytoplasmic poly-adenylated mRNAs form mRNA granules in post-ischemic neurons and that these granules correlated with protein synthesis inhibition and hence cell death.”

The news correspondents obtained a quote from the research from the Wayne State University School of Medicine, “Here we utilized the texture analysis software MaZda to quantify mRNA granules in photomicrographs of the pyramidal cell layer of rat hippocampal region CA3 around 1h of reperfusion after 10min of normothermic global cerebral ischemia. At 1h reperfusion, we observed variations in the texture of mRNA granules amongst samples that were readily quantified by texture analysis. Individual sample variation was consistent with the interpretation that animal-to-animal variations in mRNA granules reflected the time-course of mRNA granule formation. We also used texture analysis to quantify the effect of cycloheximide, given either before or after brain ischemia, on mRNA granules. If administered before ischemia, cycloheximide inhibited mRNA granule formation, but if administered after ischemia did not prevent mRNA granulation, indicating mRNA granule formation is dependent on dissociation of polysomes.”

According to the news reporters, the research concluded: “We conclude that texture analysis is an effective means for quantifying the complex morphological changes induced in neurons by brain ischemia and reperfusion.”

For more information on this research see: Texture analysis of polyadenylated mRNA staining following global brain ischemia and reperfusion. *Computer Methods and Programs In Biomedicine*, 2012;105(1):81-94. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting J.J. Szymanski, Dept. of Physiology, Wayne State University School of Medicine, Detroit, MI 48201, United States. (2013 Jan 22)

### **Washington University School of Medicine, St. Louis: The ADP receptor P2RY12 regulates osteoclast function and pathologic bone remodeling**

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on Bone Research have been presented. According to news reporting from St. Louis, Missouri, by NewsRx journalists, research stated, “The adenosine diphosphate (ADP) receptor P2RY12 (purinergic receptor P2Y, G protein coupled, 12) plays a critical role in platelet aggregation, and P2RY12 inhibitors are used clinically to prevent cardiac and cerebral thrombotic events. Extracellular ADP has also been shown to increase osteoclast (OC) activity, but the role of P2RY12 in OC biology is unknown.”

The news correspondents obtained a quote from the research from the Washington University School of Medicine, “Here, we examined the role of mouse P2RY12 in OC function. Mice lacking P2ry12 had decreased OC activity and were partially protected from age-associated bone loss. P2ry12-/-OCs exhibited intact differentiation markers, but diminished resorptive function. Extracellular ADP enhanced OC adhesion and resorptive activity of WT, but not P2ry12-/-, OCs. In platelets, ADP stimulation of P2RY12 resulted in GTPase Ras-related protein (RAP1) activation and subsequent  $\alpha$ IIB $\beta$  integrin activation. Likewise, we found that ADP stimulation induced RAP1 activation in WT and integrin  $\beta$ 3 gene knockout (Itgb3-/-) OCs, but its effects were substantially blunted in P2ry12-/-OCs. In vivo, P2ry12-/-mice were partially protected from pathologic bone loss associated with serum transfer arthritis, tumor growth in bone, and ovariectomy-induced osteoporosis: all conditions associated with increased extracellular ADP. Finally, mice treated with the clinical inhibitor of P2RY12, clopidogrel, were protected from pathologic osteolysis.”

According to the news reporters, the research concluded: “These results demonstrate that P2RY12 is the primary ADP receptor in OCs and suggest that P2RY12 inhibition is a potential therapeutic target for pathologic bone loss.”

For more information on this research see: The ADP receptor P2RY12 regulates osteoclast function and pathologic bone remodeling. *The Journal of Clinical Investigation*, 2012;122(10):3579-92.

Our news journalists report that additional information may be obtained by contacting X. Su, Dept. of Medicine, Division of Oncology, Washington University in St Louis School of Medicine, St Louis, Missouri 63110, United States. (2012 Dec 25)

### **University of Kragujevac: ScolioMedIS: Web-oriented information system for idiopathic scoliosis visualization and monitoring**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators discuss new findings in Computer Research. According to news reporting out of Kragujevac, Serbia, by NewsRx editors, research stated, “Adolescent idiopathic scoliosis is the most common type of abnormal curvature observed in spine and it progresses rapidly during the puberty period. The most followed clinical way of assessing the spinal deformity is subjective by measuring the characteristic angles of spinal curve from a set of radiographic images.”

Our news journalists obtained a quote from the research from the University of Kragujevac, “This paper presents a web-based information system (called ScolioMedIS) based on parameterized 3D anatomical models of the spine to quantitatively assess the deformity and to

minimize the amount of radiation exposure by reducing the number of radiographs required. The main components of the system are 3D parametric solid model of spine, back surfaces, relevant clinical information and scoliosis ontology. The patient-specific spine model is regenerated from the parametric model and surface data using anatomical information extracted from radiographic images. The system is designed to take inherent advantage of Web for facilitating multi-center data collection and collaborative clinical decisions.”

According to the news editors, the research concluded: “The preliminary analysis of patient data showed promising results, which involve improved documentation standard, clinical decision knowledge base record, facilitated exchange and retrieval of medical data between institutions in multi-center clinical studies, 3D visualization of spinal deformity, and permanent monitoring of treatments.”

For more information on this research see: ScolioMedIS: Web-oriented information system for idiopathic scoliosis visualization and monitoring. *Computer Methods and Programs in Biomedicine*, 2012;108(2):736-749. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting G. Devedzic, University of Kragujevac, Medical Fac Kragujevac, Kragujevac, Serbia. (2012 Dec 21)

### **Wenzhou Medical College: Physical modeling with orthotropic material based on harmonic fields**

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Computer Research is the subject of a report. According to news reporting originating in Wenzhou, People’s Republic of China, by NewsRx journalists, research stated, “Although it is well known that human bone tissues have obvious orthotropic material properties, most works in the physical modeling field adopted oversimplified isotropic or approximated transversely isotropic elasticity due to the simplicity. This paper presents a convenient methodology based on harmonic fields, to construct volumetric finite element mesh integrated with complete orthotropic material.”

The news reporters obtained a quote from the research from Wenzhou Medical College, “The basic idea is taking advantage of the fact that the longitudinal axis direction indicated by the shape configuration of most bone tissues is compatible with the trajectory of the maximum material stiffness. First, surface harmonic fields of the longitudinal axis

direction for individual bone models were generated, whose scalar distribution pattern tends to conform very well to the object shape. The scalar iso-contours were extracted and sampled adaptively to construct volumetric meshes of high quality. Following, the surface harmonic fields were expanded over the whole volumetric domain to create longitudinal and radial volumetric harmonic fields, from which the gradient vector fields were calculated and employed as the orthotropic principal axes vector fields.”

According to the news reporters, the research concluded: “Contrastive finite element analyses demonstrated that elastic orthotropy has significant effect on simulating stresses and strains, including the value as well as distribution pattern, which underlines the relevance of our orthotropic modeling scheme.”

For more information on this research see: Physical modeling with orthotropic material based on harmonic fields. *Computer Methods and Programs in Biomedicine*, 2012;108(2):536-547. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting S.H. Liao, Wenzhou Med College, Affiliated Hosp 1, Wenzhou, People’s Republic of China. (2012 Dec 21)

### **Aristotle University, Thessaloniki: Searching biosignal databases by content and context: Research Oriented Integration System for ECG Signals (ROISES)**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news reporting out of Thessaloniki, Greece, by VerticalNews editors, research stated, “Technological advances in textile, biosensor and electrocardiography domain induced the wide spread use of bio-signal acquisition devices leading to the generation of massive bio-signal datasets. Among the most popular bio-signals, electrocardiogram (ECG) possesses the longest tradition in bio-signal monitoring and recording, being a strong and relatively robust signal.”

Our news journalists obtained a quote from the research from Aristotle University, “As research resources are fostered, research community promotes the need to extract new knowledge from bio-signals towards the adoption of new medical procedures. However, integrated access,

query and management of ECGs are impeded by the diversity and heterogeneity of bio-signal storage data formats. In this scope, the proposed work introduces a new methodology for the unified access to bio-signal databases and the accompanying metadata. It allows decoupling information retrieval from actual underlying datasource structures and enables transparent content and context based searching from multiple data resources. Our approach is based on the definition of an interactive global ontology which manipulates the similarities and the differences of the underlying sources to either establish similarity mappings or enrich its terminological structure.”

According to the news editors, the research concluded: “We also introduce ROISES (Research Oriented Integration System for ECG Signals), for the definition of complex content based queries against the diverse bio-signal data sources.”

For more information on this research see: Searching biosignal databases by content and context: Research Oriented Integration System for ECG Signals (ROISES). *Computer Methods and Programs in Biomedicine*, 2012;108(2):453-466. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting A. Kokkinaki, Aristotle University, Lab Med Informat, Fac Med, Thessaloniki 54124, Greece. (2012 Dec 20)

### **Dow Europe, Horgen: Development of PK- and PBPK-based modeling tools for derivation of biomonitoring guidance values**

By a News Reporter-Staff News Editor at Computer Weekly News – Investigators publish new report on Computer Research. According to news reporting from Horgen, Switzerland, by VerticalNews journalists, research stated, “There are numerous programs ongoing to analyze environmental exposure of humans to xenobiotic chemicals via biomonitoring measurements (e.g.: EU ESBIO, COPHES; US CDC NHANES; Canadian Health Measures Survey). The goal of these projects is to determine relative trends in exposure to chemicals, across time and sub-populations.”

The news correspondents obtained a quote from the research from Dow Europe, “Due to the lack of data, there is often little information correlating biomarker concentrations with exposure levels and durations. As a result, it can be difficult to utilize biomonitoring data to evaluate if exposures adhere to or exceed hazard/exposure criteria such



as the Derived No-Effect Level values under the EU REACH program, or Reference Dose/Concentration values of the US EPA. A tiered approach of simple, arithmetic pharmacokinetic (PK) models, as well as more standardized mean-value, physiologically-based (PBPK) models, have therefore been developed to estimate exposures from biomonitoring results. Both model types utilize a user-friendly Excel spreadsheet interface. QSPR estimations of chemical-specific parameters have been included, as well as accommodation of variations in urine production.”

According to the news reporters, the research concluded: “Validation of each model’s structure by simulations of published datasets and the impact of assumptions of major model parameters will be presented.”

For more information on this research see: Development of PK- and PBPK-based modeling tools for derivation of biomonitoring guidance values. *Computer Methods and Programs in Biomedicine*, 2012;108(2):773-788. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting M. Bartels, Dow Europe GmbH, Horgen, Switzerland. (2012 Dec 20)

### **Framingham State College: A geometrical approach for evaluating left ventricular remodeling in myocardial infarct patients**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news reporting out of Framingham, Massachusetts, by Vertical-News editors, research stated, “A computational method for quantifying left ventricle (LV) remodeling using 3D mesh models reconstructed from magnetic resonance imaging is proposed. The underlying geometry of the LV mesh is obtained by using a quadric fitting method, and its quantification is performed by using a curvedness shape descriptor.”

Our news journalists obtained a quote from the research from Framingham State College, “To achieve robustness, we have performed detailed studies of the effects of n-ring parameter selection on the accuracy of this method with in vitro and in vivo LV models. We have found that curvedness calculations based on a 5-ring selection can accurately depict anomalies in LV shape despite the presence of noise due to manual image segmentation. Our studies show that patients after myocardial infarction exhibit significant LV shape alteration in terms of curvedness, in particular at the apex. The diastole-to-systole change

in regional curvedness was significantly lower suggesting regional differences in hypokinesis due to infarcted myocardium.”

According to the news editors, the research concluded: “This approach may add new insights into ventricular deformation and enable better discrimination between normal and pathologic conditions.”

For more information on this research see: A geometrical approach for evaluating left ventricular remodeling in myocardial infarct patients. *Computer Methods and Programs in Biomedicine*, 2012;108(2):500-510. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting Y. Su, Framingham State College, Framingham, MA, United States. (2012 Dec 20)

### **Peoples Hospital, Chengdu: A novel method of obtaining 3D images of detached retina**

By a News Reporter-Staff News Editor at Computer Weekly News – New research on Computer Research is the subject of a report. According to news reporting from Chengdu, People’s Republic of China, by VerticalNews journalists, research stated, “We describe a new method of obtaining three-dimensional (3D) images of detached retina. Twelve-slice photos of the partial retina were obtained according to the twelve positions on a clock face.”

The news correspondents obtained a quote from the research from Peoples Hospital, “Twelve sections were then cut from these photos and joined together. Each sector was resized to match nearby sectors and the complete retinal picture was then created. A sphere mapping algorithm was used to map the two-dimensional (2D) picture to a sphere, which was then used to simulate the actual eyeball.”

According to the news reporters, the research concluded: “Finally, a 3D image of the entire retina with a clearly visible detached section was created by the Visualization Toolkit (VTK).”

For more information on this research see: A novel method of obtaining 3D images of detached retina. *Computer Methods and Programs in Biomedicine*, 2012;108(2):665-668. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting Y.R. Zhai, Sichuan Prov Peoples Hosp, Dept. of Ophthalmol, Chengdu 610072, People's Republic of China. (2012 Dec 20)

### **RWTH Aachen University Hospital: Generic integration of content-based image retrieval in computer-aided diagnosis**

By a News Reporter-Staff News Editor at Computer Weekly News – A new study on Computer Research is now available. According to news reporting out of Aachen, Germany, by VerticalNews editors, research stated, “Content-based image retrieval (CBIR) offers approved benefits for computer-aided diagnosis (CAD), but is still not well established in radiological routine yet. An essential factor is the integration gap between CBIR systems and clinical information systems.”

Our news journalists obtained a quote from the research from RWTH Aachen University Hospital, “The international initiative Integrating the Healthcare Enterprise (IHE) aims at improving interoperability of medical computer systems. We took into account deficiencies in THE compliance of current picture archiving and communication systems (PACS), and developed an intermediate integration scheme based on the IHE post-processing workflow integration profile (PWF) adapted to CBIR in CAD. The Image Retrieval in Medical Applications (IRMA) framework was used to apply our integration scheme exemplarily, resulting in the application called IRMAcon. The novel IRMAcon scheme provides a generic, convenient and reliable integration of CBIR systems into clinical systems and workflows.”

According to the news editors, the research concluded: “Based on the IHE PWF and designed to grow at a pace with the THE compliance of the particular PACS, it provides sustainability and fosters CBIR in CAD.”

For more information on this research see: Generic integration of content-based image retrieval in computer-aided diagnosis. *Computer Methods and Programs in Biomedicine*, 2012;108(2):589-599. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting P. Weltera, RWTH Aachen Univ Hosp, Dept. of Diagnost Radiol, Aachen, Germany. (2012 Dec 20)

### **Semantic patient information aggregation and medicinal decision support**

By a News Reporter-Staff News Editor at Computer Weekly News – Researchers detail new data in Computer Research. According to news reporting originating in Ghent, Belgium, by VerticalNews journalists, research stated, “Although the health care sector has already been subjected to a major computerization effort, this effort is often limited to the implementation of standalone systems which do not communicate with each other. Interoperability problems limit health care applications from achieving their full potential.”

The news reporters obtained a quote from the research, “In this paper, we propose the use of Semantic Web technologies to solve interoperability problems between data providers. Through the development of unifying health care ontologies, data from multiple health care providers can be aggregated, which can then be used as input for a decision support system. This way, more data is taken into account than a single health care provider possesses in his local setting.”

According to the news reporters, the research concluded: “The feasibility of our approach is demonstrated by the creation of an end-to-end proof of concept, focusing on Belgian health care providers and medicinal decision support.”

For more information on this research see: Semantic patient information aggregation and medicinal decision support. *Computer Methods and Programs in Biomedicine*, 2012;108(2):724-735. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting P. De Potter, Agfa HealthCare, Adv Clin Applicat Res Grp, B-9000 Ghent, Belgium. (2012 Dec 20)

### **Tampere University Hospital: Prediction of a state of a subject on the basis of a stabllogram signal and video oculography test**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news originating from Tampere, Finland, by VerticalNews correspondents, research stated, “Postural stability decreases with ageing and may lead to accidental falls, isolation and a reduction in the quality of life. The age at the onset of postural derangement, its extent and the

reason for deterioration are poorly known within an individual, but in general it becomes more severe with age.”

Our news journalists obtained a quote from the research from Tampere University Hospital, “In order to prevent falls and avoid severe injuries the postural derangement has to be noticed by the person and the possible nursing personnel. In this work we propose such numerical features, which can discriminate the persons having good or poor postural stability. These features can also be utilized to measure the outcome and progression of balance training. With these postural stability algorithms providing stability features for a subject we managed to classify correctly the type of stance on the force platform in more than 80% of sixty subjects.”

According to the news editors, the research concluded: “We used le-nearest neighbor algorithm as an intuitive baseline method and compared its results with those of support vector machines and hidden Markov models.”

For more information on this research see: Prediction of a state of a subject on the basis of a stabilogram signal and video oculography test. *Computer Methods and Programs in Biomedicine*, 2012;108(2):580-588. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from J. Rasku, Tampere Univ Hosp, Dept. of Otorhinolaryngol, Tampere, Finland. (2012 Dec 20)

### **University of Leon: Texture and moments-based classification of the acrosome integrity of boar spermatozoa images**

By a News Reporter-Staff News Editor at Computer Weekly News – Researchers detail new data in Computer Research. According to news reporting from Leon, Spain, by VerticalNews journalists, research stated, “The automated assessment of the sperm quality is an important challenge in the veterinary field. In this paper, we explore how to describe the acrosomes of boar spermatozoa using image analysis so that they can be automatically categorized as intact or damaged.”

The news correspondents obtained a quote from the research from the University of Leon, “Our proposal aims at characterizing the acrosomes by means of texture features. The texture is described using first order statistics and features derived from the co-occurrence matrix of the image, both computed from the original image and from the coefficients yielded by the Discrete Wavelet Transform. Texture descriptors

are evaluated and compared with moments-based descriptors in terms of the classification accuracy they provide.”

According to the news reporters, the research concluded: “Experimental results with a Multilayer Perceptron and the k-Nearest Neighbours classifiers show that texture descriptors outperform moment-based descriptors, reaching an accuracy of 94.93%, which makes this approach very attractive for the veterinarian community.”

For more information on this research see: Texture and moments-based classification of the acrosome integrity of boar spermatozoa images. *Computer Methods and Programs in Biomedicine*, 2012;108(2):873-881. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting E. Alegre, University of Leon, Dept. of Elect Syst & Automat Engn, E-24071 Leon, Spain. (2012 Dec 20)

### **University of Limerick: Optimization of scheduling patient appointments in clinics using a novel modelling technique of patient arrival**

By a News Reporter-Staff News Editor at Computer Weekly News – A new study on Computer Research is now available. According to news reporting originating from Limerick, Ireland, by Vertical-News correspondents, research stated, “This paper re-visits the question of mapping a probability distribution to patient unpunctuality in appointment-driven outpatient clinics, with reference to published empirical arrival data. This data indicates the possibility of interesting aberrations such as local modes and near-modes, asymmetry and peakedness.”

Our news editors obtained a quote from the research from the University of Limerick, “We examine the form of some published data on patient unpunctuality, and propose a mixed distribution which we call ‘F3’ to provide a richer representation of shape such as in the shoulders of the distribution. The adequacy of this model is assessed in a worked example referencing a classical study, where a comparison is made of F3 against the normal and Pearson VII distributions with reference to summary statistics, graphical probability plots (P-P and Q-Q), a range of goodness of fitness criteria. Under this patient arrival setting, 2P method is proposed for optimal patient interval setting to minimize waiting time of both patient and the doctor and this 2P method is validated with a tentative simulation example. This study argues

that frequency distribution of patient unpunctuality shows asymmetry in shape which is resulted from various types of arrival behaviours.”

According to the news editors, the research concluded: “Consequently optimal appointment intervals of scheduled patients, which minimize the total waiting time of patients and the doctor is highly related to patient unpunctuality patterns and this makes the optimal appointment intervals for various patient unpunctualities predictable.”

For more information on this research see: Optimization of scheduling patient appointments in clinics using a novel modelling technique of patient arrival. *Computer Methods and Programs in Biomedicine*, 2012;108(2):467-476. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting G.F. Tai, University of Limerick, Dept. of Mfg & Operat Engn, Limerick, Ireland. (2012 Dec 20)

### **University of London: An approach to localize the retinal blood vessels using bit planes and centerline detection**

By a News Reporter-Staff News Editor at Computer Weekly News – Researchers detail new data in Computer Research. According to news reporting from London, United Kingdom, by VerticalNews journalists, research stated, “The change in morphology, diameter, branching pattern or tortuosity of retinal blood vessels is an important indicator of various clinical disorders of the eye and the body. This paper reports an automated method for segmentation of blood vessels in retinal images.”

The news correspondents obtained a quote from the research from the University of London, “A unique combination of techniques for vessel centerlines detection and morphological bit plane slicing is presented to extract the blood vessel tree from the retinal images. The centerlines are extracted by using the first order derivative of a Gaussian filter in four orientations and then evaluation of derivative signs and average derivative values is performed. Mathematical morphology has emerged as a proficient technique for quantifying the blood vessels in the retina. The shape and orientation map of blood vessels is obtained by applying a multidirectional morphological top-hat operator with a linear structuring element followed by bit plane slicing of the vessel enhanced grayscale image. The centerlines are combined with these maps to obtain the segmented vessel tree. The methodology is tested on three publicly available databases DRIVE, STARE and MESSIDOR.”

According to the news reporters, the research concluded: “The results demonstrate that the performance of the proposed algorithm is comparable with state of the art techniques in terms of accuracy, sensitivity and specificity.”

For more information on this research see: An approach to localize the retinal blood vessels using bit planes and centerline detection. *Computer Methods and Programs in Biomedicine*, 2012;108(2):600-616. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting M.M. Fraz, University of London, Div Populat Hlth Sci & Educ, London, United Kingdom. (2012 Dec 20)

### **University of Melbourne: Tensor based sparse decomposition of 3D shape for visual detection of mirror symmetry**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news originating from Melbourne, Australia, by VerticalNews correspondents, research stated, “This study explores an approach for analysing the mirror (reflective) symmetry of 3D shapes with tensor based sparse decomposition. The approach combines non-negative tensor decomposition and directional texture synthesis, with symmetry information about 3D shapes that is represented by 2D textures synthesised from sparse, decomposed images.”

Our news journalists obtained a quote from the research from the University of Melbourne, “This technique requires the center of mass of 3D objects to be at the origin of the coordinate system. The decomposition of 3D shapes and analysis of their symmetry are useful for image compression, pattern recognition, as well as there being an emerging interest in the medical community due to its potential to find morphological changes between healthy and pathological structures. This paper postulates that sparse texture synthesis can be used to describe the decomposed basis images acting as symmetry descriptors for a 3D shape.”

According to the news editors, the research concluded: “We apply the theory of non-negative tensor decomposition and sparse texture synthesis, deduce the new representation, and show some application examples.”

For more information on this research see: Tensor based sparse decomposition of 3D shape for visual detection of mirror symmetry.



*Computer Methods and Programs in Biomedicine*, 2012;108(2):629-643. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from X.X. Yin, University of Melbourne, Dept. of Comp Sci & Software Engr, Melbourne Sch Engr, Melbourne, Vic 3010, Australia. (2012 Dec 20)

### **University of Westminster, London: Profiling hospitals based on emergency readmission: A multilevel transition modelling approach**

By a News Reporter-Staff News Editor at Computer Weekly News – Investigators discuss new findings in Computer Research. According to news reporting originating from London, United Kingdom, by Vertical-News correspondents, research stated, “Emergency readmission is seen as an important part of the United Kingdom government policy to improve the quality of care that patients receive. In this context, patients and the public have the right to know how well different health organizations are performing.”

Our news editors obtained a quote from the research from the University of Westminster, “Most methods for profiling estimate the expected numbers of adverse outcomes (e.g. readmission, mortality) for each organization. A number of statistical concerns have been raised, such as the differences in hospital sizes and the unavailability of relevant data for risk adjustment. Having recognized these statistical concerns, a new framework known as the multilevel transition model is developed. Hospital specific propensities of the first, second and further readmissions are considered to be measures of performance, where these measures are used to define a new performance index. During the period 1997 and 2004, the national (English) hospital episodes statistics dataset comprise more than 5 million patient readmissions. Implementing a multilevel model using the complete population dataset could possibly take weeks to estimate the parameters. To resolve the problem, we extract 1000 random samples from the original data, where each random sample is likely to lead to differing hospital performance measures. For computational efficiency a Grid implementation of the model is developed. Analysing the output from the full 1000 sample, we noticed that 4 out of the 5 worst performing hospitals treating cancer patients were in London.”

According to the news editors, the research concluded: “These hospitals are known to be the leading NHS Trusts in England, providing diverse range of services to complex patients, and therefore it is inevitable to expect higher numbers of emergency readmissions.”

For more information on this research see: Profiling hospitals based on emergency readmission: A multilevel transition modelling approach. *Computer Methods and Programs in Biomedicine*, 2012;108(2):487-499. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting E. Demir, Univ Westminster, Dept. of Informat Syst & Comp, Sch Elect & Comp Sci, London W1R 8AL, United Kingdom. (2012 Dec 20)

### **iGAIT: An interactive accelerometer based gait analysis system**

By a News Reporter-Staff News Editor at Computer Weekly News – A new study on Computer Research is now available. According to news reporting from Dorset, United Kingdom, by VerticalNews journalists, research stated, “This paper presents a software program (iGAIT) developed in MATLAB, for the analysis of gait patterns extracted from accelerometer recordings. iGAIT provides a user-friendly graphical interface to display and analyse gait acceleration data recorded by an accelerometer attached to the lower back of subjects. The core function of iGAIT is gait feature extraction, which can be used to derive 31 features from acceleration data, including 6 spatio-temporal features, 7 regularity and symmetry features, and 18 spectral features.”

The news correspondents obtained a quote from the research, “Features extracted are summarised and displayed on screen, as well as an option to be stored in text files for further review or analysis if required. Another unique feature of iGAIT is that it provides interactive functionality allowing users to manually adjust the analysis process according to their requirements. The system has been tested under Window XP, Vista and Window 7 using three different types of accelerometer data.”

According to the news reporters, the research concluded: “It is designed for analysis of accelerometer data recorded with sample frequencies ranging from 5 Hz to 200 Hz.”

For more information on this research see: iGAIT: An interactive accelerometer based gait analysis system. *Computer Methods and Programs in Biomedicine*, 2012;108(2):715-723. *Computer Methods and*

*Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting M.J. Yang, Angloeuropean Coll Chiropract, Bournemouth BH5 2DF, Dorset, United Kingdom. (2012 Dec 20)

### **Automated septum thickness measurement-A Kalman filter approach**

By a News Reporter-Staff News Editor at Journal of Mathematics – Researchers detail new data in Computer Research. According to news reporting from Levanger, Norway, by VerticalNews journalists, research stated, “Interventricular septum thickness in end-diastole (IVSd) is one of the key parameters in cardiology. This paper presents a fast algorithm, suitable for pocket-sized ultrasound devices, for measurement of IVSd using 2D B-mode parasternal long axis images.”

The news correspondents obtained a quote from the research, “The algorithm is based on a deformable model of the septum and the mitral valve. The model shape is estimated using an extended Kalman filter. A feasibility study using 32 unselected recordings is presented. The recordings originate from a database consisting of subjects from a normal healthy population. Five patients with suspected hypertrophy were included in the study. Reference B-mode measurements were made by two cardiologists. A paired t-test revealed a non-significant mean difference, compared to the B-mode reference, of (mean +/- SD) 0.14 +/- 1.36 mm ( $p = 0.532$ ). Pearson’s correlation coefficient was 0.79 ( $p < 0.001$ ). The results are comparable to the variability between the two cardiologists, which was found to be 1.29 +/- 1.23 mm ( $p < 0.001$ ).”

According to the news reporters, the research concluded: “The results indicate that the method has potential as a tool for rapid assessment of IVSd.”

For more information on this research see: Automated septum thickness measurement-A Kalman filter approach. *Computer Methods and Programs in Biomedicine*, 2012;108(2):477-486. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting S.R. Snare, N Drondelag Hlth Trust, Levanger Hosp, Levanger, Norway. (2012 Dec 18)

## **Jagiellonian University, Krakow: Application of detector precision characteristics and histogram packing for compression of biological fluorescence micrographs**

By a News Reporter-Staff News Editor at Journal of Mathematics – Data detailed on Computer Research have been presented. According to news reporting from Krakow, Poland, by VerticalNews journalists, research stated, “Modern applications of biological microscopy such as high-content screening (HCS), 4D imaging, and multispectral imaging may involve collection of thousands of images in every experiment making efficient image-compression techniques necessary. Reversible compression algorithms, when used with biological micrographs, provide only a moderate compression ratio, while irreversible techniques obtain better ratios at the cost of removing some information from images and introducing artifacts.”

The news correspondents obtained a quote from the research from Jagiellonian University, “We construct a model of noise, which is a function of signal in the imaging system. In the next step insignificant intensity levels are discarded using intensity binning. The resultant images, characterized by sparse intensity histograms, are coded reversibly. We evaluate compression efficiency of combined reversible coding and intensity depth-reduction using single-channel 12-bit light micrographs of several subcellular structures. We apply local and global measures of intensity distribution to estimate maximum distortions introduced by the proposed algorithm. We demonstrate that the algorithm provides efficient compression and does not introduce significant changes to biological micrographs.”

According to the news reporters, the research concluded: “The algorithm preserves information content of these images and therefore offers better fidelity than standard irreversible compression method JPEG2000.”

For more information on this research see: Application of detector precision characteristics and histogram packing for compression of biological fluorescence micrographs. *Computer Methods and Programs in Biomedicine*, 2012;108(2):511-523. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting T. Bernas, Jagiellonian University, Dept. of Biochem Biophys & Biotechnol, PL-30387 Krakow, Poland. (2012 Dec 18)

## **Tianjin University: A systematic approach to embedded biomedical decision making**

By a News Reporter-Staff News Editor at Journal of Mathematics – Investigators publish new report on Computer Research. According to news originating from Tianjin, People's Republic of China, by Vertical-News correspondents, research stated, "An embedded decision making is a key feature for many biomedical systems. In most cases human life directly depends on correct decisions made by these systems, therefore they have to work reliably."

Our news journalists obtained a quote from the research from Tianjin University, "This paper describes how we applied systems engineering principles to design a high performance embedded classification system in a systematic and well structured way. We introduce the structured design approach by discussing requirements capturing, specifications refinement, implementation and testing. Thereby, we follow systems engineering principles and execute each of these processes as formal as possible. The requirements, which motivate the system design, describe an automated decision making system for diagnostic support. These requirements are refined into the implementation of a support vector machine (SVM) algorithm which enables us to integrate automated decision making in embedded systems. With a formal model we establish functionality, stability and reliability of the system. Furthermore, we investigated different parallel processing configurations of this computationally complex algorithm. We found that, by adding SVM processes, an almost linear speedup is possible. Once we established these system properties, we translated the formal model into an implementation. The resulting implementation was tested using XMOs processors with both normal and failure cases, to build up trust in the implementation."

According to the news editors, the research concluded: "Finally, we demonstrated that our parallel implementation achieves the speedup, predicted by the formal model."

For more information on this research see: A systematic approach to embedded biomedical decision making. *Computer Methods and Programs in Biomedicine*, 2012;108(2):656-664. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from Z. Song, Tianjin University, Sch Elect Engrn, Tianjin, People's Republic of China. (2012 Dec 18)

## **University of Montreal: An eikonal-diffusion solver and its application to the interpolation and the simulation of reentrant cardiac activations**

By a News Reporter-Staff News Editor at Journal of Mathematics – Fresh data on Cardiology are presented in a new report. According to news reporting from Montreal, Canada, by VerticalNews editors, the research stated, “Electrical propagation of the cardiac impulse in the myocardium can be described by the eikonal-diffusion equation. This equation governs the field of activation times in a domain where conduction properties are specified.”

The news correspondents obtained a quote from the research from the University of Montreal, “This approach has been applied to knowledgebased interpolation of sparse measurements of activation times and to the creation of initial conditions for detailed ionic models of cardiac propagation. This paper presents the mathematical basis, matrix formulation, and compact Matlab implementation of an iterative finite-element solver (triangular meshes) for the eikonal-diffusion equation extended to reentrant activations, which automatically identifies the period of reentry and computes the resulting isochrones. An iterative algorithm is designed to perform Laplacian interpolation of reentrant activation maps to be used as initial estimate for the eikonal-diffusion solver.”

According to the news reporters, the research concluded: “The performance of the algorithm is analyzed in test-case geometries (ventricular slice and simplified atrial surface model).”

For more information on this research see: An eikonal-diffusion solver and its application to the interpolation and the simulation of reentrant cardiac activations. *Computer Methods and Programs in Biomedicine*, 2012;108(2):548-558. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting V. Jacquemet, University of Montreal, Dept. of Physiol, Montreal, PQ H3C 3J7, Canada. (2012 Dec 18)

### **University of Chile, Santiago: The O3-Vet project: Integration of a standard nomenclature of clinical terms in a veterinary electronic medical record for veterinary hospitals**

By a News Reporter-Staff News Editor at Veterinary Week – Data detailed on Electronic Medical Records have been presented. According to news originating from Santiago, Chile, by VerticalNews correspondents, research stated, “In order to improve the hospital information system of the Chilean University Hospital, the Veterinary Medicine School of Universidad de Chile made a research cooperation with Universita San Raffaele Roma to develop and test a new release of the O3-Vet software application.”

Our news journalists obtained a quote from the research from the University of Chile, “O3-Vet was selected by the Chilean University mainly for two reasons: (1) it uses human medicine standardized technologies such as ‘Health Level 7’ (HL7) and ‘Integrating the Healthcare Enterprise’ (IHE), which allow a good level of data sharing and hospital management; (2) it is open source, which means it can be adapted to specific hospital needs. In the new release, a subset of diagnostic terms was added from the ‘Systematized Nomenclature of Medicine Clinical Terms’ (SNOMED CT), selected by the ‘American Animal Hospital Association’ (AAHA) to standardize the filing of clinical data and its retrieval.”

According to the news editors, the research concluded: “Results from a limited survey of veterinarians of the University (n = 9) show that the new release improved the management of the Chilean University Hospital and the ability to retrieve useful clinical data.”

For more information on this research see: The O3-Vet project: Integration of a standard nomenclature of clinical terms in a veterinary electronic medical record for veterinary hospitals. *Computer Methods and Programs in Biomedicine*, 2012;108(2):760-772. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from M. Zaninelli, University of Chile, Santiago, Chile. (2012 Dec 17)

### **University of Texas, Austin: The effect of temperature on the autofluorescence of scattering and non-scattering tissue**

By a News Reporter-Staff News Editor at Medical Devices & Surgical Technology Week – Research findings on Lasers in Medicine are discussed in a new report. According to news reporting originating in Austin, Texas, by NewsRx journalists, research stated, “With the increasing use of fluorescence in medical applications, a comprehensive understanding of the effect of temperature on tissue autofluorescence is essential. The purpose of this study is to explore the effect of temperature on the fluorescence of porcine cornea and rat skin and determine the relative contributions of irreversible changes in optical properties and in fluorescence yield.”

The news reporters obtained a quote from the research from the University of Texas, “Design/Materials and Methods Fluorescence, diffuse reflectance, and temperature measurements were acquired from excised porcine cornea and rat skin over a temperature range of 0 to 80 degrees C. A dual excitation system was used with a 337 nm pulsed nitrogen laser for the fluorescence and a white light source for the diffuse reflectance measurements. A thermal camera measured tissue temperature. Optical property changes were inferred from diffuse reflectance measurements. The reversibility of the change in fluorescence was examined by acquiring measurements while the tissue sample cooled from the highest induced temperature to room temperature. The fluorescence intensity decreased with increasing tissue temperature. This fluorescence change was reversible when the tissue was heated to a temperature of 45 degrees C, but irreversible when heated to a temperature of 80 degrees C. Auto-fluorescence intensity dependence on temperature appears to be a combination of temperature-induced optical property changes and reduced fluorescence quantum yield due to changes in collagen structure.”

According to the news reporters, the research concluded: “Temperature-induced changes in measured fluorescence must be taken into consideration in applications where fluorescence is used to diagnose disease or guide therapy. *Lasers Surg. Med.* 44:712-718, 2012.”

For more information on this research see: The effect of temperature on the autofluorescence of scattering and non-scattering tissue. *Lasers in Surgery and Medicine*, 2012;44(9):712-718. *Lasers in Surgery and Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Lasers in Surgery and Medicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1096-9101)



Our news correspondents report that additional information may be obtained by contacting A.J. Walsh, Univ Texas Austin, Dept. of Biomed Engn, Austin, TX 78712, United States. (2012 Dec 16)

### **PIEAS, Islamabad: Carotid artery image segmentation using modified spatial fuzzy c-means and ensemble clustering**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedicine. According to news originating from Islamabad, Pakistan, by NewsRx correspondents, research stated, “Disease diagnosis based on ultrasound imaging is popular because of its non-invasive nature. However, ultrasound imaging system produces low quality images due to the presence of spackle noise and wave interferences.”

Our news journalists obtained a quote from the research from PIEAS, “This shortcoming requires a considerable effort from experts to diagnose a disease from the carotid artery ultrasound images. Image segmentation is one of the techniques, which can help efficiently in diagnosing a disease from the carotid artery ultrasound images. Most of the pixels in an image are highly correlated. Considering the spatial information of surrounding pixels in the process of image segmentation may further improve the results. When data is highly correlated, one pixel may belong to more than one clusters with different degree of membership. In this paper, we present an image segmentation technique namely improved spatial fuzzy c-means and an ensemble clustering approach for carotid artery ultrasound images to identify the presence of plaque. Spatial, wavelets and gray level co-occurrence matrix (GLCM) features are extracted from carotid artery ultrasound images. Redundant and less important features are removed from the features set using genetic search process. Finally, segmentation process is performed on optimal or reduced features. Ensemble clustering with reduced feature set outperforms with respect to segmentation time as well as clustering accuracy. Intima-media thickness (IMT) is measured from the images segmented by the proposed approach. Based on IMT measured values, Multi-Layer Back-Propagation Neural Networks (MLBPNN) is used to classify the images into normal or abnormal. Experimental results show the learning capability of MLBPNN classifier and validate the effectiveness of our proposed technique.”

According to the news editors, the research concluded: “The proposed approach of segmentation and classification of carotid artery ultrasound images seems to be very useful for detection of plaque in carotid artery.”

For more information on this research see: Carotid artery image segmentation using modified spatial fuzzy c-means and ensemble clustering. *Computer Methods and Programs In Biomedicine*, 2012;108(3):1261-76. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from M. Hassan, Dept. of Computer & Information Sciences, PIEAS, PO Nilore, Islamabad, Pakistan. (2012 Dec 12)

### **Graduate School of Medicine, Bunkyo ku: Changes in microRNA expression in rat lungs caused by sevoflurane anesthesia: a TaqMan<sup>®</sup>; low-density array study**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators discuss new findings in Biomedical Research. According to news reporting originating in Bunkyo ku, Japan, by NewsRx journalists, research stated, “Reportedly, a large number of microRNAs (miRNAs) play an important role in inflammatory lung diseases such as asthma, idiopathic pulmonary fibrosis (IPF), acute respiratory distress syndrome (ARDS), and pulmonary arterial hypertension (PAH). Sevoflurane is routinely used to various patients, and its safety has been confirmed by clinical outcomes; however, its effects to lungs at the miRNA level have not been elucidated.”

The news reporters obtained a quote from the research from the Graduate School of Medicine, “In our previous genomic studies, we showed that sevoflurane anesthesia affected the expression of many genes and mRNAs in rat lungs. In this study, we comprehensively investigated changes in miRNA expression caused by sevoflurane anesthesia (2.0% and 4.0%). Sevoflurane anesthesia resulted in apparent changes in miRNA expression in rat lungs, and the pattern of 2.0% sevoflurane-induced changes in miRNA expression was similar to that of 4.0% sevoflurane. Some of the differentially expressed miRNAs are known to be involved in asthma, IPF, and PAH. Especially, miR-146a, the most up-regulated miRNA, is known to attenuate the toxic effects associated with LPS stimulation.”

According to the news reporters, the research concluded: “We showed, for the first time, dynamic changes in miRNA expression caused by sevoflurane anesthesia, and moreover, our results were important to understand the influence of sevoflurane anesthesia on any patients suffered from various lung diseases.”

For more information on this research see: Changes in microRNA expression in rat lungs caused by sevoflurane anesthesia: a TaqMan<sup>®</sup>; low-density array study. *Biomedical Research*, 2012;33(5):255-63.

Our news correspondents report that additional information may be obtained by contacting S. Tanaka, Dept. of Anesthesiology and Pain Medicine, Graduate School of Medicine, Nippon Medical School, 1-1-5 Sendagi, Bunkyo-ku, Tokyo 113-8603, Japan. (2012 Dec 07)

### **Kyushu University, Fukuoka: Volatiles emitted from the roots of *Vetiveria zizanioides* suppress the decline in attention during a visual display terminal task**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Research have been presented. According to news reporting out of Fukuoka, Japan, by NewsRx editors, research stated, “The perennial grass *Vetiveria zizanioides* (vetiver) is mainly cultivated for its fragrant essential oil. Although the components of the oil and their biological activities have been studied extensively, the effect of the volatiles emitted from the roots of *V. zizanioides* on humans has so far remained unexplored.”

Our news journalists obtained a quote from the research from Kyushu University, “We investigated the effects of volatile compounds emitted from the cut roots of *V. zizanioides* (1.0 g, low-dose conditions; 30 g, high-dose conditions) on individuals during a visual display terminal task. Participants who breathed the volatile compounds emitted under low-dose conditions showed faster reaction times and stimulation of sympathetic nerve activity as measured by electrocardiography. These effects were not observed under high-dose conditions. The total amount of volatiles emitted during the experiment was 0.25 g under low-dose conditions and 1.35 g under high-dose conditions.”

According to the news editors, the research concluded: “These findings indicate that volatile compounds emitted from the roots of *V. zizanioides* under low-dose conditions may have helped subjects to maintain performance in visual discrimination tasks while maintaining high sympathetic nerve system activity.”

For more information on this research see: Volatiles emitted from the roots of *Vetiveria zizanioides* suppress the decline in attention during a visual display terminal task. *Biomedical Research*, 2012;33(5):299-308.

Our news journalists report that additional information may be obtained by contacting E. Matsubara, Dept. of Agro-environmental Sciences, Faculty of Agriculture, Kyushu University, 6-10-1 Hakozaeki, Higashi-ku, Fukuoka 812-8581, Japan. (2012 Dec 05)

## **University Hospital, Ciudad Real: A parallel solution for high resolution histological image analysis**

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Pathology is the subject of a report. According to news originating from Ciudad Real, Spain, by NewsRx correspondents, research stated, “This paper describes a general methodology for developing parallel image processing algorithms based on message passing for high resolution images (on the order of several Gigabytes). These algorithms have been applied to histological images and must be executed on massively parallel processing architectures.”

Our news journalists obtained a quote from the research from University Hospital, “Advances in new technologies for complete slide digitalization in pathology have been combined with developments in biomedical informatics. However, the efficient use of these digital slide systems is still a challenge. The image processing that these slides are subject to is still limited both in terms of data processed and processing methods. The work presented here focuses on the need to design and develop parallel image processing tools capable of obtaining and analyzing the entire gamut of information included in digital slides. Tools have been developed to assist pathologists in image analysis and diagnosis, and they cover low and high-level image processing methods applied to histological images. Code portability, reusability and scalability have been tested by using the following parallel computing architectures: distributed memory with massive parallel processors and two networks, INFINIBAND and Myrinet, composed of 17 and 1024 nodes respectively.”

According to the news editors, the research concluded: “The parallel framework proposed is flexible, high performance solution and it shows that the efficient processing of digital microscopic images is possible and may offer important benefits to pathology laboratories.”

For more information on this research see: A parallel solution for high resolution histological image analysis. *Computer Methods and Programs in Biomedicine*, 2012;108(1):388-401. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from G. Bueno, Hosp Gen Univ Ciudad Real, Dpt Anat Patol, Ciudad Real, Spain. (2012 Nov 30)

### **Comparison of checking behavior in adults with or without checking symptom of obsessive-compulsive disorder using a novel computer-based measure**

By a News Reporter-Staff News Editor at Computer Weekly News – Research findings on Obsessive-Compulsive Disorders are discussed in a new report. According to news reporting from Chungbuk, South Korea, by VerticalNews journalists, research stated, “Easy to administer behavioral measures of checking are needed to improve the assessment of this hallmark feature of OCD. We recently developed a new computer-based behavioral assessment of OCD in a previous study.”

The news correspondents obtained a quote from the research, “As a follow-up experiment for this method, the goal of this study was to examine whether the new computer-based behavioral assessment would be capable of differentiating behaviors in adults with OCD characterized by checking behavior from those without checking behavior. We compared 22 OCD patients with compulsive checking behaviors (OCD checkers), 17 OCD controls without checking behavior (OCD controls), and 31 healthy controls (HCs) on a novel computer-based behavioral measure of checking behavior. Despite similar levels of successfully completed tasks, OCD checkers demonstrated longer duration of checking behaviors than OCD controls or HCs. Interestingly, no differences were found between OCD controls and HCs in any of the dependent variables.”

According to the news reporters, the research concluded: “Our new behavioral measure offers a novel, objective, and ecologically valid measure of checking behaviors in a sample of adults with OCD.”

For more information on this research see: Comparison of checking behavior in adults with or without checking symptom of obsessive-compulsive disorder using a novel computer-based measure. *Computer Methods and Programs in Biomedicine*, 2012;108(1):434-441. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting K. Kim, Osong Med Innovat Fdn, Medical Device Dev Center, Chungwon Gun 363951, Chungbuk, South Korea. (2012 Nov 29)

### **Estimation of spatial-temporal gait parameters in level walking based on a single accelerometer: Validation on normal subjects by standard gait analysis**

By a News Reporter-Staff News Editor at Computer Weekly News – Investigators publish new report on Computer Research. According to news reporting originating in Ferrara, Italy, by VerticalNews journalists, research stated, “This paper investigates the ability of a single wireless inertial sensing device stuck on the lower trunk to provide spatial-temporal parameters during level walking. The 3-axial acceleration signals were filtered and the timing of the main gait events identified.”

The news reporters obtained a quote from the research, “Twenty-two healthy subjects were analyzed with this system for validation, and the estimated parameters were compared with those obtained with state-of-the-art gait analysis, i.e. stereophotogrammetry and dynamometry. For each side, from four to six gait cycles were measured with the device, of which two were validated by gait analysis. The new acquisition system is easy to use and does not interfere with regular walking. No statistically significant differences were found between the acceleration-based measurements and the corresponding ones from gait analysis for most of the spatial-temporal parameters, i.e. stride length, stride duration, cadence and speed, etc.; significant differences were found for the gait cycle phases, i.e. single and double support duration, etc.”

According to the news reporters, the research concluded: “The system therefore shows promise also for a future routine clinical use.”

For more information on this research see: Estimation of spatial-temporal gait parameters in level walking based on a single accelerometer: Validation on normal subjects by standard gait analysis. *Computer Methods and Programs in Biomedicine*, 2012;108(1):129-137. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting F. Bugane, Osped San Giorgio, Lab Anal Movimento, Ferrara, Italy. (2012 Nov 29)

**Increasing sensitivity in the measurement of heart rate variability: The method of non-stationary RR time-frequency analysis**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news originating from Sydney, Australia, by VerticalNews correspondents, research stated, “A novel method of the time-frequency analysis of non-stationary heart rate variability (HRV) is developed which introduces the fragmentary spectrum as a measure that brings together the frequency content, timing and duration of HRV segments. The fragmentary spectrum is calculated by the similar basis function algorithm.”

Our news journalists obtained a quote from the research, “This numerical tool of the time to frequency and frequency to time Fourier transformations accepts both uniform and non-uniform sampling intervals, and is applicable to signal segments of arbitrary length. Once the fragmentary spectrum is calculated, the inverse transform recovers the original signal and reveals accuracy of spectral estimates. Numerical experiments show that discontinuities at the boundaries of the succession of inter-beat intervals can cause unacceptable distortions of the spectral estimates. We have developed a measure that we call the ‘RR delta-gram’ as a form of the HRV data that minimises spectral errors.”

According to the news editors, the research concluded: “The analysis of the experimental HRV data from real-life and controlled breathing conditions suggests transient oscillatory components as functionally meaningful elements of highly complex and irregular patterns of HRV.”

For more information on this research see: Increasing sensitivity in the measurement of heart rate variability: The method of non-stationary RR time-frequency analysis. *Computer Methods and Programs in Biomedicine*, 2012;108(1):53-67. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from D. Melkonian, Bioemotec, Sydney, NSW 2006, Australia. (2012 Nov 29)

### **Peking University, Beijing: 3D navigation and monitoring for spinal milling operation based on registration between multiplanar fluoroscopy and CT images**

By a News Reporter-Staff News Editor at Computer Weekly News – Fresh data on Computer Research are presented in a new report. According to news reporting originating from Beijing, People's Republic of China, by VerticalNews correspondents, research stated, "Milling operations in spinal surgery demand much experience and skill for the surgeon to perform the procedure safely. A 3D navigation method is introduced aiming at providing a monitoring system with enhanced safety and minimal intraoperative interaction."

Our news editors obtained a quote from the research from Peking University, "An automatic registration method is presented to establish the 3D-3D transformation between the preoperative CT images and a common reference system in the surgical space, and an intensity-based similarity metric adapted for the multi-planar configuration is introduced in the registration procedure. A critical region is defined for real-time monitoring in order to prevent penetration of the lamina and avoid violation of nerve structures. The contour of the spinal canal is reconstructed as the critical region, and different levels of warning limits are defined. During the milling procedure, the position of the surgical instrument relative to the critical region is provided with augmented display and audio warnings. Timely alarm is provided for surgeons to prevent surgical failure when the mill approaches the critical region."

According to the news editors, the research concluded: "Our validation experiment shows that real-time 3D navigation and monitoring is advantageous for improving the safety of the milling operation."

For more information on this research see: 3D navigation and monitoring for spinal milling operation based on registration between multiplanar fluoroscopy and CT images. *Computer Methods and Programs in Biomedicine*, 2012;108(1):151-157. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting S. Luan, Peking University, Hosp 3, Dept. of Orthopaed, Beijing, People's Republic of China. (2012 Nov 29)



### **University of Wisconsin, Madison: Quantifying the exact allocation ratios in randomized clinical trials with biased coin randomization**

By a News Reporter-Staff News Editor at Computer Weekly News – Researchers detail new data in Computer Research. According to news reporting out of Madison, Wisconsin, by VerticalNews editors, research stated, “The biased coin randomization approach is frequently adopted in randomized clinical trials to control the balance in overall treatment assignments.”

Our news journalists obtained a quote from the research from the University of Wisconsin, “In this article, an algorithm is developed to theoretically determine the exact allocation ratios for all the patients that will be enrolled in a randomized clinical trial with biased coin randomization based on the order in which they are randomized. Our results show that the exact allocation ratios can significantly deviate from the ratio as specified for the trial, which poses challenges to the enrollment of the trial and to the interpretation of the results.”

According to the news editors, the research concluded: “In order to maintain a constant allocation ratio throughout the trial, a modification of the widely adopted permuted block randomization is proposed, which is shown to achieve better balance for not only the overall treatment assignments but also the baseline stratification variables that are desired to be balanced at the end of the trial.”

For more information on this research see: Quantifying the exact allocation ratios in randomized clinical trials with biased coin randomization. *Computer Methods and Programs in Biomedicine*, 2012;108(1):197-202. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting Y.Z. Lin, University of Wisconsin, Madison, WI 53706, United States. (2012 Nov 29)

### **“Stroke Nav” A wireless data collection and review system to support stroke care delivery**

By a News Reporter-Staff News Editor at Telecommunications Weekly – A new study on Computer Research is now available. According to news reporting originating in Oxford, United Kingdom, by VerticalNews journalists, research stated, “Stroke Nav’ is a novel system to support

the care of stroke patients. The system contains purpose-built web-based software to facilitate accurate near-real time data collection by clinicians throughout the complex care settings traversed by patients.”

The news reporters obtained a quote from the research, “Tools are included to facilitate pre-defined and bespoke data review with graphical dashboards showing performance metrics and other aggregate data. The software was designed collaboratively by health care professionals and engineers, and is accessible via the hospital intranet using desktop or laptop computers and wireless mobile devices. Stroke Nav is being routinely used in two hospitals, with over 1400 patients registered, and is now being introduced in other hospitals.”

According to the news reporters, the research concluded: “The system is delivering benefits in relation to multidisciplinary communication, knowledge management, patient safety, clinical audit and service performance.”

For more information on this research see: “Stroke Nav” A wireless data collection and review system to support stroke care delivery. *Computer Methods and Programs in Biomedicine*, 2012;108(1):338-345. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting O.J. Gibson, NIHR Biomed Res Center, Oxford, United Kingdom. (2012 Nov 28)

### **Research Unit, Girona: Development of an automated system to classify retinal vessels into arteries and veins**

By a News Reporter-Staff News Editor at Journal of Mathematics – Data detailed on Computer Research have been presented. According to news reporting originating in Girona, Spain, by VerticalNews journalists, research stated, “There are some evidence of the association between the calibre of the retinal blood vessels and hypertension. Computer-assisted procedures have been proposed to measure the calibre of retinal blood vessels from high-resolution photographs.”

The news reporters obtained a quote from the research from Research Unit, “Most of them are in fact semi-automatic. Our objective in this paper is twofold, to develop a totally automated system to classify retinal vessels into arteries and veins and to compare the measurements of the arteriolar-to-venular diameter ratio (AVR) computed from the system with those computed from observers. Our classification

method consists of four steps. First, we obtain the vascular tree structure using a segmentation algorithm. Then, we extract the profiles. After that, we select the best feature vectors to distinguish between veins and arteries. Finally, we use a clustering algorithm to classify each detected vessel as an artery or a vein. Our results show that compared with an observer-based method, our method achieves high sensitivity and specificity in the automated detection of retinal arteries and veins. In addition the system is robust enough independently of the radii finally chosen, which makes it more trustworthy in its clinical application.”

According to the news reporters, the research concluded: “We conclude that the system represents an automatic method of detecting arteries and veins to measure the calibre of retinal microcirculation across digital pictures of the eye fundus.”

For more information on this research see: Development of an automated system to classify retinal vessels into arteries and veins. *Computer Methods and Programs in Biomedicine*, 2012;108(1):367-376. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting M. Saez, Hlth Care Inst, Res Unit, Girona, Spain. (2012 Nov 27)

### **University of Miami: Intracardial embryonic delivery of developmental modifiers in utero**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Biomedicine have been published. According to news reporting originating from Miami, Florida, by NewsRx correspondents, research stated, “Our knowledge of organ ontogeny is largely based on loss-of-function (knockout) or gain-of-function (transgenesis) approaches. However, developmental modulators such as proteins, mRNAs, microRNAs(miRNAs), small interfering RNAs, and other small molecules may complement the above DNA-modifying technologies in a much more direct way.”

Our news editors obtained a quote from the research from the University of Miami, “Unfortunately, their use is often limited by the ability of these compounds to cross the placenta and reach physiologically relevant concentrations when administered systemically to the mother. The design of safe and effective techniques to deliver these compounds into the embryo is therefore an area of great scientific potential. In this

article we report a new method for introducing developmental modulators into murine embryos by means of direct injection into the heart. Unlike other reported methods that require surgical exposure of the uterus, our percutaneous ultrasound-guided approach allows for the intracardial injection of mouse embryos as early as embryonic day 10.5 (e10.5) and throughout gestation in a minimally invasive manner that largely preserves embryo viability. This system offers a critical advantage over in vitro settings because the effects of any given treatment can be observed without disturbing the native environment of the developing organ.”

According to the news editors, the research concluded: “Procedures are described for the delivery and detection of transducible proteins as well as morpholinos designed to block the expression of specific miRNAs within the living embryo.”

For more information on this research see: Intracardial embryonic delivery of developmental modifiers in utero. *Cold Spring Harbor Protocols*, 2012;2012(9):962-8.

The news editors report that additional information may be obtained by contacting J. Dominguez-Bendala, Diabetes Research Institute, University of Miami, Miller School of Medicine, Miami, Florida 33136, United States. (2012 Nov 27)

### **Improvements of Adaptive Filtering by Optimal Projection to filter different artifact types on long duration EEG recordings**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Researchers detail new data in Biomedicine. According to news reporting originating in Lille, France, by NewsRx journalists, research stated, “Adaptive Filtering by Optimal Projection (AFOP) is an automatic method for reducing ocular and muscular artifacts on electroencephalographic (EEG) recordings. This paper presents two additions to this method: an improvement of the stability of ocular artifact filtering and an adaptation of the method for filtering electrode artifacts.”

The news reporters obtained a quote from the research, “With these improvements, it is possible to reduce almost all the current types of artifacts, while preserving brain signals, particularly those characterising epilepsy. This generalised method consists of dividing the signal into several time-frequency windows, and in applying different spatial filters to each. Two steps are required to define one of these spatial filters: the first step consists of defining artifact spatial projection using the Common Spatial Pattern (CSP) method and the second consists of defining EEG spatial projection via regression. For this second step, a progressive orthogonalisation process is proposed to improve stability.

This method has been tested on long-duration EEG recordings of epileptic patients. A neurologist quantified the ratio of removed artifacts and the ratio of preserved EEG. Among the 330 artifacted pages used for evaluation, readability was judged better for 78% of pages, equal for 20% of pages, and worse for 2%. Artifact amplitudes were reduced by 80% on average. At the same time, brain sources were preserved in amplitude from 70% to 95% depending on the type of waves (alpha, theta, delta, spikes, etc.). A blind comparison with manual Independent Component Analysis (ICA) was also realised.”

According to the news reporters, the research concluded: “The results show that this method is competitive and useful for routine clinical practice.”

For more information on this research see: Improvements of Adaptive Filtering by Optimal Projection to filter different artifact types on long duration EEG recordings. *Computer Methods and Programs In Biomedicine*, 2012;108(1):234-49. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting S. Boudet, Univ Nord de France, F-59000 Lille, France. (2012 Nov 19)

### **University of Barcelona: Intra-graft expression of genes involved in iron homeostasis predicts the development of operational tolerance in human liver transplantation**

By a News Reporter-Staff News Editor at Clinical Trials Week – Current study results on Organ Transplants have been published. According to news reporting out of Barcelona, Spain, by NewsRx editors, research stated, “Following organ transplantation, lifelong immunosuppressive therapy is required to prevent the host immune system from destroying the allograft. This can cause severe side effects and increased recipient morbidity and mortality.”

Our news journalists obtained a quote from the research from the University of Barcelona, “Complete cessation of immunosuppressive drugs has been successfully accomplished in selected transplant recipients, providing proof of principle that operational allograft tolerance is attainable in clinical transplantation. The intra-graft molecular pathways associated with successful drug withdrawal, however, are not well defined. In this study, we analyzed sequential blood and liver tissue samples collected from liver transplant recipients enrolled in a prospective multicenter immunosuppressive drug withdrawal clinical trial. Before initiation of drug withdrawal, operationally tolerant and non-tolerant recipients differed in the intra-graft expression of genes involved in the regulation of iron homeostasis. Furthermore, as compared

with non-tolerant recipients, operationally tolerant patients exhibited higher serum levels of hepcidin and ferritin and increased hepatocyte iron deposition. Finally, liver tissue gene expression measurements accurately predicted the outcome of immunosuppressive withdrawal in an independent set of patients.”

According to the news editors, the research concluded: “These results point to a critical role for iron metabolism in the regulation of intra-graft alloimmune responses in humans and provide a set of biomarkers to conduct drug-weaning trials in liver transplantation.”

For more information on this research see: Intra-graft expression of genes involved in iron homeostasis predicts the development of operational tolerance in human liver transplantation. *The Journal of Clinical Investigation*, 2012;122(1):368-82.

Our news journalists report that additional information may be obtained by contacting F. Bohne, Liver Unit, Hospital Clinic Barcelona, IDIBAPS, CIBEREHD, University of Barcelona, Barcelona, Spain. (2012 Nov 12)

### **CHA University, Gyeonggi Do: Skin rejuvenation by microneedle fractional radiofrequency treatment in Asian skin; Clinical and histological analysis**

By a News Reporter-Staff News Editor at Medical Devices & Surgical Technology Week – New research on Lasers in Medicine is the subject of a report. According to news originating from Gyeonggi Do, South Korea, by NewsRx correspondents, research stated, “For skin rejuvenation, microneedle fractional radiofrequency (RF) is a recently developed minimally invasive method for delivering RF energy directly into the skin using microneedle. We evaluated efficacy and safety of microneedle fractional RF for skin rejuvenation in Asian skin and also conducted immunohistochemical analysis before and after treatment.”

Our news journalists obtained a quote from the research from CHA University, “Twenty-five females (mean age 54.2, Fitzpatrick skin phototypes IIIIV) received three consecutive fractional RF treatment at 4-week intervals. Outcome assessments included standardized photography, physician’s global assessment, patient’s satisfaction scores, objective biophysical measurements, and histologic analysis including immunohistochemical staining. All patients showed clinical improvement on physician’s global assessment and patient’s satisfaction scores. Among objective biophysical measurements, improvement in hydration and skin roughness was noticed. Histologic examination revealed marked increase in dermal thickness, dermal collagen content and dermal fibrillin content. Side effects were minimal. Limitations The limitations are the small number of patients and lack of long-term follow-up.”

According to the news editors, the research concluded: “Microneedle fractional RF is a safe and effective skin rejuvenation method in Asians. *Lasers Surg. Med.* 44:631636, 2012.”

For more information on this research see: Skin rejuvenation by microneedle fractional radiofrequency treatment in Asian skin; Clinical and histological analysis. *Lasers in Surgery and Medicine*, 2012;44(8):631-636. *Lasers in Surgery and Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Lasers in Surgery and Medicine* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1096-9101](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1096-9101))

The news correspondents report that additional information may be obtained from K.Y. Seo, CHA Univ, Dept. of Dermatol, CHA Bundang Med Center, Songnam 463712, Gyeonggi Do, South Korea. (2012 Nov 11)

### **Boston University School of Medicine: Numerical framework to model temporally resolved multi-stage dynamic systems**

By a News Reporter-Staff News Editor at Computer Weekly News – Fresh data on Biochemistry are presented in a new report. According to news reporting out of Boston, Massachusetts, by VerticalNews editors, research stated, “Numerical modeling of steroid hormone signaling presents an exciting challenge involving spatiotemporal coordination of multiple events. Ligand binding in cytoplasm triggers dissociation and/or association of coregulators which subsequently regulate DNA binding and transcriptional activity in nucleus.”

Our news journalists obtained a quote from the research from the Boston University School of Medicine, “In order to develop a comprehensive multi-stage model, it is imperative to follow not only the transcriptional outcomes but also the intermediate protein complexes. Accordingly, we developed a software toolkit for simulating complex biochemical pathways as a set of non-linear differential equations in LabVIEW (Laboratory Virtual Instrumentation and Engineering Workbench, National Instruments, Austin, TX) environment. The toolkit is visual, highly modular, loosely coupled with the rest of LabVIEW, scalable and extensible. The toolkit can be used to develop and validate biochemical models and estimate model parameters from existing experimental data. We illustrate the application of the toolkit for simulation of steroid hormone response in cells, and demonstrate how the toolkit can be employed for other biological and chemical systems as well.”

According to the news editors, the research concluded: “The software module presented here can be used stand-alone as well as built into data collection and analysis applications.”

For more information on this research see: Numerical framework to model temporally resolved multi-stage dynamic systems. *Computer Methods and Programs In Biomedicine*, 2012;108(2):750-9. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs In Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting M.N. Zakharov, Section of Endocrinology, Diabetes and Nutrition, Boston University School of Medicine, 670 Albany Street, Boston, MA 02118, United States. (2012 Nov 08)

### **Jaw tissues segmentation in dental 3D CT images using fuzzy-connectedness and morphological processing**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Dentistry. According to news reporting originating in Valencia, Spain, by NewsRx journalists, research stated, “The success of oral surgery is subject to accurate advanced planning. In order to properly plan for dental surgery or a suitable implant placement, it is necessary an accurate segmentation of the jaw tissues: the teeth, the cortical bone, the trabecular core and over all, the inferior alveolar nerve.”

The news reporters obtained a quote from the research, “This manuscript presents a new automatic method that is based on fuzzy connectedness object extraction and mathematical morphology processing. The method uses computed tomography data to extract different views of the jaw: a pseudo-orthopantomographic view to estimate the path of the nerve and cross-sectional views to segment the jaw tissues. The method has been tested in a groundtruth set consisting of more than 9000 cross-sections from 20 different patients and has been evaluated using four similarity indicators (the Jaccard index, Dice’s coefficient, point-to-point and point-to-curve distances), achieving promising results in all of them (0.726&#177;0.031, 0.840&#177;0.019, 0.144&#177;0.023mm and 0.163&#177;0.025mm, respectively).”

According to the news reporters, the research concluded: “The method has proven to be significantly automated and accurate, with errors around 5% (of the diameter of the nerve), and is easily integrable in current dental planning systems.”

For more information on this research see: Jaw tissues segmentation in dental 3D CT images using fuzzy-connectedness and morphological processing. *Computer Methods and Programs In Biomedicine*, 2012;108(2):832-43. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs In Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))



Our news correspondents report that additional information may be obtained by contacting R. Llorens, Instituto Interuniversitario de Investigación en Bioingeniería y Tecnología Orientada al Ser Humano, Universitat Politècnica de Valencia, Camino de Vera s, n, 46022 Valencia, Spain. (2012 Nov 07)

### **University of Ulster, Coleraine: Exposure to clinical X-ray radiation does not alter antibiotic susceptibility or genotype profile in Gram-negative and Gram-positive clinical pathogens**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedicine. According to news reporting originating in Coleraine, United Kingdom, by NewsRx journalists, research stated, “Inadvertent exposure of bacterial pathogens to X-ray radiation may be an environmental stress, where the bacterium may respond by increasing mutational events, thereby potentially resulting in increased antibiotic resistance and alteration to genotypic profile. In order to examine this, four clinical pathogens, including the Gram-negative organisms *Escherichia coli* O157:H7 NCTC12900 and *Pseudomonas aeruginosa* NCTC10662, as well as the Gram-positive organisms *Staphylococcus aureus* NCTC6571 and *Enterococcus faecium* were exposed to X-rays (35,495 cGy/cm(2)) over a seven-day period.”

The news reporters obtained a quote from the research from the University of Ulster, “Antibiotic susceptibility was assessed before, during and after exposure by examining susceptibility, as quantified by E-test with six antibiotics, as well as to a further 11 antibiotics by measurement of susceptibility zone sizes (mm). Additionally, the DNA profile of each organism was compared before, during and after exposure employing the enterobacterial repetitive intergenic consensus-polymerase chain reaction (ERIC PCR). Results indicated that exposure of these organisms to this amount of X-ray radiation did not alter their antibiotic susceptibility, nor their genomic DNA profile.”

According to the news reporters, the research concluded: “Overall, these data indicate that exposure of bacteria to X-ray radiation does not alter the test organisms’ antibiotic susceptibility profiles, nor alter genomic DNA profiles of bacteria, which therefore does not compromise molecular epidemiological tracking of bacteria within healthcare environments in which patients have been exposed to X-ray radiation.”

For more information on this research see: Exposure to clinical X-ray radiation does not alter antibiotic susceptibility or genotype profile in Gram-negative and Gram-positive clinical pathogens. *British Journal of Biomedical Science*, 2012;69(3):119-122. *British Journal of Biomedical Science* can be contacted at: Step Publishing Ltd, Subscription Dept, North Farm Rd, Tunbridge Wells TN2 3DR, Kent, England.

Our news correspondents report that additional information may be obtained by contacting K. Hayashi, University of Ulster, Sch Biomed Sci, Coleraine BT52 1SA, Londonderry, United Kingdom. (2012 Nov 06)

### **Inje University, Gyeongnam: Simulation studies on depth of interaction effect correction using a Monte Carlo computed system matrix for brain positron emission tomography**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – New research on Biomedicine is the subject of a report. According to news reporting originating from Gyeongnam, South Korea, by NewsRx correspondents, research stated, “The parallax errors caused by a lack of depth-of-interaction (DOI) information often degrade reconstruction quality in positron emission tomography (PET). To reduce parallax errors, some PET systems employ multi-layered detectors to provide detailed DOI information, but this approach requires more complicated detector configurations and signal processing schemes.”

Our news editors obtained a quote from the research from Inje University, “In this paper, we conduct simulation studies on an inherited DOI effect correction of a brain PET with a single-layered detector. For this purpose, we compare the maximum likelihood expectation maximization (MLEM) iterations using the Monte Carlo computed system matrix of the single-layered detector with filtered backprojection (FBP) reconstructions from projection data obtained from multi-layered detectors. We also investigate the benefits of multi-layered detectors in MLEM iterations using simulated data. The quantitative comparison in this paper shows that an inherited DOI effect correction of a Monte Carlo computed system matrix for a single-layered detector results in the associated MLEM iterations outperforming FBP reconstructions even for the case in which the projection data for FBPs are obtained from an octuple-layered detector. It also shows that use of multi-layered detectors provides better results overall in MLEM reconstruction, but the improvement seems not to be substantial enough to ignore the complexity and costs required for multi-layered detectors.”

According to the news editors, the research concluded: “Based on these results, we conclude that detailed DOI information from multi-layered detectors is favorable, but unnecessary in brain PET imaging, because the inherited DOI effect correction via a Monte Carlo computed system matrix for a single-layered detector is sufficient.”

For more information on this research see: Simulation studies on depth of interaction effect correction using a Monte Carlo computed system matrix for brain positron emission tomography. *Computer Methods and Programs In Biomedicine*, 2012;108(2):820-31. (Elsevier -

www.elsevier.com; Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting N.Y. Lee, School of Computer Aided Science, Institute of Basic Sciences, Inje University, Gimhae, Gyeongnam 621-749, South Korea. (2012 Nov 05)

### **Swinburne University of Technology, Melbourne: Numerical analysis of coronary artery bypass grafts: An over view**

By a News Reporter-Staff News Editor at Cardiovascular Week – Researchers detail new data in Biomedicine. According to news reporting from Melbourne, Australia, by NewsRx journalists, research stated, “Arterial bypass grafts tend to fail after some years due to the development of intimal thickening (restenosis). Non-uniform hemodynamics following a bypass operation contributes to restenosis and bypass failure can occur due to the focal development of anastomotic intimal hyperplasia.”

The news correspondents obtained a quote from the research from the Swinburne University of Technology, “Additionally, surgical injury aggravated by compliance mismatch between the graft and artery has been suggested as an initiating factor for progress of wall thickening along the suture line Vascular grafts that are small in diameter tend to occlude rapidly. Computational fluid dynamics (CFD) methods have been effectively used to simulate the physical and geometrical parameters characterizing the hemodynamics of various arteries and bypass configurations. The effects of such changes on the pressure and flow characteristics as well as the wall shear stress during a cardiac cycle can be simulated. Recently, utilization of fluid and structure interactions have been used to determine fluid flow parameters and structure forces including stress and strains relationships under steady and transient conditions. In parallel to this, experimental diagnostics techniques such as Laser Doppler Anemometry, Particle Image Velocimetry, Doppler Guide wire and Magnetic Resonance Imaging have been used to provide essential information and to validate the numerical results. Moreover, clinical imaging techniques such as magnetic resonance or computed tomography have assisted considerably in gaining a detailed patient-specific picture of the blood flow and structure dynamics. This paper gives a review of recent numerical investigations of various configurations of coronary artery bypass grafts (CABG).”

According to the news reporters, the research concluded: “In addition, the paper ends with a summary of the findings and the future directions.”

For more information on this research see: Numerical analysis of coronary artery bypass grafts: An over view. *Computer Methods and Programs In Biomedicine*, 2012;108(2):689-705. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting A.A. Owida, Biomechanics and Tissue Engineering Group, Swinburne University of Technology, Hawthorn, Melbourne, Victoria, Australia. (2012 Nov 05)

### **Vascular Biology Program, Boston: Epoxyeicosanoids stimulate multiorgan metastasis and tumor dormancy escape in mice**

By a News Reporter-Staff News Editor at Clinical Trials Week – Investigators publish new report on Pharmacology. According to news reporting originating from Boston, Massachusetts, by NewsRx correspondents, research stated, “Epoxyeicosatrienoic acids (EETs) are small molecules produced by cytochrome P450 epoxygenases. They are lipid mediators that act as autocrine or paracrine factors to regulate inflammation and vascular tone.”

Our news editors obtained a quote from the research from Vascular Biology Program, “As a result, drugs that raise EET levels are in clinical trials for the treatment of hypertension and many other diseases. However, despite their pleiotropic effects on cells, little is known about the role of these epoxyeicosanoids in cancer. Here, using genetic and pharmacological manipulation of endogenous EET levels, we demonstrate that EETs are critical for primary tumor growth and metastasis in a variety of mouse models of cancer. Remarkably, we found that EETs stimulated extensive multiorgan metastasis and escape from tumor dormancy in several tumor models. This systemic metastasis was not caused by excessive primary tumor growth but depended on endothelium-derived EETs at the site of metastasis. Administration of synthetic EETs recapitulated these results, while EET antagonists suppressed tumor growth and metastasis, demonstrating in vivo that pharmacological modulation of EETs can affect cancer growth. Furthermore, inhibitors of soluble epoxide hydrolase (sEH), the enzyme that metabolizes EETs, elevated endogenous EET levels and promoted primary tumor growth and metastasis.”

According to the news editors, the research concluded: “Thus, our data indicate a central role for EETs in tumorigenesis, offering a mechanistic link between lipid signaling and cancer and emphasizing the critical importance of considering possible effects of EET-modulating drugs on cancer.”

For more information on this research see: Epoxyeicosanoids stimulate multiorgan metastasis and tumor dormancy escape in mice. *The Journal of Clinical Investigation*, 2012;122(1):178-91.

The news editors report that additional information may be obtained by contacting D. Panigrahy, Vascular Biology Program, Children's Hospital Boston, Boston, Massachusetts, United States. (2012 Oct 29)

### **University of California, San Francisco: The acute respiratory distress syndrome**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Biomedicine have been published. According to news reporting originating in San Francisco, California, by NewsRx journalists, research stated, “The acute respiratory distress syndrome (ARDS) is an important cause of acute respiratory failure that is often associated with multiple organ failure. Several clinical disorders can precipitate ARDS, including pneumonia, sepsis, aspiration of gastric contents, and major trauma.”

The news reporters obtained a quote from the research from the University of California, “Physiologically, ARDS is characterized by increased permeability pulmonary edema, severe arterial hypoxemia, and impaired carbon dioxide excretion. Based on both experimental and clinical studies, progress has been made in understanding the mechanisms responsible for the pathogenesis and the resolution of lung injury, including the contribution of environmental and genetic factors. Improved survival has been achieved with the use of lung-protective ventilation.”

According to the news reporters, the researchers concluded: “Future progress will depend on developing novel therapeutics that can facilitate and enhance lung repair.”

For more information on this research see: The acute respiratory distress syndrome. *The Journal of Clinical Investigation*, 2012;122(8):2731-40.

Our news correspondents report that additional information may be obtained by contacting M.A. Matthay, Cardiovascular Research Institute and Departments of Medicine and Anesthesia, UCSF, San Francisco, CA, United States. (2012 Oct 19)

### **Harvard School of Medicine, Boston: Targeting CDK1 promotes FLT3-activated acute myeloid leukemia differentiation through C/EBPa**

By a News Reporter-Staff News Editor at Ivy League Week – Research findings on Acute Myeloid Leukemia are discussed in a new report. According to news reporting out of Boston, Massachusetts, by NewsRx editors, research stated, “Mutations that activate the fms-like tyrosine kinase 3 (FLT3) receptor are among the most prevalent mutations in acute myeloid leukemias. The oncogenic role of FLT3 mutants has been attributed to the abnormal activation of several downstream signaling pathways, such as STAT3, STAT5, ERK1/2, and AKT.”

Our news journalists obtained a quote from the research from the Harvard School of Medicine, “Here, we discovered that the cyclin-dependent kinase 1 (CDK1) pathway is also affected by internal tandem duplication mutations in FLT3. Moreover, we also identified C/EBPa, a granulopoiesis-promoting transcription factor, as a substrate for CDK1. We further demonstrated that CDK1 phosphorylates C/EBPa on serine 21, which inhibits its differentiation-inducing function. Importantly, we found that inhibition of CDK1 activity relieves the differentiation block in cell lines with mutated FLT3 as well as in primary patient-derived peripheral blood samples. Clinical trials with CDK1 inhibitors are currently under way for various malignancies.”

According to the news editors, the researchers concluded: “Our data strongly suggest that targeting the CDK1 pathway might be applied in the treatment of FLT3ITD mutant leukemias, especially those resistant to FLT3 inhibitor therapies.”

For more information on this research see: Targeting CDK1 promotes FLT3-activated acute myeloid leukemia differentiation through C/EBPa. *The Journal of Clinical Investigation*, 2012;122(8):2955-66.

Our news journalists report that additional information may be obtained by contacting H.S. Radomska, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, United States. (2012 Oct 16)

### **University of California, Orange: Mechanical properties of porcine cartilage after uniform RF heating**

By a News Reporter-Staff News Editor at Medical Devices & Surgical Technology Week – A new study on Lasers in Medicine is now available. According to news reporting originating in Orange, California, by NewsRx journalists, research stated, “Thermally mediated modalities of cartilage reshaping utilize localized heating of cartilage combined with mechanical deformation to achieve new geometries. We sought to

determine the steady state elastic modulus of thermally modified cartilage without deformation, as this provides a constraint in mechanical models of the shape change process.”

The news reporters obtained a quote from the research from the University of California, “Design/Materials and Methods The main objective of this study was to characterize the steady state elastic modulus of porcine septal cartilage after uniform heating with radiofrequency (RF) to peak temperatures of 50 +/- 5, 65 +/- 5, and 85 +/- 5 degrees C. The cartilage was divided into three equally sized regions, designated as anterior, middle and posterior. Each region was then sectioned into two specimens with the proximal component serving as a paired control. The data confirm that there is high baseline variability in control steady state elastic moduli between animals. Also, the control values confirm a decreasing steady state elastic modulus from anterior to posterior. There is no statistical significance ( $P > 0.05$ ) found between the elastic moduli of control and treated samples. Although shape change and retention have been fairly well characterized, little is known about the specific relation between steady state elastic modulus of cartilage and maximum treatment temperature. We determined that the difference of steady state elastic modulus between control and treated porcine septal samples was not statistically significant after uniform heating with RF to peak temperatures of 50 +/- 5, 65 +/- 5, and 85 +/- 5 degrees C. Ultimately, the results of this study do not pertain to the regions of heated cartilage that are shaped to hold a new form; however, it does show that the regions that are not mechanically deformed do return to the original pre-treatment elastic modulus.”

According to the news reporters, the researchers concluded: “This is still useful information that may be used in finite element models to predict changes in internal stress distributions of cartilage after laser reshaping. *Lasers Surg. Med.* 44:572-579, 2012.”

For more information on this research see: Mechanical properties of porcine cartilage after uniform RF heating. *Lasers in Surgery and Medicine*, 2012;44(7):572-579. *Lasers in Surgery and Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Lasers in Surgery and Medicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1096-9101)

Our news correspondents report that additional information may be obtained by contacting A.J. Zemek, University of California, Div Facial Plast Surg, Dept. of Otolaryngol Head & Neck Surg, Orange, CA 92697, United States. (2012 Oct 14)

### **University of Missouri, Columbia: Permanent hair reduction with a home-use diode laser: Safety and effectiveness 1 year after eight treatments**

By a News Reporter-Staff News Editor at Medical Devices & Surgical Technology Week – Investigators publish new report on Lasers in Medicine. According to news originating from Columbia, Missouri, by NewsRx editors, the research stated, “To evaluate the safety and efficacy of a home-use hair removal diode laser (TRIA Beauty, Inc., Dublin, CA) in a multiple treatment regimen. Design/Materials and Methods Thirteen indicated adults with naturally brown or black hair and Fitzpatrick skin type IIV received 8 monthly treatments with the diode laser at three fluences, with a fourth area left untreated as a control.”

Our news journalists obtained a quote from the research from the University of Missouri, “Quantitative hair counts were made at each treatment visit and periodically for 12 months after the last treatment. The treated sites exhibited statistically significant hair count reduction that generally increased with each treatment and remained stable during the 1 year follow-up period. The mean percent hair count reduction was 47%, 55%, and 73% at 1 month after the last treatment and 44%, 49%, and 65% at 12 months after the last treatment at fluences of 7, 12, and 20 J/cm<sup>2</sup>, respectively, compared to control. Eighty-six percent (86%) of subjects had greater than 30% hair reduction and 38% had >80% hair reduction at 12 months post-treatment. At the same time point, 31% of subjects reported complete (100%) hair removal and 69% reported that the hair that did regrow was less noticeable due to being finer and/or lighter. The only observed side effects were erythema and edema that were mild, transient, and self-resolving usually within a few hours.”

According to the news editors, the researchers concluded: “The home-use diode laser was safe and highly effective at permanently reducing unwanted hair. *Lasers Surg. Med.* 44:550-557, 2012.”

For more information on this research see: Permanent hair reduction with a home-use diode laser: Safety and effectiveness 1 year after eight treatments. *Lasers in Surgery and Medicine*, 2012;44(7):550-557. *Lasers in Surgery and Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Lasers in Surgery and Medicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1096-9101)

The news correspondents report that additional information may be obtained from R.G. Wheeland, University of Missouri, Dept. of Dermatology, Columbia, MO, United States. (2012 Oct 14)



### **Functional foods in genomic medicine: a review of fermented papaya preparation research progress**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedicine have been published. According to news reporting out of Milano, Italy, by NewsRx editors, research stated, “Functional foods’ represent an emerging opportunity and they will certainly play a consistent and important role in future too. Such a new perspective entirely depends on the growing attention paid by nutritionists to the development of new innovating solutions aiming at acting on organic systems as well as on more general topics relating to consumer good health conditions.”

Our news journalists obtained a quote from the research, “Differently from the past, when mainly retrospective epidemiological studies or empirical experiences were carried out on single nutrients, such a new and growing interest by the scientific community follows research deeply oriented to clinics supplemented by an accurate study on nutrients, genomics and single nutritional requirement diagnostics. Already in 1993, the leading journal Nature published a report ‘Japan is exploring limits between food and medicine’ (Swinbanks 1993).”

According to the news editors, the researchers concluded: “Clearly the success of ‘Functional foods’ depends on the food industry capacity too of developing new effective products which on the one side meet any consumer request and on the other must be have positive effects on health, supported and validated by scientific research and therefore far beyond simple positive properties, as recently underlined in a meeting, organised by a no profit non governmental international association.”

For more information on this research see: Functional foods in genomic medicine: a review of fermented papaya preparation research progress. *Acta Bio-medica De L’ateneo Parmense*, 2012;83(1):21-9.

Our news journalists report that additional information may be obtained by contacting F. Marotta, ReGenera Research Group, Milano, Italy. (2012 Oct 03)

### **University of Modena and Reggio Emilia: Compartment syndrome after viper-bite in toddler: case report and review of literature**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Biomedicine. According to news originating from Modena, Italy, by NewsRx correspondents, research stated, “Snakebites in Italy are a rare source of severe medical condition, except in case of venomous snakes. The venom causes both local and/or systemic complication which may determine death in 6-60 hours, particularly in children and the elderly.”

Our news journalists obtained a quote from the research from the University of Modena and Reggio Emilia, “In fact, the same amount of venom affects children more severely than adults because of the reduced total dilution volume in children. The only specific and conflicting therapy for venomous snakebite is to administer the appropriate anti-venom; the remaining therapy is symptomatic and supportive. We describe the case of a 22-month-old child who, despite appropriate symptomatic treatment, developed severe signs and an acute compartment syndrome of the right upper limb, a rare complication of venom snakebite. Administration of antivenom and fasciotomy were needed to resolve the acute episode permitting a positive outcome.”

According to the news editors, the researchers concluded: “On the basis of literature review and our experience we hypothesize an algorithm for the treatment of these patients.”

For more information on this research see: Compartment syndrome after viper-bite in toddler: case report and review of literature. *Acta Bio-medica De L'ateneo Parmense*, 2012;83(1):44-50.

The news correspondents report that additional information may be obtained from Z. Pietrangiulillo, Dept. of Pediatrics, University of Modena & Reggio Emilia, Modena, Italy. (2012 Oct 03)

### **Niigata University Graduate School of Medical and Dental Science: Skin rubdown with a dry towel, ‘kanpu-masatsu’ is an aerobic exercise affecting body temperature, energy production, and the immune and autonomic nervous systems**

By a News Reporter-Staff News Editor at Life Science Weekly – Research findings on Myeloid Cells are discussed in a new report. According to news reporting originating from Niigata, Japan, by NewsRx correspondents, research stated, “Skin rubdown using a dry towel (SRDT) to scrub the whole body is a traditional therapy for health promotion. To investigate its mechanism, 24 healthy male volunteers were studied.”

Our news editors obtained a quote from the research from the Niigata University Graduate School of Medical and Dental Science, “Body temperature, pulse rate, red blood cells (RBCs), serum levels of catecholamines and cortisol, blood gases (PO<sub>2</sub>), sO<sub>2</sub>), PCO<sub>2</sub>) and pH), lactate and glucose, and the ratio and number of white blood cells (WBCs) were assessed before and after SRDT. After SRDT, pulse rate and body temperature were increased. PO<sub>2</sub>), sO<sub>2</sub>) and pH were also increased and there was no Rouleaux formation by RBCs. Lactate level

tended to increase, whereas that of glucose did not. Adrenaline and noradrenaline levels increased, indicating sympathetic nerve (SN) dominance with increase in granulocytes. WBC number and ratio were divided into two groups according to granulocyte ratio ( $\geq 60\%$ ) before SRDT: a normal group and a SN group. Only in the SN group did the granulocyte ratio decrease and the lymphocyte ratio and number increase after SRDT.”

According to the news editors, the researchers concluded: “It is suggested that SRDT is a mild aerobic, systemic exercise that might affect the immune system via the autonomic nervous system.”

For more information on this research see: Skin rubdown with a dry towel, ‘kanpu-masatsu’ is an aerobic exercise affecting body temperature, energy production, and the immune and autonomic nervous systems. *Biomedical Research*, 2012;33(4):243-8.

The news editors report that additional information may be obtained by contacting M. Watanabe, Dept. of Immunology, Niigata University School of Medicine, Niigata, Japan. (2012 Oct 02)

### **Swansea University: Multifractal characterisation of electrocardiographic RR and QT time-series before and after progressive exercise**

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators publish new report on Biomedicine. According to news reporting originating from Swansea, United Kingdom, by NewsRx correspondents, research stated, “The scaling (fractal) characteristics of electrocardiograms (ECG) provide information complementary to traditional linear measurements (heart rate, repolarisation rate etc.) allowing them to discriminate signal changes induced pathologically or pharmacologically. Under such interventions scaling behaviour is described by multiple local scaling exponents and the signal is termed multifractal.”

Our news editors obtained a quote from the research from Swansea University, “Exercise testing is used extensively to quantify and monitor cardiorespiratory health, yet to our knowledge there has been no previous multifractal investigation of exercise-induced changes in heart rate dynamics. Ambulatory ECGs were acquired from eight healthy participants. Linear descriptive statistics and a parameterisation of multifractal singularity spectra were determined for inter-beat (RR) and intra-beat (QT) time-series before and after exercise. Multivariate analyses of both linear and multifractal measures discriminated between pre-and post-exercise periods and proportionally more significant correlations were observed between linear than between multifractal measures. Variance was more uniformly distributed over the first three principal components for multifractal measures and the two

classes of measures were uncorrelated. Order and phase randomisation of the time-series indicated that both sample distribution and correlation properties contribute to multifractality.”

According to the news editors, the researchers concluded: “This exploratory study indicates the possibility of using physical exercise in conjunction with multifractal methodology as an adjunctive description of autonomically mediated modulation of heart rate.”

For more information on this research see: Multifractal characterisation of electrocardiographic RR and QT time-series before and after progressive exercise. *Computer Methods and Programs In Biomedicine*, 2012;108(1):176-85. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting M.J. Lewis, College of Engineering, Swansea University, Swansea, UK. (2012 Sep 24)

### **University of Patras, Rion: Optimizations of the naive-Bayes classifier for the prognosis of B-Chronic Lymphocytic Leukemia incorporating flow cytometry data**

By a News Reporter-Staff News Editor at Hematology Week – Fresh data on Leukemia are presented in a new report. According to news originating from Rion, Greece, by NewsRx correspondents, research stated, “Prognosis of B-Chronic Lymphocytic Leukemia (B-CLL) remains a challenging problem in medical research and practice. While the parameters obtained by flow cytometry analysis form the basis of the diagnosis of the disease, the question whether these parameters offer additional prognostic information still remains open.”

Our news journalists obtained a quote from the research from the University of Patras, “In this work, we attempt to provide computer-assisted support to the clinical experts of the field, by deploying a classification system for B-CLL multiparametric prognosis that combines various heterogeneous (clinical, laboratory and flow cytometry) parameters associated with the disease. For this purpose, we employ the naive-Bayes classifier and propose an algorithm that improves its performance. The algorithm discretizes the continuous classification attributes (candidate prognostic parameters) and selects the most useful subset of them to optimize the classification accuracy. Thus, in addition to the high classification accuracy achieved, the proposed approach also suggests the most informative parameters for the prognosis.”

According to the news editors, the researchers concluded: “The experimental results demonstrate that the inclusion of flow cytometry parameters in our system improves prognosis.”

For more information on this research see: Optimizations of the naive-Bayes classifier for the prognosis of B-Chronic Lymphocytic Leukemia incorporating flow cytometry data. *Computer Methods and Programs In Biomedicine*, 2012;108(1):158-67. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from J. Lakoumentas, Dept. of Medical Physics, School of Medicine, University of Patras, GR-26504 Rion, Greece. (2012 Sep 24)

### **University of Calgary: Computer-aided optimal design of custom scoliosis braces considering clinical and patient evaluations**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators discuss new findings in Musculoskeletal Diseases and Conditions. According to news originating from Calgary, Canada, by NewsRx correspondents, research stated, “Scoliosis causes an abnormal three dimensional curvature of the spine that is often treated by an orthotic device called brace. The objective of this research was to develop a new approach to automatically identify the optimal design of custom-built brace, based on clinical and patient evaluations.”

Our news journalists obtained a quote from the research from the University of Calgary, “In this approach, torso geometry of the scoliosis patient was achieved using a 3-D imaging system that generated a 3-D torso surface model, which was modified using a custom CAD system to design the 3-D brace surface model. Two design parameters, a translational correction factor and a rotational correction factor, were selected to design the brace geometry from the torso geometry. The 3-D digital brace was evaluated by three clinical evaluation measures (imbalance, rib hump and principal axis angle reduction) and one patient evaluation measure (discomfort).”

According to the news editors, the researchers concluded: “A multi-objective optimization method was employed to identify the optimal design parameters considering both clinical and patient evaluations.”

For more information on this research see: Computer-aided optimal design of custom scoliosis braces considering clinical and patient evaluations. *Computer Methods and Programs in Biomedicine*, 2012;107(3):478-489. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from D. Visser, University of Calgary, Dept. of Surg, Calgary, AB T2N 1N4, Canada. (2012 Sep 21)

### **National Research Council, Pavia: Interplay of spatial aggregation and computational geometry in extracting diagnostic features from cardiac activation data**

By a News Reporter-Staff News Editor at Computer Weekly News – A new study on Computer Research is now available. According to news reporting from Pavia, Italy, by VerticalNews journalists, research stated, “Functional imaging plays an important role in the assessment of organ functions, as it provides methods to represent the spatial behavior of diagnostically relevant variables within reference anatomical frameworks.”

The news correspondents obtained a quote from the research from National Research Council, “The salient physical events that underly a functional image can be unveiled by appropriate feature extraction methods capable to exploit domain-specific knowledge and spatial relations at multiple abstraction levels and scales. In this work we focus on general feature extraction methods that can be applied to cardiac activation maps, a class of functional images that embed spatio-temporal information about the wavefront propagation.”

According to the news reporters, the researchers concluded: “The described approach integrates a qualitative spatial reasoning methodology with techniques borrowed from computational geometry to provide a computational framework for the automated extraction of basic features of the activation wavefront kinematics and specific sets of diagnostic features that identify an important class of rhythm pathologies.”

For more information on this research see: Interplay of spatial aggregation and computational geometry in extracting diagnostic features from cardiac activation data. *Computer Methods and Programs in Biomedicine*, 2012;107(3):456-467. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting L. Ironi, CNR, IMATI, I-27100 Pavia, Italy. (2012 Sep 20)

### **University of Siena: Evaluating the human ongoing visual search performance by eye tracking application and sequencing tests**

By a News Reporter-Staff News Editor at Computer Weekly News – Researchers detail new data in Computer Research. According to news reporting out of Siena, Italy, by VerticalNews editors, research stated, “Human visual search is an everyday activity that enables humans to explore the real world. Given the visual input, during a visual search, it is necessary to select some aspects of input to shift the gaze to next target.”

Our news journalists obtained a quote from the research from the University of Siena, “The aim of the study is to develop a mathematical method able to evaluate the visual selection process during the execution of a high cognitively demanding task such as the trial making test part B (TMT). The TMT is a neuropsychological instrument where numbers and letters should be connected to each other in numeric and alphabetic order. We adapted the TMT to an eye-tracking version, and we used a vector model, the ‘eight pointed star’ (8PS), to discover how selection (fixations) guides next exploration (saccades) and how human top-down factors interact with bottom-up saliency.”

According to the news editors, the researchers concluded: “The results reported a trend to move away from the last fixations correlated to the number of distracters and the execution performance.”

For more information on this research see: Evaluating the human ongoing visual search performance by eye tracking application and sequencing tests. *Computer Methods and Programs in Biomedicine*, 2012;107(3):468-477. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting G. Veneri, University of Siena, Eye Tracking & Vis Applicat Lab, I-53100 Siena, Italy. (2012 Sep 20)

### **Zhejiang University, Hangzhou: Supporting adaptive clinical treatment processes through recommendations**

By a News Reporter-Staff News Editor at Computer Weekly News – Fresh data on Computer Research are presented in a new report. According to news reporting originating in Hangzhou, People’s Republic of China, by VerticalNews journalists, research stated, “Efficient clinical treatment processes is considered a key factor of medical quality control. Current IT solutions are far away from this perspective since they

typically have difficulty supporting the variances occurring in clinical practices, and providing adequate flexible support of clinical processes.”

The news reporters obtained a quote from the research from Zhejiang University, “This paper proposes a hybrid approach based on rough set theory and case-based reasoning to allow physicians to rapidly adjust patients’ treatment processes to changes of patients’ clinical states. In detail, the proposed approach recommends appropriate treatment plans in clinical process execution by adopting a similarity measure to select appropriate clinical treatment plans executed on patients who presented similar features to the current one. Such clinical treatment plans are then applied to suggest which actions to perform next in clinical treatment process execution. As a motivating scenario, this study performs the experiments of type 2 diabetes patient’s treatment process.”

According to the news reporters, the researchers concluded: “The results show that the proposed approach is feasible to recommend suitable clinical treatment plans in clinical process execution, which makes adaptive clinical treatment processes possible.”

For more information on this research see: Supporting adaptive clinical treatment processes through recommendations. *Computer Methods and Programs in Biomedicine*, 2012;107(3):413-424. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting X.D. Lu, Zhejiang University, Coll Biomed Engn & Instrument Sci, Key Lab Biomed Engn, Minist Educ, Hangzhou, Zhejiang, People’s Republic of China. (2012 Sep 20)

### **Taipei Medical University: Study on the potential for delay tolerant networks by health workers in low resource settings**

By a News Reporter-Staff News Editor at Journal of Engineering – Investigators publish new report on Computer Research. According to news reporting originating in Taipei, Taiwan, by VerticalNews journalists, research stated, “Medical Informatics Systems (MIS) have been suggested as having great potential to improve health care delivery in low resource settings. One of the major barriers for adopting MIS in this context is a lack of adequate network/communication infrastructure.”

The news reporters obtained a quote from the research from Taipei Medical University, “Delay Tolerant Networking (DTN) is an approach for establishing network connectivity in situations where it is possible to support physical transport of the digital information. To date most DTN



research has been technically oriented, and very few services have been implemented to support healthcare systems using the technology. It is thus unclear about the potential that DTN may have for supporting MIS systems in low resource settings. The goals of the paper are twofold, first, to gain an initial estimate of interest in different services that can be supported by DTN. Second, to find out the necessary frequency associated with each service for supporting health work in low resource settings. Fifty questionnaires were distributed to attendants at the International Conference on Global Health that had acknowledged having health work experience in a poor connectivity context. The respondents were using a 5-point Likert scale regarding if 9 different potential DTN services 'would be useful'. They also were asked how often data delivery would be necessary for these services to be useful. The Chi square was calculated to measure acceptance. 37 responses were received, aggregating the response rate of 74%. The respondents represented having work experience from 8 months to 15 years from 35 resource poor countries. The Chi square test showed very high statistical significance for 'strongly agree and agree' for the potential usefulness of the proposed DTN services, with a p-value less than 0.001. The frequency of data delivery that would be necessary for services to be useful varied considerably. This study provides evidence of potential for DTN to support useful services that support health work in low resource settings, and that services like access to email, notification of lab results, backup of EHR and teleconsultation are seem to be most important services that can be supported by DTN. The necessary frequency of data delivery for each service, will be highly dependent on context. In a low resource setting with limited mobility, the physical transport of digital data at a frequency of less than once per week should still be sufficient for useful services like notification of lab results and ordering of medical supplies. Research comparing different methods for delivery of DTN data should thus be useful. Further research and collaboration between MIS and Computer Science research communities is recommended in order to help develop DTN services that can be evaluated."

According to the news reporters, the researchers concluded: "Efforts to enhance awareness among stakeholders about how DTN can be used to support health services should be worthwhile."

For more information on this research see: Study on the potential for delay tolerant networks by health workers in low resource settings. *Computer Methods and Programs in Biomedicine*, 2012;107(3):557-564. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting S. Syed-Abdul, Taipei Medical University, Coll Med Sci & Technol, Taipei, Taiwan. (2012 Sep 19)

**Neuromuscular Research Laboratory, Rochester:  
Myasthenic syndrome AChRa C-loop mutant disrupts  
initiation of channel gating**

By a News Reporter-Staff News Editor at Life Science Weekly – Researchers detail new data in Biomedicine. According to news reporting originating from Rochester, Minnesota, by NewsRx correspondents, research stated, “Congenital myasthenic syndromes (CMSs) are neuromuscular disorders that can be caused by defects in ace-tylcholine receptor (AChR) function. Disease-associated point mutants can reveal the unsuspected functional significance of mutated residues.”

Our news editors obtained a quote from the research from Neuromuscular Research Laboratory, “We identified two pathogenic mutations in the extracellular domain of the AChR a subunit (AChRa) in a patient with myasthenic symptoms since birth: a V188M mutation in the C-loop and a heteroallelic G74C mutation in the main immunogenic region. The G74C mutation markedly reduced surface AChR expression in cultured cells, whereas the V188M mutant was expressed robustly but had severely impaired kinetics. Single-channel patch-clamp analysis indicated that V188M markedly decreased the apparent AChR channel opening rate and gating efficiency. Mutant cycle analysis of energetic coupling among conserved residues within or dispersed around the AChRa C-loop revealed that V188 is functionally linked to Y190 in the C-loop and to D200 in &#223;-strand 10, which connects to the M1 transmembrane domain. Furthermore, V188M weakens inter-residue coupling of K145 in &#223;-strand 7 with Y190 and with D200.”

According to the news editors, the researchers concluded: “Cumulatively, these results indicate that V188 of AChRa is part of an interdependent tetrad that contributes to rearrangement of the C-loop during the initial coupling of agonist binding to channel gating.”

For more information on this research see: Myasthenic syndrome AChRa C-loop mutant disrupts initiation of channel gating. *The Journal of Clinical Investigation*, 2012;122(7):2613-21.

The news editors report that additional information may be obtained by contacting X.M. Shen, Neuromuscular Research Laboratory, Dept. of Neurology, Mayo Clinic, Rochester, MN, United States. (2012 Sep 18)

### **Roswell Park Cancer Institute, Buffalo: IL-6 potentiates tumor resistance to photodynamic therapy (PDT)**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Light Therapy. According to news reporting out of Buffalo, New York, by NewsRx editors, research stated, “Photodynamic therapy (PDT) is an anticancer modality approved for the treatment of early disease and palliation of late stage disease. PDT of tumors results in the generation of an acute inflammatory response.”

Our news journalists obtained a quote from the research from Roswell Park Cancer Institute, “The extent and duration of the inflammatory response is dependent upon the PDT regimen employed and is characterized by rapid induction of proinflammatory cytokines, such as IL-6, and activation and mobilization of innate immune cells. The importance of innate immune cells in long-term PDT control of tumor growth has been well defined. In contrast the role of IL-6 in long-term tumor control by PDT is unclear.”

According to the news editors, the researchers concluded: “Previous studies have shown that IL-6 can diminish or have no effect on PDT antitumor efficacy.”

For more information on this research see: IL-6 potentiates tumor resistance to photodynamic therapy (PDT). *Lasers In Surgery and Medicine*, 2011;43(7):676-85. (Wiley-Blackwell - <http://www.wiley.com/>; *Lasers In Surgery and Medicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1096-9101)

Our news journalists report that additional information may be obtained by contacting C.M. Brackett, Dept. of Immunology, Roswell Park Cancer Institute, Buffalo, New York 14263, United States. (2012 Sep 05)

### **Department of Plastic Surgery, Rehovot: Evaluation of safety and efficacy of the TriPollar technology for treatment of wrinkles**

By a News Reporter-Staff News Editor at Medical Devices & Surgical Technology Week – Investigators discuss new findings in *Lasers in Medicine*. According to news reporting out of Rehovot, Israel, by NewsRx editors, research stated, “Patient demand for non-surgical, non-invasive, and no-downtime wrinkle reduction treatment procedures has grown dramatically over the past decade as new treatments and technologies have been introduced. This study was performed in order to evaluate the safety and efficacy of the TriPollar radiofrequency (RF) technology and intended for wrinkle reduction treatment.”

Our news journalists obtained a quote from the research from the Department of Plastic Surgery, “Thirty-seven Subjects were recruited

in two sites and were treated for the reduction of facial wrinkles and rhytides and followed for 3 months after the last treatment. The safety of using the TriPollar system was established by the physicians' assessments and observations of adverse events after each treatment. To evaluate treatment efficacy, pre- and post-treatment photos were assessed using a blinded evaluation by two uninvolved physicians. No unexpected adverse side effects were detected or reported. All subjects participating in the study reported no pain or mild pain during the treatments. The photographic analysis of pre- and post-treatment by the two blinded physicians revealed improvement (downgrade of at least 1 score according to the Fitzpatrick scale) in 94% (according to first reviewer) and 97% (according to second reviewer) of study subjects. All patients (100%) were satisfied from treatment results to a different extent."

According to the news editors, the researchers concluded: "The results of this study clearly indicate that the TriPollar system offers a non-invasive, effective, safe and virtually painless wrinkle and rhytides reduction treatment. *Lasers Surg. Med.* 44:453-458, 2012."

For more information on this research see: Evaluation of safety and efficacy of the TriPollar technology for treatment of wrinkles. *Lasers in Surgery and Medicine*, 2012;44(6):453-458. *Lasers in Surgery and Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Lasers in Surgery and Medicine* - <http://onlinelibrary.wiley.com/journal/10.1002/> (ISSN) 1096-9101)

Our news journalists report that additional information may be obtained by contacting S.D. Shapiro, Kaplan Hosp, Dept. of Plast Surg, IL-76100 Rehovot, Israel. (2012 Aug 26)

### **St. John's Institute of Dermatology, London: Dermatofibrosarcoma protuberans: dealing with slow Mohs procedures employing formalin-fixed, paraffin wax-embedded tissue in a busy diagnostic laboratory**

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Dermatofibrosarcomas is the subject of a report. According to news reporting out of London, United Kingdom, by NewsRx editors, research stated, "Dermatofibrosarcoma protuberans (DFSP) is a relatively uncommon tumour that arises in the dermis and underlying soft tissue. Surgical removal is the preferred treatment, with relatively wide clearance margins of 3 cm or more."

Our news journalists obtained a quote from the research from the St. John's Institute of Dermatology, "Slow Mohs procedures are often employed successfully to treat patients with such tumours. Slow Mohs

procedures offer the benefit of improved cure rates and maximal tissue conservation. However, dealing with such tissue successfully presents the laboratory with a host of technical problems. This report advocates a set protocol to follow for slow Mohs, based on the experience acquired from dealing with 37 cases of DFSP over a 12-year period.”

According to the news editors, the researchers concluded: “The report establishes the benefits of slow Mohs paraffin wax-embedded tissue over frozen sections in terms of improved morphology, tissue preservation and immunocytochemical labelling with anti-CD34.”

For more information on this research see: Dermatofibrosarcoma protuberans: dealing with slow Mohs procedures employing formalin-fixed, paraffin wax-embedded tissue in a busy diagnostic laboratory. *British Journal of Biomedical Science*, 2012;69(2):56-61. *British Journal of Biomedical Science* can be contacted at: Step Publishing Ltd, Subscription Dept, North Farm Rd, Tunbridge Wells TN2 3DR, Kent, England.

Our news journalists report that additional information may be obtained by contacting G.E. Orchard, St. Thomas Hospital, St Johns Inst Dermatol, Dept. of Dermatopathol, London SE1 7EH, United Kingdom. (2012 Aug 24)

### **Harbin Medical University, Heilongjiang: Bmi-1 siRNA inhibited ovarian cancer cell line growth and decreased telomerase activity**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Small Interference RNAs (siRNAs) are presented in a new report. According to news reporting from Heilongjiang, People’s Republic of China, by NewsRx journalists, research stated, “The knockdown of Bmi-1 could effectively suppress cancer cell proliferation and tumourigenicity in several cancers. This study aims to investigate whether or not Bmi-1 plays a causative role in the proliferation of ovarian epithelial cancer cells and telomerase activity.”

The news correspondents obtained a quote from the research from Harbin Medical University, “The messenger RNA (mRNA) and protein expression levels of Bmi-1 in the human ovarian carcinoma cell line OVCAR-3 were down-regulated by Bmi-1 siRNA, as confirmed by real-time polymerase chain reaction (PCR) and Western blot. Cell viability was analysed by MTT assay, and telomerase activity was analysed by a modified telomeric repeat amplification protocol. Targeting Bmi-1 with siRNA inhibited Bmi-1 mRNA over five-fold compared with the control cells, and inhibited Bmi-1 protein expression over three-fold compared with control cells. The viability of the OVCAR-3 ovarian cancer cell line

was reduced by Bmi-1 mRNA compared to control cells. Telomerase activity was decreased 22.73% (from 0.33 to 0.255) by Bmi-1 siRNA treatment compared to control cells.”

According to the news reporters, the researchers concluded: “As Bmi-1 siRNA depressed telomerase activity, cell immortalisation may be prevented; thus, silencing Bmi-1 may be a potential therapy to manage ovarian cancer.”

For more information on this research see: Bmi-1 siRNA inhibited ovarian cancer cell line growth and decreased telomerase activity. *British Journal of Biomedical Science*, 2012;69(2):62-66. *British Journal of Biomedical Science* can be contacted at: Step Publishing Ltd, Subscription Dept, North Farm Rd, Tunbridge Wells TN2 3DR, Kent, England.

Our news journalists report that additional information may be obtained by contacting T. Xin, Harbin Med Univ, Affiliated Hosp 2, Harbin 150086, Heilongjiang, People’s Republic of China. (2012 Aug 22)

### **Leiden University: A warning concerning the estimation of multinomial logistic models with correlated responses in SAS**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news reporting from Leiden, Netherlands, by VerticalNews journalists, research stated, “Kuss and McLerran [1] in a paper in this journal provide SAS code for the estimation of multinomial logistic models for correlated data. Their motivation derived from two papers that recommended to estimate such models using a Poisson likelihood, which is according to Kuss and McLerran ‘statistically correct but computationally inefficient.’”

The news correspondents obtained a quote from the research from Leiden University, “Kuss and McLerran propose several estimating methods. Some of these are based on the fact that the multinomial model is a multivariate binary model. Subsequently a procedure proposed by Wright [5] is exploited to fit the models. In this paper we will show that the new computation methods, based on the approach by Wright, are statistically incorrect because they do not take into account that for multinomial data a multivariate link function is needed.”

According to the news reporters, the researchers concluded: “An alternative estimation strategy is proposed using the clustered bootstrap.”

For more information on this research see: A warning concerning the estimation of multinomial logistic models with correlated responses in SAS. *Computer Methods and Programs in Biomedicine*, 2012;107(2):341-346. *Computer Methods and Programs in Biomedicine*

can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting M. de Rooij, Leiden University, Inst Psychol, Methodol & Stat Unit, NL-2300 RA Leiden, Netherlands. (2012 Aug 16)

### **University of Crete, Iraklion: Geometrical methods for level set based abdominal aortic aneurysm thrombus and outer wall 2D image segmentation**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Computer Research have been published. According to news reporting originating in Iraklion, Greece, by VerticalNews journalists, research stated, “Abdominal aortic aneurysm (AAA) is a localized dilatation of the aortic wall. Accurate measurements of its geometric characteristics are critical for a reliable estimate of AAA rupture risk.”

The news reporters obtained a quote from the research from the University of Crete, “However, current imaging modalities do not provide sufficient contrast to distinguish thrombus from surrounding tissue thus making the task of segmentation quite challenging. The main objective of this paper is to address this problem and accurately extract the thrombus and outer wall boundaries from cross sections of a 3D AAA image data set (CTA). This is achieved by new geometrical methods applied to the boundary curves obtained by a Level Set Method (LSM). Such methods address the problem of leakage of a moving front into sectors of similar intensity and that of the presence of calcifications. The versatility of the methods is tested by creating artificial images which simulate the real cases. Segmentation quality is quantified by comparing the results with a manual segmentation of the slices of ten patient data sets. Sensitivity to the parameter settings and reproducibility are analyzed.”

According to the news reporters, the researchers concluded: “This is the first work to our knowledge that utilizes the level set framework to extract both the thrombus and external AAA wall boundaries.”

For more information on this research see: Geometrical methods for level set based abdominal aortic aneurysm thrombus and outer wall 2D image segmentation. *Computer Methods and Programs in Biomedicine*, 2012;107(2):202-217. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier -

[www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting C. Zohios, University of Crete, Dept. of Math, Iraklion 71409, Greece. (2012 Aug 16)

### **University of Nottingham: Monte Carlo simulation of parameter confidence intervals for non-linear regression analysis of biological data using Microsoft Excel**

By a News Reporter-Staff News Editor at Computer Weekly News – Current study results on Drugs and Therapies have been published. According to news reporting originating from Nottingham, United Kingdom, by VerticalNews correspondents, research stated, “This study describes a method to obtain parameter confidence intervals from the fitting of non-linear functions to experimental data, using the SOLVER and Analysis ToolPaK Add-In of the Microsoft Excel spreadsheet. Previously we have shown that Excel can fit complex multiple functions to biological data, obtaining values equivalent to those returned by more specialized statistical or mathematical software.”

Our news editors obtained a quote from the research from the University of Nottingham, “However, a disadvantage of using the Excel method was the inability to return confidence intervals for the computed parameters or the correlations between them. Using a simple Monte-Carlo procedure within the Excel spreadsheet (without recourse to programming), SOLVER can provide parameter estimates (up to 200 at a time) for multiple ‘virtual’ data sets, from which the required confidence intervals and correlation coefficients can be obtained.”

According to the news editors, the researchers concluded: “The general utility of the method is exemplified by applying it to the analysis of the growth of *Listeria monocytogenes*, the growth inhibition of *Pseudomonas aeruginosa* by chlorhexidine and the further analysis of the electrophysiological data from the compound action potential of the rodent optic nerve.”

For more information on this research see: Monte Carlo simulation of parameter confidence intervals for non-linear regression analysis of biological data using Microsoft Excel. *Computer Methods and Programs in Biomedicine*, 2012;107(2):155-163. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting R.J.W. Lambert, University of Nottingham, Queens Med



Center, Sch Biomed Sci, Nottingham NG7 2UH, United Kingdom. (2012 Aug 16)

### **GlaxoSmithKline, Verona: Bayesian population approaches to the analysis of dose escalation studies**

By a News Reporter-Staff News Editor at Journal of Mathematics – Investigators discuss new findings in Computer Research. According to news reporting out of Verona, Italy, by VerticalNews editors, research stated, “In dose escalation studies cohorts of subjects are given increasing doses of a candidate drug to assess safety and tolerability, pharmacokinetics and pharmacological response. The escalation is carried on until a predefined stopping limit is achieved, often identified by a pharmacokinetic endpoint such as peak plasma concentration or area under the plasma concentration-time profile.”

Our news journalists obtained a quote from the research from GlaxoSmithKline, “In the present work, the application of Bayesian methodologies to Phase I dose escalation studies is explored. A Bayesian population model is devised, which provides predictions of dose-response and dose-risk curves, both for individuals already enrolled in the trial and for a new, previously untested subject. Empirical and fully Bayesian estimation algorithms are worked out. Such methods provide equivalent performances on both experimental and simulated datasets.”

According to the news editors, the researchers concluded: “With respect to previous work, it is quantitatively proven not only that a more general and flexible model is identifiable, but also that such flexibility is needed in real scenarios.”

For more information on this research see: Bayesian population approaches to the analysis of dose escalation studies. *Computer Methods and Programs in Biomedicine*, 2012;107(2):189-201. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting A. Russu, GlaxoSmithKline, Clin Pharmacol Modeling & Simulat, Verona, Italy. (2012 Aug 14)

### **Tufts University, Medford: Photoconversion for tracking the dynamics of cell movement in *Xenopus laevis* embryos**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Biomedicine. According to news originating from Medford, Massachusetts, by NewsRx correspondents, research stated, “*Xenopus laevis* is an ideal model system for investigating dynamic morphogenetic processes during embryogenesis, regeneration, and homeostasis. Our understanding of these events has been greatly facilitated by lineage labeling, that is, marking a cell or a group of cells and all their descendants using vital dyes, fluorescent molecules, or transplantation techniques.”

Our news journalists obtained a quote from the research from Tufts University, “Unfortunately, these strategies are limited in their spatiotemporal resolution: They do not allow long-term dynamic in vivo imaging, are generally invasive, and labeling is restricted to cells on the surface. Genetically encoded fluorescent proteins (FPs), on the other hand, provide excellent alternative methods to traditional lineage labeling, enabling labeling with high spatiotemporal resolution and tracking of cellular and subcellular structures to study patterning events. Over the past decade, FPs have evolved to allow fine control of their spectral properties (in a defined region of interest) for greater labeling specificity. One example is EosFP, which is a protein cloned from the scleractinian coral *Lobophyllia hemprichii* that can be photoconverted from green to red fluorescence state with near-ultraviolet (UV) light irradiation.”

According to the news editors, the researchers concluded: “Here, we describe EosFP-photoconversion of *Xenopus* embryos to track cells during developmental and regenerative processes using a metal-halide- or xenon-arc-based fluorescent microscope system, which provides a simpler, less expensive alternative to photoconversion using laser microscopy.”

For more information on this research see: Photoconversion for tracking the dynamics of cell movement in *Xenopus laevis* embryos. *Cold Spring Harbor Protocols*, 2012;2012 Jun(6):683-90.

The news correspondents report that additional information may be obtained from B.T. Chernet, Dept. of Biology and Center for Regenerative and Developmental Biology, Tufts University, Medford, Massachusetts 02155, United States. (2012 Aug 14)

**University of Guelph: Determination of nonlinear fibre-reinforced biphasic poroviscoelastic constitutive parameters of articular cartilage using stress relaxation indentation testing and an optimizing finite element analysis**

By a News Reporter-Staff News Editor at Journal of Mathematics – Researchers detail new data in Algorithms. According to news reporting originating from Guelph, Canada, by VerticalNews correspondents, research stated, “An inverse method was developed to determine the material constitutive parameters of human articular cartilage from stress relaxation indentation tests. The cartilage was modeled as a fibre-reinforced nonlinear biphasic poroviscoelastic material, and a finite element (FE) model was used with a simulated annealing (SA) optimization algorithm to determine the material parameters that minimized the error between the experimental and predicted time dependant indentation loads.”

Our news editors obtained a quote from the research from the University of Guelph, “The values of the 15 optimized material parameters were found to be insensitive to the initial guesses, and, when friction between the indenter and the cartilage was considered, resulted in good agreement between the measured stress relaxation response and the FE prediction ( $R^2 = 0.99$ ). The optimized material parameters determined from experiments that used two different indenter sizes on the same samples were compared. When assuming frictionless contact between the indenter and the cartilage, all of the optimized parameters except for the Poisson’s ratio were found to be relatively insensitive to indenter size. A second set of models that included frictional contact greatly reduced the sensitivity of the optimized Poisson’s ratio to indenter size, thus confirming the validity of the model and demonstrating the importance of modeling friction.”

According to the news editors, the researchers concluded: “The results also demonstrate the robustness of the SA optimization algorithm to ensure convergence of a large number of material properties to a global minimum regardless of the quality of the initial guesses.”

For more information on this research see: Determination of nonlinear fibre-reinforced biphasic poroviscoelastic constitutive parameters of articular cartilage using stress relaxation indentation testing and an optimizing finite element analysis. *Computer Methods and Programs in Biomedicine*, 2012;107(2):315-326. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting A. Seifzadeh, University of Guelph, Ontario Vet College, Guelph, ON N1G 2W1, Canada. (2012 Aug 14)

### **University Hospital, Copenhagen: Automatic multi-modal intelligent seizure acquisition (MISA) system for detection of motor seizures from electromyographic data and motion data**

By a News Reporter-Staff News Editor at Journal of Robotics & Machine Learning – New research on Brain Diseases is the subject of a report. According to news reporting from Copenhagen, Denmark, by VerticalNews journalists, research stated, “The objective is to develop a non-invasive automatic method for detection of epileptic seizures with motor manifestations. Ten healthy subjects who simulated seizures and one patient participated in the study.”

The news correspondents obtained a quote from the research from University Hospital, “Surface electromyography (sEMG) and motion sensor features were extracted as energy measures of reconstructed sub-bands from the discrete wavelet transformation (DWT) and the wavelet packet transformation (WPT). Based on the extracted features all data segments were classified using a support vector machine (SVM) algorithm as simulated seizure or normal activity. A case study of the seizure from the patient showed that the simulated seizures were visually similar to the epileptic one. The multi-modal intelligent seizure acquisition (MISA) system showed high sensitivity, short detection latency and low false detection rate. The results showed superiority of the multi-modal detection system compared to the uni-modal one.”

According to the news reporters, the researchers concluded: “The presented system has a promising potential for seizure detection based on multi-modal data.”

For more information on this research see: Automatic multi-modal intelligent seizure acquisition (MISA) system for detection of motor seizures from electromyographic data and motion data. *Computer Methods and Programs in Biomedicine*, 2012;107(2):97-110. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting I. Conradsen, Rigshospitalet, University Hospital, Dept. of Clin Neurophysiol, DK-2100 Copenhagen, Denmark. (2012 Aug 13)

**Toho University Omori Medical Center, Tokyo: Expression of cytokeratin 34&#223;E12 is a good indicator of tumor progression in esophageal squamous cell carcinoma**

By a News Reporter-Staff News Editor at Women's Health Weekly – Research findings on Breast Cancer are discussed in a new report. According to news originating from Tokyo, Japan, by NewsRx correspondents, research stated, “Esophageal squamous cell carcinoma (ESCC) is considered one of the most aggressive cancers with poor prognosis. The high molecular weight cytokeratin 34&#223;E12 (CK34&#223;E12) is recognized by the antibody, that is expressed in the cytoplasm of epithelial basal cells, and has been considered as a potential marker for prostate cancer, breast cancer, and basaloid carcinoma of the lung.”

Our news journalists obtained a quote from the research from Toho University Omori Medical Center, “However, there are no clinicopathological studies investigating CK34&#223;E12 expression at the invasive front of ESCC. In this study, we examined 170 surgically resected cases of ESCC to clarify the clinicopathological significance of CK34&#223;E12 expression. CK34&#223;E12 expression was found in 85.3% (145/170) of ESCC cases and was significantly correlated with lymph node metastasis (66.2% [96/145],  $p=0.034$ ), depth of tumor invasion (57.9% [84/145],  $p=0.042$ ), and differentiation (82.1% [119/145],  $p=0.013$ ).”

According to the news editors, the researchers concluded: “These results indicated that CK34&#223;E12 expression is a good indicator of lymph node metastasis, depth of tumor invasion, and differentiation in case of ESCC.”

For more information on this research see: Expression of cytokeratin 34&#223;E12 is a good indicator of tumor progression in esophageal squamous cell carcinoma. *Biomedical Research*, 2012;33(3):183-9.

The news correspondents report that additional information may be obtained from M. Ono, Division of Gastroenterology and Hepatology, Dept. of Internal Medicine, Toho University Omori Medical Center, Tokyo, Japan. (2012 Aug 09)

**Hokkaido University, Sapporo: Glycochenodeoxycholic acid promotes proliferation of intestinal epithelia via reduction of cyclic AMP and increase in H2AX phosphorylation after exposure to  $\gamma$ -rays**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Cell Proliferation are presented in a new report. According to news reporting from Sapporo, Japan, by NewsRx journalists, research stated,

“Bile acids (BAs) are considered to be promotive factors in colorectal carcinogenesis. We investigated whether BAs in the cellular environment influence proliferation of intestinal epithelial cell lines.”

The news correspondents obtained a quote from the research from Hokkaido University, “Some BAs induced proliferation in several epithelial cell lines. In the proliferation assay, significant increases in IEC-6 cell proliferation were observed in response to glycodeoxycholic acid or glycochenodeoxycholic acid (GCDCA). Among the glycine-conjugated derivatives of BAs, especially GCDCA reduced cAMP production in IEC-6 cells. Pertussis toxin completely inhibited the GCDCA-induced increase in IEC-6 proliferation, suggesting GCDCA-induced proliferation required Gai activation and cAMP reduction. Treatment with 3-isobutyl-1-methylxanthine, a phosphodiesterase inhibitor, also suppressed GCDCA-induced IEC-6 proliferation. We confirmed an increase in MEK1/2 phosphorylation in GCDCA-treated IEC-6 cells, and inhibition of MEK1/2 by U0126 clearly suppressed GCDCA-induced IEC-6 cell proliferation. A significant increase was observed in the phosphorylation of histone H2AX in GCDCA-treated IEC-6 cells after exposure to  $\gamma$ -rays. Cell cycle analysis revealed that GCDCA increased the proportion of cells in S phase only after  $\gamma$ -ray exposure.”

According to the news reporters, the researchers concluded: “These results indicate that glycine-conjugated BAs in the cellular environment are potent inducers of cell proliferation accompanied by genomic instability in intestinal epithelia.”

For more information on this research see: Glycochenodeoxycholic acid promotes proliferation of intestinal epithelia via reduction of cyclic AMP and increase in H2AX phosphorylation after exposure to  $\gamma$ -rays. *Biomedical Research*, 2012;33(3):159-65.

Our news journalists report that additional information may be obtained by contacting S. Ishizuka, Division of Applied Bioscience, Research Faculty of Agriculture, Hokkaido University, Sapporo 060-8589, Japan. (2012 Aug 08)

### **Martin-Luther-University, Halle Saale: Software for semiparametric shared gamma and log-normal frailty models: An overview**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Biomedicine have been published. According to news reporting from Halle Saale, Germany, by NewsRx journalists, research stated, “In survival analysis individuals are followed over some period and the time until the transition from an initial to a final state is of particular interest. An important tool for analyzing potential risk factors of this transition is the Cox proportional hazards model.”

The news correspondents obtained a quote from the research from Martin-Luther-University, “This model requires homogeneity in the study population and independence between the observations. An extension of the Cox model to deal with both, unobserved heterogeneity and clustered survival data, are frailty models [1]. Different software are available for the analysis of shared frailty models such as *coxph*, *coxme*, *phmm*, *frailtyPenal*, *SPGAM* or *SPLN3*. This makes it difficult for the user to find the appropriate tool for the specific problem under investigation. To compare the performance of the aforementioned software a large simulation study was conducted.”

According to the news reporters, the researchers concluded: “Advantages and limitations of the software are discussed in detail.”

For more information on this research see: Software for semiparametric shared gamma and log-normal frailty models: An overview. *Computer Methods and Programs In Biomedicine*, 2012;107(3):582-97. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting K. Hirsch, Martin-Luther-University Halle-Wittenberg, Institute of Medical Epidemiology, Biostatistics and Informatics, Magdeburger Str 8, D-06097 Halle (Saale), Germany. (2012 Aug 08)

### **Military University of Technology, Warsaw: Multiresolution MUAPs decomposition and SVM-based analysis in the classification of neuromuscular disorders**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedicine are discussed in a new report. According to news reporting out of Warsaw, Poland, by NewsRx editors, research stated, “This paper describes a new method for the classification of neuromuscular disorders based on the analysis of scalograms determined by the Symlet 4 wavelet technique. The approach involves isolating single motor unit action potentials (MUAPs), computing their scalograms, taking the maximum values of the scalograms in five selected scales, and averaging across MUAPs to give a single 5-dimensional feature vector per subject.”

Our news journalists obtained a quote from the research from the Military University of Technology, “After SVM analysis, the vector is reduced to a single decision parameter, called the Wavelet Index, allowing the subject to be assigned to one of three groups: myogenic, neurogenic or normal. The software implementation of the method described above created a tool supporting electromyographic (EMG) examinations. The

method is characterized by a high probability for the accurate diagnosis of muscle state.”

According to the news editors, the researchers concluded: “The method produced 5 misclassifications out of 800 examined cases (total error of 0.”

For more information on this research see: Multiresolution MUAPs decomposition and SVM-based analysis in the classification of neuromuscular disorders. *Computer Methods and Programs In Biomedicine*, 2012;107(3):393-403. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting A.P. Dobrowolski, Military University of Technology, Faculty of Electronics, 2 Kaliskiego St, 00-908 Warsaw, Poland. (2012 Aug 08)

### **National Institutes of Health, Bethesda: Histology image analysis for carcinoma detection and grading**

By a News Reporter-Staff News Editor at Electronics Newsweekly – Fresh data on Carcinomas are presented in a new report. According to news reporting originating in Bethesda, Maryland, by VerticalNews journalists, research stated, “This paper presents an overview of the image analysis techniques in the domain of histopathology, specifically, for the objective of automated carcinoma detection and classification. As in other biomedical imaging areas such as radiology, many computer assisted diagnosis (CAD) systems have been implemented to aid histopathologists and clinicians in cancer diagnosis and research, which have been attempted to significantly reduce the labor and subjectivity of traditional manual intervention with histology images.”

The news reporters obtained a quote from the research from the National Institutes of Health, “The task of automated histology image analysis is usually not simple due to the unique characteristics of histology imaging, including the variability in image preparation techniques, clinical interpretation protocols, and the complex structures and very large size of the images themselves. In this paper we discuss those characteristics, provide relevant background information about slide preparation and interpretation, and review the application of digital image processing techniques to the field of histology image analysis. In particular, emphasis is given to state-of-the-art image segmentation methods for feature extraction and disease classification.”

According to the news reporters, the researchers concluded: “Four major carcinomas of cervix, prostate, breast, and lung are selected to illustrate the functions and capabilities of existing CAD systems.”



For more information on this research see: Histology image analysis for carcinoma detection and grading. *Computer Methods and Programs In Biomedicine*, 2012;107(3):538-56. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting L. He, National Library of Medicine, National Institutes of Health, 8600 Rockville Pike, Bethesda, MD, United States. (2012 Aug 08)

### **New Jersey Institute of Technology, Newark: Graphical process design tools for iontophoretic transdermal drug-delivery devices**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Drugs and Therapies. According to news reporting out of Newark, New Jersey, by NewsRx editors, the research stated, “A graphical procedure was proposed for the optimum design of transdermal drug-delivery systems enhanced by iontophoresis. Contour plots displayed the relationships among steady-state plasma level, current density and initial drug concentration in a vehicle.”

Our news journalists obtained a quote from the research from the New Jersey Institute of Technology, “This information was combined with a closed-form expression of the process time constant, estimated as the medicament in the blood reaches a plateau after application of the electric field. Analysis was conducted using Laplace-transformed variables and did not require time-domain solutions.”

According to the news editors, the researchers concluded: “Simulation results show that a current density of 0.044mA/cm(2) and a loading of 3500g/ml of dexamethasone sodium m-sulfo benzoate were necessary to achieve an equilibrium plasma concentration of 1.254ng/cm(3) with a time constant of 8.”

For more information on this research see: Graphical process design tools for iontophoretic transdermal drug-delivery devices. *Computer Methods and Programs In Biomedicine*, 2012;107(3):447-55. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting L. Simon, Otto H York Dept. of Chemical, Biological and Pharmaceutical Engineering, New Jersey Institute of Technology, Newark, NJ 07102, United States. (2012 Aug 08)

### **Akita University Graduate School of Medicine: The regulation of distention-induced ATP release from urothelium by the adenylyl cyclase-cyclic AMP pathway**

By a News Reporter-Staff News Editor at Life Science Weekly – New research on Biomedical Research is the subject of a report. According to news reporting originating from Akita, Japan, by NewsRx correspondents, research stated, “Distention of the bladder during urine storage induces ATP release from urothelium, thereby facilitating transmission of visceral sensory signals to afferent nerve fibers. An excess of urothelial ATP release was found in interstitial cystitis, a condition accompanied by hyperesthesia of the urinary bladder; it remains unclear which signals are involved in this upregulation.”

Our news editors obtained a quote from the research from the Akita University Graduate School of Medicine, “The present study demonstrated that the adenylyl cyclase pathway enhances distention-induced ATP release in mouse bladder. In the absence of distention, adenylyl cyclase activation by forskolin or cyclic AMP increases by rolipram did not induce significant ATP release. However, forskolin or rolipram significantly enhanced ATP release from urothelium by a physiologically normal urine storage pressure (5 cmH<sub>2</sub>O). Blockade of adenylyl cyclases did not alter pressure-induced ATP release in normal condition.”

According to the news editors, the researchers concluded: “Thus, the adenylyl cyclase-cAMP pathway might be activated in pathological conditions and cause an excess of ATP release.”

For more information on this research see: The regulation of distention-induced ATP release from urothelium by the adenylyl cyclase-cyclic AMP pathway. *Biomedical Research*, 2012;33(3):153-7.

The news editors report that additional information may be obtained by contacting K. Matsumoto-Miyai, Dept. of Neurophysiology, Akita University Graduate School of Medicine 1-1-1 Hondo, Akita, Akita 010-8543, Japan. (2012 Aug 07)

### **Amity University, Noida: Comparative study of cinnamon oil and clove oil on some oral microbiota**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Dental Diseases and Abnormalities. According to news originating from Noida, India, by NewsRx correspondents, research stated, “A comparative study was carried out between cinnamon oil and clove oil on the oral micro-biota causing dental caries. Cinnamon oil was found to be more effective than clove oil exhibiting broad spectrum of antibacterial activity inhibiting all the ten test bacterial species involved in dental caries.”

Our news journalists obtained a quote from the research from Amity University, "Cinnamon oil produced maximum inhibition zone of diameter (IZD) of 24.0 mm against *Streptococcus mutans* (major causative bacteria of dental plaque) as compared to clove oil (IZD=13.0mm). This is contrary to the popular belief that clove oil is effective in tooth decay and dental plaque."

According to the news editors, the researchers concluded: "This study shows the potential of cinnamon oil over clove oil in the treatment of dental caries."

For more information on this research see: Comparative study of cinnamon oil and clove oil on some oral microbiota. *Acta Bio-medica De L'ateneo Parmense*, 2011;82(3):197-9.

The news correspondents report that additional information may be obtained from C. Gupta, Amity Institute for Herbal Research and Studies, Amity University, Noida, India. (2012 Aug 07)

### **Lister Hill National Center for Biomedical Communications, Bethesda: Multivariate Bayesian modeling of known and unknown causes of events-An application to biosurveillance**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Biomedicine have been published. According to news reporting originating from Bethesda, Maryland, by NewsRx correspondents, research stated, "This paper investigates Bayesian modeling of known and unknown causes of events in the context of disease-outbreak detection. We introduce a multivariate Bayesian approach that models multiple evidential features of every person in the population."

Our news editors obtained a quote from the research from Lister Hill National Center for Biomedical Communications, "This approach models and detects (1) known diseases (e.g., influenza and anthrax) by using informative prior probabilities and (2) unknown diseases (e.g., a new, highly contagious respiratory virus that has never been seen before) by using relatively non-informative prior probabilities. We report the results of simulation experiments which support that this modeling method can improve the detection of new disease outbreaks in a population. A contribution of this paper is that it introduces a multivariate Bayesian approach for jointly modeling both known and unknown causes of events."

According to the news editors, the researchers concluded: "Such modeling has general applicability in domains where the space of known causes is incomplete."

For more information on this research see: Multivariate Bayesian modeling of known and unknown causes of events-An application to biosurveillance. *Computer Methods and Programs In Biomedicine*, 2012;107(3):436-46. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods

and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting Y. Shen, The Lister Hill National Center for Biomedical Communications, Bethesda, MD, United States. (2012 Aug 07)

### **Selcuk University, Konya: A hybrid system based on information gain and principal component analysis for the classification of transcranial Doppler signals**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Investigators discuss new findings in Biomedicine. According to news reporting originating from Konya, Turkey, by NewsRx editors, the research stated, “A transcranial Doppler (TCD) is a non-invasive, easy to apply and reliable technique which is used in the diagnosis of various brain diseases by measuring the blood flow velocities in brain arteries. This study aimed to classify the TCD signals, and feature ranking (information gain -IG) and dimension reduction methods (principal component analysis -PCA) were used as a hybrid to improve the classification efficiency and accuracy.”

Our news editors obtained a quote from the research from Selcuk University, “In this context, each feature within the feature space was ranked depending on its importance for the classification using the IG method. Thus, the less important features were ignored and the highly important features were selected. Then, the PCA method was applied to the highly important features for dimension reduction. As a result, a hybrid feature reduction between the selection of the highly important features and the application of the PCA method on the reduced features were achieved. To evaluate the effectiveness of the proposed method, experiments were conducted using a support vector machine (SVM) classifier on the TCD signals recorded from the temporal region of the brain of 82 patients, as well as 24 healthy people.”

According to the news editors, the researchers concluded: “The experimental results showed that using the IG and PCA methods as a hybrid improves the classification efficiency and accuracy compared with individual usage.”

For more information on this research see: A hybrid system based on information gain and principal component analysis for the classification of transcranial Doppler signals. *Computer Methods and Programs In Biomedicine*, 2012;107(3):598-609. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting H. Uguz, Dept. of Computer Engineering, Selcuk University, Konya, Turkey. (2012 Aug 06)

**Aristotle University, Thessaloniki: Real time emotion aware applications: A case study employing emotion evocative pictures and neuro-physiological sensing enhanced by Graphic Processor Units**

By a News Reporter-Staff News Editor at Journal of Mathematics – Fresh data on Computer Research are presented in a new report. According to news reporting originating in Thessaloniki, Greece, by VerticalNews journalists, researchers stated “In this paper the feasibility of adopting Graphic Processor Units towards real-time emotion aware computing is investigated for boosting the time consuming computations employed in such applications. The proposed methodology was employed in analysis of encephalographic and electrodermal data gathered when participants passively viewed emotional evocative stimuli.”

The news reporters obtained a quote from the research by the authors from Aristotle University, “The GPU effectiveness when processing electroencephalographic and electrodermal recordings is demonstrated by comparing the execution time of chaos/complexity analysis through nonlinear dynamics (multi-channel correlation dimension/D2) and signal processing algorithms (computation of skin conductance level/SCL) into various popular programming environments. Apart from the beneficial role of parallel programming, the adoption of special design techniques regarding memory management may further enhance the time minimization which approximates a factor of 30 in comparison with ANSI C language (single-core sequential execution).”

According to the news reporters, the researchers concluded: “Therefore, the use of GPU parallel capabilities offers a reliable and robust solution for real-time sensing the user’s affective state.”

For more information on this research see: Real time emotion aware applications: A case study employing emotion evocative pictures and neuro-physiological sensing enhanced by Graphic Processor Units. *Computer Methods and Programs in Biomedicine*, 2012;107(1):16-27. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting E.I. Konstantinidis, Aristotle University, Sch Med, Lab Med Informat, Thessaloniki 54124, Greece. (2012 Jul 17)

### **Department of Embryology, Baltimore: Cooperation between Rb and Arf in suppressing mouse retinoblastoma**

By a News Reporter-Staff News Editor at Pediatrics Week – A new study on Eye Diseases and Conditions is now available. According to news reporting from Baltimore, Maryland, by VerticalNews journalists, researchers stated “Retinoblastoma is a pediatric cancer that has served as a paradigm for tumor suppressor gene function. Retinoblastoma is initiated by RB gene mutations, but the subsequent cooperating mutational events leading to tumorigenesis are poorly characterized.”

The news correspondents obtained a quote from the research by the authors from the Department of Embryology, “We investigated what these additional genomic alterations might be using human retinoblastoma samples and mouse models. Array-based comparative genomic hybridization studies revealed deletions in the CDKN2A locus that include ARF and P16INK4A, both of which encode tumor suppressor proteins, in both human and mouse retinoblastoma. Through mouse genetic analyses, we found that Arf was the critical tumor suppressor gene in the deleted region. In mice, inactivation of one allele of Arf cooperated with Rb and p107 loss to rapidly accelerate retinoblastoma, with frequent loss of heterozygosity (LOH) at the Arf locus. Arf has been reported to exhibit p53-independent tumor suppressor roles in other systems; however, our results showed no additive effect of p53 and Arf coinactivation in promoting retinoblastoma. Moreover, p53 inactivation completely eliminated any selection for Arf LOH.”

According to the news reporters, the researchers concluded: “Thus, our data reveal important insights into the p53 pathway in retinoblastoma and show that Arf is a key collaborator with Rb in retinoblastoma suppression.”

For more information on this research see: Cooperation between Rb and Arf in suppressing mouse retinoblastoma. *The Journal of Clinical Investigation*, 2012;122(5):1726-33.

Our news journalists report that additional information may be obtained by contacting K. Conkrite, Dept. of Embryology, Carnegie Institution, Baltimore, Maryland 21218, United States. (2012 Jul 14)

### **University of California School of Medicine, Los Angeles: MyD88 is critically involved in immune tolerance breakdown at environmental interfaces of Foxp3-deficient mice**

By a News Reporter-Staff News Editor at Health & Medicine Week – Research findings on Deficiency Disease are discussed in a new report. According to news reporting from Los Angeles, California, by NewsRx

journalists, researchers stated “Tregs expressing the transcription factor Foxp3 suppress self-reactive T cells, prevent autoimmunity, and help contain immune responses to foreign antigens, thereby limiting the potential for inadvertent tissue damage. Mutations in the FOXP3 gene result in Treg deficiency in mice and humans, which leads to the development of a multisystem autoimmune inflammatory disease.”

The news correspondents obtained a quote from the research by the authors from the University of California School of Medicine, “The contribution of dysregulated innate immune responses to the pathogenesis of Foxp3 deficiency disease is unknown. In this study, we examined the role of microbial signals in the pathogenesis of Foxp3 deficiency disease by studying Foxp3 mutant mice that had concurrent deficiencies in TLR signaling pathways. Global deficiency of the common TLR adaptor MyD88 offered partial protection from Foxp3 deficiency disease. Specifically, it protected from disease at the environmental interfaces of the skin, lungs, and gut. In contrast, systemic disease, in the form of unrestrained lymphoproliferation, continued unabated. The effect of MyD88 deficiency at environmental interfaces involved the disruption of chemokine gradients that recruit effector T cells and DCs, resulting in their entrapment in secondary lymphoid tissues. These results suggests that Tregs have a key role in maintaining tolerance at host-microbial interfaces by restraining tonic MyD88-dependent proinflammatory signals.”

According to the news reporters, the researchers concluded: “Moreover, microbial factors may play a substantial role in the pathogenesis of human autoimmune disease resulting from Treg deficiency.”

For more information on this research see: MyD88 is critically involved in immune tolerance breakdown at environmental interfaces of Foxp3-deficient mice. *The Journal of Clinical Investigation*, 2012;122(5):1933-47.

Our news journalists report that additional information may be obtained by contacting M.N. Rivas, Division of Immunology, Allergy and Rheumatology, Dept. of Pediatrics, The David Geffen School of Medicine at the University of California at Los Angeles, Los Angeles, California, United States. (2012 Jul 13)

### **Slovak University of Technology, Bratislava: System approach to modeling of liver glucose metabolism with physiologically interpreted model parameters outgoing from [(18)F]FDG concentrations measured by PET**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Biomedicine are discussed in a new report. According to news reporting originating in Bratislava, Slovakia, by NewsRx journalists,

researchers stated “New mathematical models from physiologically interpreted parameters capable of evaluating glucose metabolism within the liver and/or the whole body were developed. The group of pigs in a fasting state and the group of pigs with euglycemic supraphysiological hyperinsulinemia were scanned by positron emission tomography after a single dose of [(18)F]FDG tracer.”

The news reporters obtained a quote from the research by the authors from the Slovak University of Technology, “Simultaneously frequent sampling of the dynamic data of [(18)F]FDG plasma concentration in artery, portal vein and hepatic vein was obtained. A system approach to the liver and/or the whole-body system by the tools of linear dynamic system theory was used. Three kinds of structural models, single input and single output or multiple outputs and multiple inputs and single output, were identified. Differences between the group of fasting pigs and the group of pigs in euglycemic supraphysiological hyperinsulinemia were identified by estimated parameters of the structural models.”

According to the news reporters, the researchers concluded: “The suitability of the structural mathematical models for the estimation of physiologically interpreted parameters from PET was validated.”

For more information on this research see: System approach to modeling of liver glucose metabolism with physiologically interpreted model parameters outgoing from [(18)F]FDG concentrations measured by PET. *Computer Methods and Programs In Biomedicine*, 2012;107(2):347-56. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting Z. Rausova, Faculty of Mechanical Engineering, Slovak University of Technology, Bratislava, Slovakia. (2012 Jul 11)

### **University of Sydney: Automated PET-guided liver segmentation from low-contrast CT volumes using probabilistic atlas**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Biomedicine. According to news reporting originating from Sydney, Australia, by NewsRx correspondents, researchers stated “The use of the functional PET information from PET-CT scans to improve liver segmentation from low-contrast CT data is yet to be fully explored. In this paper, we fully utilize PET information to tackle challenging liver segmentation issues including (1) the separation and removal of the surrounding muscles from liver region of interest (ROI), (2) better localization and mapping of the probabilistic atlas onto the



low-contrast CT for a more accurate tissue classification, and (3) an improved initial estimation of the liver ROI to speed up the convergence of the expectation-maximization (EM) algorithm for the Gaussian distribution mixture model under the guidance of a probabilistic atlas.”

Our news editors obtained a quote from the research by the authors from the University of Sydney, “The primary liver extraction from the PET volume provides a simple mechanism to avoid the complicated pre-processing of feature extraction as used in the existing liver CT segmentation methods. It is able to guide the probabilistic atlas to better conform to the CT liver region and hence helps to overcome the challenge posed by liver shape variability. Our proposed method was evaluated against manual segmentation by experienced radiologists.”

According to the news editors, the researchers concluded: “Experimental results on 35 clinical PET-CT studies demonstrated that our method is accurate and robust in automated normal liver segmentation.”

For more information on this research see: Automated PET-guided liver segmentation from low-contrast CT volumes using probabilistic atlas. *Computer Methods and Programs In Biomedicine*, 2012;107(2):164-74. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting C. Li, Biomedical & Multimedia Information Technology Research Group, University of Sydney, Sydney, NSW 2006, Australia. (2012 Jul 11)

### **Urticaria induced by laser epilation: A clinical and histopathological study with extended follow-up in 36 patients**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Immune System Diseases and Conditions are discussed in a new report. According to news originating from Bilbao, Spain, by NewsRx correspondents, researchers stated “Laser epilation is the most common dermatologic light-based procedure in the world. We describe a unique side effect of the procedure: a delayed persistent urticarial rash.”

Our news journalists obtained a quote from the research by the authors, “We conducted a retrospective study involving 13,284 patients who received laser epilation at our clinics from January 2006 through March 2010 with 755nm alexandrite laser (MiniGentleLase, Gentlelase, and GentleMax, Candela). Using patient clinical data and photos that were recorded on a standard side-effect report chart, we identified patients with suspected urticaria. Those patients were then followed for a period that ranged from 12 to 63 months. Only patients who could

be diagnosed, treated, and followed by the dermatologist at our clinics were included in the study. Patients diagnosed or treated by other physicians or nurses and those without clinical photos or insufficient follow-up data were not included. We identified 36 patients who developed a severe, itchy, persistent hive rash on the treated area 672?hours after treatment. Eruption occurred most often on the legs (31 cases), followed by the groin (11 cases), axillae (eight cases), forearms (one case), and upper lip (one case). The eruption consisted of a hive rash with multiple pruritic perifollicular papules and confluent plaques on the treated area. Most patients required oral corticosteroids to control the symptoms. Lesions resolved in 730 days. The urticaria occurred mostly after the first treatment (26 cases), and was recurrent in subsequent treatments. Pretreating with oral corticosteroids prevented or limited the eruption. Thirty-three of the 36 patients reported a history of allergic rhinitis or some other allergy. Skin biopsies on four patients showed edema and a deep, dense dermal infiltrate consistent with lymphocytes mixed with eosinophils in a perivascular and occasionally perifollicular pattern in the mid and lower dermis. Persistent urticaria is a rare side effect of laser epilation. Rupture of the hair follicle by laser heat may trigger a delayed hypersensitivity reaction in a subset of predisposed allergic patients. An antigen from the disrupted hair follicle may be the triggering factor. To prevent this side effect, we recommend that laser epilation in allergic patients be preceded by an extended laser patch test, which should be evaluated 2448?hours later.”

According to the news editors, the researchers concluded: “Preventive prednisone should be prescribed to patients who develop an urticarial rash on the test area. *Lasers Surg. Med.* 44:384389, 2012.”

For more information on this research see: Urticaria induced by laser epilation: A clinical and histopathological study with extended follow-up in 36 patients. *Lasers in Surgery and Medicine*, 2012;44(5):384-389. *Lasers in Surgery and Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Lasers in Surgery and Medicine* - [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1096-9101](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1096-9101))

The news correspondents report that additional information may be obtained from N. Landa, Galdakao Hosp, Bilbao, Basque Country, Spain. (2012 Jul 11)

## Technical University, Lodz: 3D image texture analysis of simulated and real-world vascular trees

By a News Reporter-Staff News Editor at Life Science Weekly – Researchers detail new data in Biomedicine. According to news originating from Lodz, Poland, by NewsRx correspondents, researchers stated

“A method is proposed for quantitative description of blood-vessel trees, which can be used for tree classification and/or physical parameters indirect monitoring. The method is based on texture analysis of 3D images of the trees.”

Our news journalists obtained a quote from the research by the authors from Technical University, “Several types of trees were defined, with distinct tree parameters (number of terminal branches, blood viscosity, input and output flow). A number of trees were computer-simulated for each type. 3D image was computed for each tree and its texture features were calculated. Best discriminating features were found and applied to 1-NN nearest neighbor classifier. It was demonstrated that (i) tree images can be correctly classified for realistic signal-to-noise ratio, (ii) some texture features are monotonously related to tree parameters, (iii) 2D texture analysis is not sufficient to represent the trees in the discussed sense. Moreover, applicability of texture model to quantitative description of vascularity images was also supported by unsupervised exploratory analysis. Eventually, the experimental confirmation was done, with the use of confocal microscopy images of rat brain vasculature. Several classes of brain tissue were clearly distinguished based on 3D texture numerical parameters, including control and different kinds of tumours -treated with NG2 proteoglycan to promote angiogenesis-dependent growth of the abnormal tissue.”

According to the news editors, the researchers concluded: “The method, applied to magnetic resonance imaging e.g. real neovasculature or retinal images can be used to support noninvasive medical diagnosis of vascular system diseases.”

For more information on this research see: 3D image texture analysis of simulated and real-world vascular trees. *Computer Methods and Programs In Biomedicine*, 2012;107(2):140-54. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs In Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from M. Kocinski, Institute of Electronics, Technical University of Lodz, ul Wolczanska 211, 215, 90-924 Lodz, Poland. (2012 Jul 10)

### **University Medical Center, Freiburg: Revertant mosaicism in a human skin fragility disorder results from slipped mispairing and mitotic recombination**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Biomedicine. According to news reporting

out of Freiburg, Germany, by NewsRx editors, researchers stated “Spontaneous gene repair, also called revertant mosaicism, has been documented in several genetic disorders involving organs that undergo self-regeneration, including the skin. Genetic reversion may occur through different mechanisms, and in a single individual, the mutation can be repaired in various ways.”

Our news journalists obtained a quote from the research by the authors from University Medical Center, “Here we describe a disseminated pattern of revertant mosaicism observed in 6 patients with Kindler syndrome (KS), a genodermatosis caused by loss of kindlin-1 (encoded by FERMT1) and clinically characterized by patchy skin pigmentation and atrophy. All patients presented duplication mutations (c.456dupA and c.676dupC) in FERMT1, and slipped mispairing in direct nucleotide repeats was identified as the reversion mechanism in all investigated revertant skin spots. The sequence around the mutations demonstrated high propensity to mutations, favoring both microinsertions and microdeletions. Additionally, in some revertant patches, mitotic recombination generated areas with homozygous normal keratinocytes. Restoration of kindlin-1 expression led to clinically and structurally normal skin.”

According to the news editors, the researchers concluded: “Since loss of kindlin-1 severely impairs keratinocyte proliferation, we predict that revertant cells have a selective advantage that allows their clonal expansion and, consequently, the improvement of the skin condition.”

For more information on this research see: Revertant mosaicism in a human skin fragility disorder results from slipped mispairing and mitotic recombination. *The Journal of Clinical Investigation*, 2012;122(5):1742-6.

Our news journalists report that additional information may be obtained by contacting D. Kiritsi, Dept. of Dermatology, University Medical Center Freiburg, Freiburg, Germany. (2012 Jul 10)

### **University of Novi Sad: Request redirection paradigm in medical image archive implementation**

By a News Reporter-Staff News Editor at Telemedicine Week – Investigators publish new report on Biomedicine. According to news originating from Novi Sad, Serbia, by NewsRx correspondents, researchers stated “It is widely recognized that the JPEG2000 facilitates issues in medical imaging: storage, communication, sharing, remote access, interoperability, and presentation scalability. Therefore, JPEG2000 support was added to the DICOM standard Supplement 61.”

Our news journalists obtained a quote from the research by the authors from the University of Novi Sad, “Two approaches to support JPEG2000 medical image are explicitly defined by the DICOM

standard: replacing the DICOM image format with corresponding JPEG2000 codestream, or by the Pixel Data Provider service, DICOM supplement 106. The latest one supposes two-step retrieval of medical image: DICOM request and response from a DICOM server, and then JPIP request and response from a JPEG2000 server. We propose a novel strategy for transmission of scalable JPEG2000 images extracted from a single codestream over DICOM network using the DICOM Private Data Element without sacrificing system interoperability. It employs the request redirection paradigm: DICOM request and response from JPEG2000 server through DICOM server.”

According to the news editors, the researchers concluded: “The paper presents programming solution for implementation of request redirection paradigm in a DICOM transparent manner.”

For more information on this research see: Request redirection paradigm in medical image archive implementation. *Computer Methods and Programs In Biomedicine*, 2012;107(2):111-21. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from D. Dragan, Computer and Control Department, Faculty of Technical Science, University of Novi Sad, Trg Dositeja Obradovica 6, 21000 Novi Sad, Serbia. (2012 Jul 10)

### **Karadeniz Technical University, Trabzon: Simple methods for segmentation and measurement of diabetic retinopathy lesions in retinal fundus images**

By a News Reporter-Staff News Editor at Diabetes Week – Current study results on Diabetes have been published. According to news reporting out of Trabzon, Turkey, by NewsRx editors, researchers stated “Diabetic retinopathy (DR) is one of the most important complications of diabetes mellitus, which causes serious damages in the retina, consequently visual loss and sometimes blindness if necessary medical treatment is not applied on time. One of the difficulties in this illness is that the patient with diabetes mellitus requires a continuous screening for early detection.”

Our news journalists obtained a quote from the research by the authors from Karadeniz Technical University, “So far, numerous methods have been proposed by researchers to automate the detection process of DR in retinal fundus images. In this paper, we developed an alternative simple approach to detect DR. This method was built on the inverse segmentation method, which we suggested before to detect Age Related Macular Degeneration (ARMDs). Background image approach along with inverse segmentation is employed to measure and follow up the degenerations in retinal fundus images. Direct segmentation techniques

generate unsatisfactory results in some cases. This is because of the fact that the texture of unhealthy areas such as DR is not homogenous. The inverse method is proposed to exploit the homogeneity of healthy areas rather than dealing with varying structure of unhealthy areas for segmenting bright lesions (hard exudates and cotton wool spots). On the other hand, the background image, dividing the retinal image into high and low intensity areas, is exploited in segmentation of hard exudates and cotton wool spots, and microaneurysms (MAs) and hemorrhages (HEMs), separately. Therefore, a complete segmentation system is developed for segmenting DR, including hard exudates, cotton wool spots, MAs, and HEMs. This application is able to measure total changes across the whole retinal image. Hence, retinal images that belong to the same patients are examined in order to monitor the trend of the illness. To make a comparison with other methods, a Naive Bayes method is applied for segmentation of DR.”

According to the news editors, the researchers concluded: “The performance of the system, tested on different data sets including various qualities of retinal fundus images, is over 95% in detection of the optic disc (OD), and 90% in segmentation of the DR.”

For more information on this research see: Simple methods for segmentation and measurement of diabetic retinopathy lesions in retinal fundus images. *Computer Methods and Programs In Biomedicine*, 2012;107(2):274-93. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting C. Kose, Dept. of Computer Engineering, Faculty of Engineering, Karadeniz Technical University, 61080 Trabzon, Turkey. (2012 Jul 09)

### University of Witten, Herdecke: Handling S/MAR Vectors

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Gene Therapy. According to news originating from Herdecke, Germany, by NewsRx correspondents, researchers stated “Nonviral episomal vectors represent attractive alternatives to currently used virus-based expression systems. In the late 1990s, it was shown that a plasmid containing an expression cassette linked to a scaffold/matrix attached region (S/MAR) replicates as a low copy number episome in all cell lines tested, as well as primary cells, and can be used for the genetic modification of higher animals.”

Our news journalists obtained a quote from the research by the authors from the University of Witten, “Once established in the cell, the S/MAR vector replicates early during S-phase and, in the absence of selection, is stably retained in the cells for an unlimited period of time.

This vector can therefore be regarded as a minimal model system for studying the epigenetic regulation of replication and functional nuclear architecture. In theory, this construct represents an almost ‘ideal’ expression system for gene therapy. In practice, S/MAR-based vectors stably modify mammalian cells with efficiencies far below those of virus-based constructs. Consequently, they have not yet found application in gene therapy trials.”

According to the news editors, the researchers concluded: “Furthermore, S/MAR vector systems are not trivial to handle and several critical technical issues have to be considered when modifying these vectors for various applications.”

For more information on this research see: Handling S/MAR Vectors. *Cold Spring Harbor Protocols*, 2012;2012(6):.

The news correspondents report that additional information may be obtained from C. Hagedorn, Centre for Biomedical Education and Research, Institute of Cell Biology, University of Witten, Herdecke, 58453 Witten, Germany. (2012 Jul 03)

### **Haukeland Hospital, Bergen: Automated approaches for analysis of multimodal MRI acquisitions in a study of cognitive aging**

By a News Reporter-Staff News Editor at Computer Weekly News – Researchers detail new data in Computer Research. According to news reporting originating in Bergen, Norway, by VerticalNews journalists, researchers stated “In this work we describe an integrated and automated workflow for a comprehensive and robust analysis of multimodal MR images from a cohort of more than hundred subjects. Image examinations are done three years apart and consist of 3D high-resolution anatomical images, low resolution tensor-valued DTI recordings and 4D resting state fMRI time series.”

The news reporters obtained a quote from the research by the authors from Haukeland Hospital, “The integrated analysis of the data requires robust tools for segmentation, registration and fiber tracking, which we combine in an automated manner. Our automated workflow is strongly desired due to the large number of subjects. Especially, we introduce the use of histogram segmentation to processed fMRI data to obtain functionally important seed and target regions for fiber tracking between them. This enables analysis of individually important resting state networks.”

According to the news reporters, the researchers concluded: “We also discuss various approaches for the assessment of white matter integrity parameters along tracts, and in particular we introduce the use of functional data analysis (FDA) for this task.”

For more information on this research see: Automated approaches for analysis of multimodal MRI acquisitions in a study of cognitive aging. *Computer Methods and Programs in Biomedicine*, 2012;106(3):328-341. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news correspondents report that additional information may be obtained by contacting E. Hodneland, Haukeland Hosp, Dept. of Neurol, N-5021 Bergen, Norway. (2012 Jun 28)

### **Brunel University, Uxbridge: Mammogram retrieval on similar mass lesions**

By a News Reporter-Staff News Editor at Biotech Week – New research on Biomedical Engineering is the subject of a report. According to news reporting originating from Uxbridge, United Kingdom, by NewsRx correspondents, researchers stated “Enormous numbers of digital mammograms have been produced in hospitals and breast screening centers. To exploit those valuable resources in aiding diagnoses and research, content-based mammogram retrieval systems are required to effectively access the mammogram databases.”

Our news editors obtained a quote from the research by the authors from Brunel University, “This paper presents a content-based mammogram retrieval system, which allows medical professionals to seek mass lesions that are pathologically similar to a given example. In this retrieval system, shape and margin features of mass lesions are extracted to represent the characteristics of mammographic lesions. To compare the similarity between the query example and any lesion within the databases, this study proposes a similarity measure scheme which involves the hierarchical arrangement of mammographic features and a weighting distance measure. This makes similarity measure of the retrieval system consistent with the way radiologists observe mass lesions. This study used the DDSM dataset to evaluate the effectiveness of the extracted shape feature and margin feature, respectively. Experimental results demonstrate that, when Zernike moments are used, round-shape masses are the most discriminative among four types of shape; the circumscribed-margin masses can be effectively discriminated among the four types of margins.”

According to the news editors, the researchers concluded: “Moreover, the result also shows that, when retrieving round-shape and circumscribed margin masses, this retrieval system can achieve the highest precision among all mass lesion types.”



For more information on this research see: Mammogram retrieval on similar mass lesions. *Computer Methods and Programs in Biomedicine*, 2012;106(3):234-248. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs in Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news editors report that additional information may be obtained by contacting C.H. Wei, Brunel University, Sch Informat Syst Comp & Math, Uxbridge UB8 3PH, Middx, United Kingdom. (2012 Jun 27)

### **Seoul National University: Effect of missing RR-interval data on nonlinear heart rate variability analysis**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting out of Seoul, South Korea, by NewsRx editors, researchers stated “The effects of missing RR-interval data on nonlinear heart rate variability (HRV) analysis were investigated using simulated missing data in actual RR-interval tachograms and actual missing RR-interval data. For the simulation study, randomly selected data (ranging from 0 to 100 s) were removed from actual data in the MIT-BIH normal sinus rhythm RR-interval database.”

Our news journalists obtained a quote from the research by the authors from Seoul National University, “The selected data are considered as a simulated artefact section. In all, 7182 tachograms of 5-min duration were used for this analysis. For each missing interval, the analysis was performed by 100 Monte Carlo runs. Poincare plot, detrended fluctuation, and entropy analysis were executed for the nonlinear HRV parameters in each run, and the normalized errors between the data with and without the missing data duration for these parameters, were calculated. In this process, the usefulness of reconstruction was considered, for which bootstrapping and several interpolation methods (nearest neighbour, linear, cubic spline, and piecewise cubic Hermite) were used. The rules for the reconstruction, derived from the results of these simulations, were evaluated with actual missing RR-interval data obtained from a capacitive-coupled ECG during sleep.”

According to the news editors, the researchers concluded: “Non-linear parameters, excepting Poincare-plot-analysis parameters, may not be appropriate for the accurate HRV analysis with missing data, since these parameters have relatively larger error values than time- or frequency-domain HRV parameters. However, the analysis of the long-term variation for nonlinear HRV values can be available through applying the rules for the reconstruction obtained in this study.”

For more information on this research see: Effect of missing RR-interval data on nonlinear heart rate variability analysis. *Computer Methods and Programs in Biomedicine*, 2012;106(3):210-218. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting K.K. Kim, Seoul National University, Coll Med, Dept. of Biomed Engn, Seoul 151, South Korea. (2012 Jun 27)

### **University of New South Wales, Canberra: Supervised restoration of degraded medical images using multiple-point geostatistics**

By a News Reporter-Staff News Editor at Telemedicine Week – Current study results on Biomedical Engineering have been published. According to news reporting from Canberra, Australia, by NewsRx editors, the researcher stated “Reducing noise in medical images has been an important issue of research and development for medical diagnosis, patient treatment, and validation of biomedical hypotheses. Noise inherently exists in medical and biological images due to the acquisition and transmission in any imaging devices.”

The news correspondents obtained a quote from the research by the author from the University of New South Wales, “Being different from image enhancement, the purpose of image restoration is the process of removing noise from a degraded image in order to recover as much as possible its original version. This paper presents a statistically supervised approach for medical image restoration using the concept of multiple-point geostatistics.”

According to the news reporters, the researchers concluded: “Experimental results have shown the effectiveness of the proposed technique which has potential as a new methodology for medical and biological image processing.”

For more information on this research see: Supervised restoration of degraded medical images using multiple-point geostatistics. *Computer Methods and Programs in Biomedicine*, 2012;106(3):201-209. *Computer Methods and Programs in Biomedicine* can be contacted at: Elsevier Ireland Ltd, Elsevier House, Brookvale Plaza, East Park Shannon, Co, Clare, 00000, Ireland. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs in Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting T.D. Pham, University of New South Wales, Sch

Informat Technol & Engn, Canberra, ACT 2600, Australia. (2012 Jun 26)

### **Aristotle University, Thessaloniki: In quest of the missing neuron: Spike sorting based on dominant-sets clustering**

By a News Reporter-Staff News Editor at Computer Weekly News – New research on Biomedical Engineering is the subject of a report. According to news reporting out of Thessaloniki, Greece, by VerticalNews editors, researchers stated “Spike sorting algorithms aim at decomposing complex extracellular signals to independent events from single neurons in the electrode’s vicinity. The decision about the actual number of active neurons is still an open issue, with sparsely firing neurons and background activity the most influencing factors.”

Our news journalists obtained a quote from the research by the authors from Aristotle University, “We introduce a graph-theoretical algorithmic procedure that successfully resolves this issue. Dimensionality reduction coupled with a modern, efficient and progressively executable clustering routine proved to achieve higher performance standards than popular spike sorting methods.”

According to the news editors, the researchers concluded: “Our method is validated extensively using simulated data for different levels of SNR.”

For more information on this research see: In quest of the missing neuron: Spike sorting based on dominant-sets clustering. *Computer Methods and Programs In Biomedicine*, 2012;107(1):28-35. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Computer Methods and Programs In Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting D.A. Adamos, Laboratory of Animal Physiology, School of Biology, Aristotle University of Thessaloniki, 54 124 Thessaloniki, Greece. (2012 Jun 21)

### **Institute of Biomedical Research, Coimbra: A method for corneal nerves automatic segmentation and morphometric analysis**

By a News Reporter-Staff News Editor at Computer Weekly News – Fresh data on Diabetes are presented in a new report. According to news reporting from Coimbra, Portugal, by VerticalNews journalists, researchers stated “The segmentation and morphometric analysis of corneal sub-basal nerves, from corneal confocal microscopy images, has

gained recently an increased interest. This interest arises from the possibility of using changes in these nerves as the basis of a simple and non-invasive method for early detection and follow-up of peripheral diabetic neuropathy, a major cause of chronic disability in diabetic patients.”

The news correspondents obtained a quote from the research by the authors from the Institute of Biomedical Research, “Here, we propose one method for automatic segmentation and analysis of corneal nerves from images obtained in vivo through corneal confocal microscopy. The method is capable of segmenting corneal nerves, with sensitivity near 90% and a percentage of false recognitions with an average of 5.3%.”

According to the news reporters, the researchers concluded: “The nerves tortuosity was calculated and shows statistically significant differences between healthy controls and diabetic individuals, in accordance to what is reported in the literature.”

For more information on this research see: A method for corneal nerves automatic segmentation and morphometric analysis. *Computer Methods and Programs In Biomedicine*, 2012;107(1):53-60. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting A. Ferreira, IBILI - Institute of Biomedical Research in Light and Image, Azinhaga de Santa Comba, Celas, 3000-548 Coimbra, Portugal. (2012 Jun 21)

### **Aristotle University, Thessaloniki: Capsule endoscopy image analysis using texture information from various colour models**

By a News Reporter-Staff News Editor at Telecommunications Weekly – Investigators publish new report on Biomedical Engineering. According to news reporting from Thessaloniki, Greece, by VerticalNews journalists, researchers stated “Wireless capsule endoscopy (WCE) is a novel imaging technique that is gradually gaining ground as it enables the non-invasive and efficacious visualization of the digestive track, and especially the entire small bowel including its middle part. However, the task of reviewing the vast amount of images produced by a WCE examination is a burden for the physicians.”

The news correspondents obtained a quote from the research by the authors from Aristotle University, “To tackle this major drawback, an innovative scheme for discriminating endoscopic images related to one of the most common intestinal diseases, ulceration, is presented here. This new approach focuses on colour-texture features in order to investigate how the structure information of healthy and abnormal tissue is distributed on RGB, HSV and CIE Lab colour spaces. The WCE images are pre-processed using bidimensional ensemble empirical mode

decomposition so as to facilitate differential lacunarity analysis to extract the texture patterns of normal and ulcerous regions.”

According to the news reporters, the researchers concluded: “Experimental results demonstrated promising classification performance (mean accuracy >95%), exhibiting a high potential towards automatic WCE image analysis.”

For more information on this research see: Capsule endoscopy image analysis using texture information from various colour models. *Computer Methods and Programs In Biomedicine*, 2012;107(1):61-74. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

Our news journalists report that additional information may be obtained by contacting V.S. Charisis, Dept. of Electrical and Computer Engineering, Aristotle University of Thessaloniki, GR 541 24 Thessaloniki, Greece. (2012 Jun 20)

### **University of Patras: Markov Chain Monte Carlo simulation for projection of end stage renal disease patients in Greece**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Renal Disease have been presented. According to news originating from Patras, Greece, by NewsRx correspondents, researchers stated “End stage renal disease (ESRD) treatment methods are considered to be among the most expensive procedures for chronic conditions worldwide which also have severe impact on patients’ quality of life. During the last decade, Greece has been among the countries with the highest incidence and prevalence, while at the same time with the lowest kidney transplantation rates.”

Our news journalists obtained a quote from the research by the authors from the University of Patras, “Predicting future patients’ number on Renal Replacement Therapy (RRT) is essential for health care providers in order to achieve more effective resource management. In this study a Markov Chain Monte Carlo (MCMC) simulation is presented for predicting the future number of ESRD patients for the period 2009-2020 in Greece. The MCMC model comprises Monte Carlo sampling techniques applied on probability distributions of the constructed Markov Chain. The model predicts that there will be 15,147 prevalent patients on RRT in Greece by 2020. Additionally, a cost-effectiveness analysis was performed on a scenario of gradually reducing the hemodialysis patients in favor of increasing the transplantation number by 2020.”

According to the news editors, the researchers concluded: “The proposed scenario showed net savings of 86.54 million Euros for the period 2009-2020 compared to the base-case prediction.”

For more information on this research see: Markov Chain Monte Carlo simulation for projection of end stage renal disease patients in Greece. *Computer Methods and Programs In Biomedicine*, 2012;107(1):90-6. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Computer Methods and Programs In Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/505960](http://www.elsevier.com/wps/product/cws_home/505960))

The news correspondents report that additional information may be obtained from A. Rodina-Theocharaki, University of Patras, Dept. of Medical Physics, BITU, Patras 26500, Rio, Greece. (2012 Jun 20)

### **Tottori University: Gymnopilin-a substance produced by the hallucinogenic mushroom, *Gymnopilus junonius*-mobilizes intracellular $\text{Ca}(2+)$ in dorsal root ganglion cells**

By a News Reporter-Staff News Editor at China Weekly News – Investigators publish new report on Phosphoric Diester Hydrolases. According to news reporting out of Tottori, Japan, by VerticalNews editors, researchers stated “*Gymnopilus junonius* is a widely spread mushroom in Japan and well known as a hallucinogenic mushroom. Gymnopilin was purified from the fruiting body of *G. junonius* and was reported to act on the spinal cord and depolarize motoneurons.”

Our news journalists obtained a quote from the research by the authors from Tottori University, “This is the only evidence that gymnopilin has a biological effect on animals and no mechanism of the action has been determined at all. In this study, we examined effects of gymnopilin on intracellular  $\text{Ca}(2+)$  concentrations ( $[\text{Ca}(2+)](i)$ ) of cultured cells isolated from the dorsal root ganglion (DRG) of the rat. The cell culture consisted of neurons and non-neuronal cells. Gymnopilin increased  $[\text{Ca}(2+)](i)$  in both the types of cells. The gymnopilinevoked  $[\text{Ca}(2+)](i)$  rise in the non-neuronal cells was inhibited by cyclopiazonic acid and U-73122, inhibitors of  $\text{Ca}(2+)$ -ATPase of the intracellular  $\text{Ca}(2+)$  store and phospholipase C, respectively, but not by removal of extracellular  $\text{Ca}(2+)$ . These results indicate that gymnopilin activated phospholipase C and mobilize  $\text{Ca}(2+)$  from the intracellular  $\text{Ca}(2+)$  store in non-neuronal cells from the DRG.”

According to the news editors, the researchers concluded: “This is the first report to show that gymnopilin directly acts on cells isolated from the mammalian nervous system.”

For more information on this research see: Gymnopilin-a substance produced by the hallucinogenic mushroom, *Gymnopilus junonius*-mobilizes intracellular  $\text{Ca}(2+)$  in dorsal root ganglion cells. *Biomedical Research*, 2012;33(2):111-8.

Our news journalists report that additional information may be obtained by contacting S. Miyazaki, Faculty of Agriculture, Tottori University, Tottori, Japan. (2012 Jun 12)

### **Oral administration of *Cimicifuga racemosa* extract affects immobilization stress-induced changes in murine cerebral monoamine metabolism**

By a News Reporter-Staff News Editor at Pain & Central Nervous System Week – Current study results on Metabolism have been published. According to news originating from Ibaraki, Japan, by NewsRx correspondents, researchers stated “We investigated the effects of *Cimicifuga racemosa* (CR) plant extracts on the changes in levels of the cerebral monoamines norepinephrine (NE), dopamine (DA), and serotonin (5-HT), the respective metabolites 3-methoxy-4-hydroxyphenylglycol (MHPG), 3,4-dihydroxyphenylacetic acid (DOPAC), and 5-hydroxyindoleacetic acid (5-HIAA), and plasma corticosterone in mice subjected to acute immobilization stress. Single oral administration of the CR extract (1,000 mg/kg) significantly attenuated plasma corticosterone levels that had been increased as a result of enforced immobilization.”

Our news journalists obtained a quote from the research by the authors, “Acute immobilization stress caused significant changes in the corresponding amine-to-metabolite ratios in the hypothalamus, hippocampus, and cortex; however, CR-extract treatment significantly attenuated the MHPG/NE change in the hypothalamus, and the 5-HIAA/5-HT changes in each region of the brain. Our results suggest that the CR extract interacts not only with the hypothalamic-pituitary-adrenal (HPA) axis but also with the sympathetic adrenomedullary (SAM) system under stress conditions.”

According to the news editors, the researchers concluded: “Thus the CR extract can alleviate acute stress responses by suppressing the changes of amine-to-metabolite ratio in brain.”

For more information on this research see: Oral administration of *Cimicifuga racemosa* extract affects immobilization stress-induced changes in murine cerebral monoamine metabolism. *Biomedical Research*, 2012;33(2):133-7.

The news correspondents report that additional information may be obtained from I. Nadaoka, Research Laboratories for Fundamental Technology of Food, Asahi Group Holdings Ltd, 1-21, Midori 1-Chome, Moriya-shi, Ibaraki, 302-0106, Japan. (2012 Jun 11)

**Azabu University, Sagamihara: Expression and analysis of a cytolethal distending toxin (cdt) gene operon in *Campylobacter lari***

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on *Campylobacter* have been presented. According to news reporting originating in Sagamihara, Japan, by NewsRx journalists, researchers stated “The present study examines the expression of cytolethal distending toxin (cdt) gene encoding a cytotoxin in *Campylobacter lari* (n=6 urease-negative [UN] *C. lari*; n=4 urease-positive thermophilic *Campylobacter* [UPTC]). When reverse transcription polymerase chain reaction (RT-PCR) was carried out with 10 *C. lari* isolates using a primer pair to amplify the *cdtB* gene transcript segment, an approximate 260 bp RT-PCR amplicon was generated with all the isolates.”

The news reporters obtained a quote from the research by the authors from Azabu University, “In addition, *cdtA*, *cdtB* and *cdtC* gene operon was identified to be polycistronically transcribed in the *C. lari* cells. The *cdtB* gene translation in the *C. lari* cells was also confirmed by Western blot analysis. Thus, the *cdt* gene operon in *C. lari* organisms, including UN *C. lari* and UPTC, was expressed at the transcriptional and translational levels in the cells.”

According to the news reporters, the researchers concluded: “The present results suggest that all three *cdt* genes may be functional in the cells.”

For more information on this research see: Expression and analysis of a cytolethal distending toxin (cdt) gene operon in *Campylobacter lari*. *British Journal of Biomedical Science*, 2012;69(1):26-30. *British Journal of Biomedical Science* can be contacted at: Step Publishing LTD, Subscription Dept, North Farm Rd, Tunbridge Wells TN2 3DR, Kent, England.

Our news correspondents report that additional information may be obtained by contacting T. Nakajima, Laboratory of Molecular Biology, Graduate School of Environmental Health Sciences, Azabu University, Sagamihara, Japan.

The publisher of the *British Journal of Biomedical Science* can be contacted at: Step Publishing LTD, Subscription Dept, North Farm Rd, Tunbridge Wells TN2 3DR, Kent, England. (2012 Jun 05)



## **Health Protection Agency, Cambridge: Automated nucleic acid isolation in viral molecular diagnostics: evaluation of the QIASymphony SP**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Biomedicine have been published. According to news originating from Cambridge, United Kingdom, by NewsRx correspondents, researchers stated “The Qiagen QIASymphony SP is a high-throughput (up to 96 samples per run), fully-automated nucleic acid isolation system. It was implemented in the authors’ laboratory to cope with the high demand for pandemic H1N1 influenza testing in 2009.”

Our news journalists obtained a quote from the research by the authors from Health Protection Agency, “This study evaluated the QIASymphony SP for viral nucleic acid isolation from quality control materials, pure cultures and various clinical specimens. The effect of varying sample volume on detection sensitivity was investigated using serial 10-fold dilutions of pure viral specimens and target nucleic acids were detected by real-time polymerase chain reaction (PCR) assays. Little variability in detection sensitivity was observed for all the viral targets tested, although variation in cycle threshold values was apparent in some cases. Importantly, pathogens were detectable over a broad concentration range and from diverse clinical specimens. Removal of PCR inhibitors was generally effective, as demonstrated by detection of viral nucleic acids and/or internal controls.”

According to the news editors, the researchers concluded: “The results demonstrate that the QIASymphony SP is suitable for use in routine virology molecular diagnostics, and provides a high-throughput capacity, which is needed in peak seasons of infection or in centralised laboratories.”

For more information on this research see: Automated nucleic acid isolation in viral molecular diagnostics: evaluation of the QIASymphony SP. *British Journal of Biomedical Science*, 2012;69(1):18-25. *British Journal of Biomedical Science* can be contacted at: Step Publishing LTD, Subscription Dept, North Farm Rd, Tunbridge Wells TN2 3DR, Kent, England.

The news correspondents report that additional information may be obtained from N.J. Parham, Health Protection Agency, Clinical Microbiology and Public Health Laboratory, Addenbrooke’s Hospital, Box 236, Hills Road, Cambridge CB2 0QW, UK.

The publisher’s contact information for the *British Journal of Biomedical Science* is: Step Publishing LTD, Subscription Dept, North Farm Rd, Tunbridge Wells TN2 3DR, Kent, England. (2012 Jun 05)

### **University of Pennsylvania, Philadelphia: Endothelial HIF-2a regulates murine pathological angiogenesis and revascularization processes**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Angiogenesis have been published. According to news reporting out of Philadelphia, Pennsylvania, by NewsRx editors, researchers stated “Localized tissue hypoxia is a consequence of vascular compromise or rapid cellular proliferation and is a potent inducer of compensatory angiogenesis. The oxygen-responsive transcriptional regulator hypoxia-inducible factor 2a (HIF-2a) is highly expressed in vascular ECs and, along with HIF-1a, activates expression of target genes whose products modulate vascular functions and angiogenesis.”

Our news journalists obtained a quote from the research by the authors from the University of Pennsylvania, “However, the mechanisms by which HIF-2a regulates EC function and tissue perfusion under physiological and pathological conditions are poorly understood. Using mice in which *Hif2a* was specifically deleted in ECs, we demonstrate here that HIF-2a expression is required for angiogenic responses during hindlimb ischemia and for the growth of autochthonous skin tumors. EC-specific *Hif2a* deletion resulted in increased vessel formation in both models; however, these vessels failed to undergo proper arteriogenesis, resulting in poor perfusion. Analysis of cultured HIF-2a-deficient ECs revealed cell-autonomous increases in migration, invasion, and morphogenetic activity, which correlated with HIF-2a-dependent expression of specific angiogenic factors, including delta-like ligand 4 (Dll4), a Notch ligand, and angiopoietin 2. By stimulating Dll4 signaling in cultured ECs or restoring Dll4 expression in ischemic muscle tissue, we rescued most of the HIF-2a-dependent EC phenotypes in vitro and in vivo, emphasizing the critical role of Dll4/Notch signaling as a downstream target of HIF-2a in ECs.”

According to the news editors, the researchers concluded: “These results indicate that HIF-1a and HIF-2a fulfill complementary, but largely nonoverlapping, essential functions in pathophysiological angiogenesis.”

For more information on this research see: Endothelial HIF-2a regulates murine pathological angiogenesis and revascularization processes. *The Journal of Clinical Investigation*, 2012;122(4):1427-43.

Our news journalists report that additional information may be obtained by contacting N. Skuli, Howard Hughes Medical Institute, University of Pennsylvania, Philadelphia, Pennsylvania 19104-6160, United States. (2012 Jun 05)

## Chapter 4

# Cellular Reprogramming

**Hannover School of Medicine: Induction of pluripotent stem cells from a cynomolgus monkey using a polycistronic simian immunodeficiency virus-based vector, differentiation toward functional cardiomyocytes, and generation of stably expressing reporter lines**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on RNA Viruses. According to news originating from Hannover, Germany, by NewsRx correspondents, research stated, “Induced pluripotent stem cells (iPSCs) represent a novel cell source for regenerative therapies. Many emerging iPSC-based therapeutic concepts will require preclinical evaluation in suitable large animal models.”

Our news journalists obtained a quote from the research from the Hannover School of Medicine, “Among the large animal species frequently used in preclinical efficacy and safety studies, macaques show the highest similarities to humans at physiological, cellular, and molecular levels. We have generated iPSCs from cynomolgus monkeys (*Macaca fascicularis*) as a segue to regenerative therapy model development in this species. Because typical human immunodeficiency virus type 1 (HIV-1)-based lentiviral vectors show poor transduction of simian cells, a simian immunodeficiency virus (SIV)-based vector was chosen for efficient transduction of cynomolgus skin fibroblasts. A corresponding polycistronic vector with codon-optimized reprogramming factors was constructed for reprogramming. Growth characteristics as well as cell and colony morphology of the resulting cynomolgus iPSCs (cyiPSCs) were demonstrated to be almost identical to cynomolgus embryonic stem cells (cyESCs), and cyiPSCs expressed typical pluripotency markers including OCT4, SOX2, and NANOG. Furthermore, differentiation in vivo and in vitro into derivatives of all three germ layers, as

well as generation of functional cardiomyocytes, could be demonstrated. Finally, a highly efficient technique for generation of transgenic cyiPSC clones with stable reporter expression in undifferentiated cells as well as differentiated transgenic cyiPSC progeny was developed to enable cell tracking in recipient animals.”

According to the news editors, the research concluded: “Our data indicate that cyiPSCs represent a valuable cell source for establishment of macaque-based allogeneic and autologous preclinical cell transplantation models for various fields of regenerative medicine.”

For more information on this research see: Induction of pluripotent stem cells from a cynomolgus monkey using a polycistronic simian immunodeficiency virus-based vector, differentiation toward functional cardiomyocytes, and generation of stably expressing reporter lines. *Cellular Reprogramming*, 2012;14(6):471-84. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

The news correspondents report that additional information may be obtained from S. Wunderlich, Leibniz Research Laboratories for Biotechnology and Artificial Organs (LEBAO), Dept. of Cardiothoracic, Transplantation and Vascular Surgery, Hannover Medical School, 30625 Hannover, Germany. (2013 Feb 05)

### **National Dairy Research Institute, Haryana: Expression pattern of pluripotent markers in different embryonic developmental stages of buffalo (*Bubalus bubalis*) embryos and putative embryonic stem cells generated by parthenogenetic activation**

By a News Reporter-Staff News Editor at Stem Cell Week – Investigators discuss new findings in Cellular Reprogramming. According to news originating from Haryana, India, by NewsRx correspondents, research stated, “In this study, we describe the production of buffalo parthenogenetic blastocysts and subsequent isolation of parthenogenetic embryonic stem cell (PGESC)-like cells. PGESC colonies exhibited dome-shaped morphology and were clearly distinguishable from the feeder layer cells.”

Our news journalists obtained a quote from the research from National Dairy Research Institute, “Different stages of development of parthenogenetic embryos and derived embryonic stem cell (ESC)-like cells expressed key ESC-specific markers, including OCT-4, NANOG, SOX-2, FOXD3, REX-1, STAT-3, TELOMERASE, NUCLEOSTEMIN, and cMYC. Immunofluorescence-based studies revealed

that the PGESCs were positive for surface-based pluripotent markers, viz., SSEA-3, SSEA-4, TRA 1-80, TRA 1-60, CD-9, and CD-90 and exhibited high alkaline phosphatase (ALP) activity. PGEC cell-like cells formed embryoid body (EB)-like structures in hanging drop cultures and when cultured for extended period of time spontaneously differentiated into derivatives of three embryonic germ layers as confirmed by RT-PCR for ectodermal (CYTOKERATIN8, NF-68), mesodermal (MSX1, BMP-4, ASA), and endodermal markers (AFP, HNF-4, GATA-4). Differentiation of PGESCs toward the neuronal lineage was successfully directed by supplementation of serum-containing media with retinoic acid. Our results indicate that the isolated ESC-like cells from parthenogenetic blastocyst hold properties of ESCs and express markers of pluripotency.”

According to the news editors, the research concluded: “The pluripotency markers were also expressed by early cleavage-stage of buffalo embryos.”

For more information on this research see: Expression pattern of pluripotent markers in different embryonic developmental stages of buffalo (*Bubalus bubalis*) embryos and putative embryonic stem cells generated by parthenogenetic activation. *Cellular Reprogramming*, 2012;14(6):530-8. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

The news correspondents report that additional information may be obtained from K.P. Singh, Animal Biotechnology Centre, National Dairy Research Institute, Karnal, Haryana, India. (2013 Feb 04)

### **Technical University of Denmark, Frederiksberg: Expression of innate immune response genes in liver and three types of adipose tissue in cloned pigs**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Cellular Reprogramming are discussed in a new report. According to news reporting from Frederiksberg, Denmark, by NewsRx journalists, research stated, “The pig has been proposed as a relevant model for human obesity-induced inflammation, and cloning may improve the applicability of this model. We tested the assumptions that cloning would reduce interindividual variation in gene expression of innate immune factors and that their expression would remain unaffected by the cloning process.”

The news correspondents obtained a quote from the research from the Technical University of Denmark, “We investigated the expression of 40 innate immune factors by high-throughput quantitative real-time PCR in samples from liver, abdominal subcutaneous adipose tissue

(SAT), visceral adipose tissue (VAT), and neck SAT in cloned pigs compared to normal outbred pigs. The variation in gene expression was found to be similar for the two groups, and the expression of a small number of genes was significantly affected by cloning. In the VAT and abdominal SAT, six out of seven significantly differentially expressed genes were downregulated in the clones. In contrast, most differently expressed genes in both liver and neck SAT were upregulated (seven out of eight). Remarkably, acute phase proteins (APPs) dominated the upregulated genes in the liver, whereas APP expression was either unchanged or downregulated in abdominal SAT and VAT. The general conclusion from this work is that cloning leads to subtle changes in specific subsets of innate immune genes.”

According to the news reporters, the research concluded: “Such changes, even if minor, may have phenotypic effects over time, e.g., in models of long-term inflammation related to obesity.”

For more information on this research see: Expression of innate immune response genes in liver and three types of adipose tissue in cloned pigs. *Cellular Reprogramming*, 2012;14(5):407-17. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

Our news journalists report that additional information may be obtained by contacting T. Rodgaard, Innate Immunology Group, National Veterinary Institute, Technical University of Denmark, Frederiksberg C, Denmark. (2012 Dec 26)

### **Jilin University, Changchun: Proliferative capacity and pluripotent characteristics of porcine adult stem cells derived from adipose tissue and bone marrow**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Cellular Reprogramming have been presented. According to news originating from Changchun, People’s Republic of China, by NewsRx correspondents, research stated, “Direct reprogramming of somatic cells to induced pluripotent stem cells (iPSCs) provides an invaluable resource for regenerative medicine. Because of some ethical and logistical barriers, human iPSCs cannot be used to generate a chimera, which is one of markers representing pluripotency.”

Our news journalists obtained a quote from the research from Jilin University, “As the most attractive model for preclinical studies, pigs offer another path to improve clinical medicine. In this study, porcine adult stem cells (pASCs), including adipose mesenchymal stem cells (AMSCs) and bone marrow mesenchymal stem cells (BMSCs), were collected and cultured under the same conditions in vitro. Real-time PCR,

immunocytochemical staining, apoptosis analysis, and induced differentiation and reprogramming techniques were used to investigate the proliferative capacity and pluripotent characteristics of pASCs. Our results showed that both AMSCs and BMSCs displayed a similar immunophenotype, and their proliferative capacity appeared as a downward trend as the cell passage number increased. The cell proliferative capacity of AMSCs was significantly lower than that of BMSCs ( $p < 0.05$ ). Moreover, each type of pASCs went through 20 passages without undergoing alterations in the expression of reprogramming transcriptional factors (Oct4, Sox2, c-Myc, and Nanog). All pASCs had adipogenic and osteogenic differentiation potential. In addition, they also could be reprogrammed to pig induced pluripotent stem cells (piP-SCs) with similar time and efficiency.”

According to the news editors, the research concluded: “Porcine BMSCs had a higher proliferative capacity than AMSCs, and the pluripotency of pASCs was stable in long-term culture.”

For more information on this research see: Proliferative capacity and pluripotent characteristics of porcine adult stem cells derived from adipose tissue and bone marrow. *Cellular Reprogramming*, 2012;14(4):342-52. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

The news correspondents report that additional information may be obtained from L. Tang, Jilin Provincial Key Laboratory of Animal Embryo Engineering, the Center for Animal Embryo Engineering of Jilin Province, College of Animal Science and Veterinary Medicine, Jilin University, Changchun, Jilin, People’s Taiwan. (2012 Oct 24)

### **Seoul National University: Oxamflatin improves developmental competence of porcine somatic cell nuclear transfer embryos**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Cellular Reprogramming. According to news reporting from Seoul, South Korea, by NewsRx journalists, research stated, “Abstract Aberrant epigenetic nuclear reprogramming of somatic nuclei is a major cause of low success in cloning. It has been demonstrated that treatment of histone deacetylase inhibitors (HDACi) enhances developmental potential of somatic cell nuclear transfer (SCNT) embryos by alteration of epigenetic status.”

The news correspondents obtained a quote from the research from Seoul National University, “The aim of the present study was to investigate the effect of oxamflatin, a novel HDACi, on the developmental competence of porcine SCNT embryos. Treatment with 1 $\mu$ M oxamflatin for

9?h after activation of SCNT embryos increased both in vitro and in vivo developmental competence. Treatment of SCNT embryos with 1?M oxamflatin significantly increased blastocyst rate and total cell number in blastocysts (33.3%±6.0 and 73.1%±1.6, respectively) than that of controls (10.3%±3.7 and 54.1%±3.5, respectively) or scriptaid (16.4%±4.6 and 64.4%±2.1, respectively). Moreover, oxamflatin showed significant higher overall cloning efficiency from 0.9% to 3.2%, whereas scriptaid demonstrated 0% to 1.8%.”

According to the news reporters, the researchers concluded: “These results indicate that oxamflatin treatment improves the developmental competence of porcine SCNT embryos.”

For more information on this research see: Oxamflatin improves developmental competence of porcine somatic cell nuclear transfer embryos. *Cellular Reprogramming*, 2012;14(5):398-406. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

Our news journalists report that additional information may be obtained by contacting S.J. Park, 1 Dept. of Theriogenology and Biotechnology, College of Veterinary Medicine, Seoul National University, Seoul 151-742, South Korea. (2012 Oct 17)

### **Suranaree University of Technology, Nakhon Ratchasima: Full-term development of gaur-bovine interspecies somatic cell nuclear transfer embryos: effect of trichostatin A treatment**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in *Cellular Reprogramming*. According to news reporting out of Nakhon Ratchasima, Thailand, by NewsRx editors, research stated, “Trichostatin A (TSA) has previously been used in somatic cell nuclear transfer (SCNT) to improve the cloning efficiency in several species, which led our team to investigate the effects of TSA on the full-term development of bovine SCNT and gaur-bovine interspecies SCNT (gaur iSCNT; gaur somatic cells as donors and bovine oocytes as recipients) embryos. Treatment with 50?nM TSA for 10?h after fusion had no positive effects on the rates of fusion, cleavage, or the development to eight-cell or morula stages in both bovine SCNT and gaur iSCNT embryos.”

Our news journalists obtained a quote from the research from the Suranaree University of Technology, “However, TSA treatment significantly enhanced the blastocyst formation rate in bovine SCNT embryos



(44 vs. 32-34% in the TSA-treated and TSA-untreated groups, respectively), but had no effects on gaur iSCNT embryos. The fresh blastocysts derived from bovine SCNT and gaur iSCNT embryos (fresh groups), as well as vitrified bovine SCNT blastocysts (vitrified group), were transferred to bovine recipients. We found that TSA treatment increased the pregnancy rates only in recipients receiving fresh bovine SCNT embryos. In recipients receiving TSA-treated bovine SCNT embryos, three cloned calves from the fresh group and twin cloned calves from the vitrified group were delivered; however, no calf was born from the TSA-untreated bovine SCNT embryos. In contrast, one gaur iSCNT calf was born from a recipient receiving blastocysts from the TSA-untreated group. In summary, TSA improved the preimplantation development and pregnancy rates of bovine SCNT embryos, but did not have any beneficial effect on gaur iSCNT embryos.”

According to the news editors, the researchers concluded: “However, one gaur iSCNT calf reached full-term development.”

For more information on this research see: Full-term development of gaur-bovine interspecies somatic cell nuclear transfer embryos: effect of trichostatin A treatment. *Cellular Reprogramming*, 2012;14(3):248-57. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

Our news journalists report that additional information may be obtained by contacting K. Srirattana, Embryo Technology and Stem Cell Research Center and School of Biotechnology, Suranaree University of Technology, Nakhon Ratchasima 30000, Thailand. (2012 Aug 29)

### **Institute of Genetics and Developmental Biology, Beijing: Handmade cloned transgenic piglets expressing the nematode fat-1 gene**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Cellular Reprogramming. According to news reporting out of Beijing, People’s Republic of China, by NewsRx editors, research stated, “Production of transgenic animals via somatic cell nuclear transfer (SCNT) has been adapted worldwide, but this application is somewhat limited by its relatively low efficiency. In this study, we used handmade cloning (HMC) established previously to produce transgenic pigs that express the functional nematode fat-1 gene.”

Our news journalists obtained a quote from the research from the Institute of Genetics and Developmental Biology, “Codon-optimized mfat-1 was inserted into eukaryotic expression vectors, which were transferred into primary swine donor cells. Reverse transcriptase PCR (RT-PCR), gas chromatography, and chromosome analyses were performed

to select donor clones capable of converting n-6 into n-3 fatty acids. Blastocysts derived from the clones that lowered the n-6/n-3 ratio to approximately 1:1 were transferred surgically into the uteri of recipients for transgenic piglets. By HMC, 37% (n=558) of reconstructed embryos developed to the blastocyst stage after 7 days of culture in vitro, with an average cell number of 81&#177;36 (n=14). Three recipients became pregnant after 408 day-6 blastocysts were transferred into four naturally cycling females, and a total of 14 live offspring were produced. The nematode *mfat-1* effectively lowered the n-6/n-3 ratio in muscle and major organs of the transgenic pig.”

According to the news editors, the researchers concluded: “Our results will help to establish a reliable procedure and an efficient option in the production of transgenic animals.”

For more information on this research see: Handmade cloned transgenic piglets expressing the nematode *fat-1* gene. *Cellular Reprogramming*, 2012;14(3):258-66. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

Our news journalists report that additional information may be obtained by contacting P. Zhang, State Key Laboratory of Molecular and Developmental Biology, Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, Beijing 100101, People’s Taiwan. (2012 Aug 28)

### **Northwest A&F University, Yangling: Valproic acid improves the in vitro development competence of bovine somatic cell nuclear transfer embryos**

By a News Reporter-Staff News Editor at Biotech Week – Fresh data on Apoptosis are presented in a new report. According to news reporting originating in Yangling, People’s Republic of China, by NewsRx journalists, researchers stated “The present study was carried out to examine the effect of valproic acid (VPA), an important histone deacetylase inhibitor, on the in vitro development and expression of the epigenetic marker histone H3 lysine 9 (H3K9ac) in bovine somatic cell nuclear transfer (SCNT) embryos. We found that treatment with 4 mM VPA for 24 h could significantly improve the development of bovine SCNT embryos.”

The news reporters obtained a quote from the research from Northwest A&F University, “Compared with the no-treatment group, the cleavage rate was higher (69.79&#177;0.99% vs. 65.11&#177;1.02%,  $p<0.05$ ), as was the blastocyst rate (39.99&#177;1.29% vs. 34.87&#177;1.74%,  $p<0.05$ ). Moreover, the rate of apoptosis (1.91&#177;

0.48% vs. 5.67% &#177; 0.40%,  $p < 0.05$ ) in blastocysts was greatly reduced after VPA treatment. Valproic acid treatment also increased the immunofluorescent signal for H3K9ac in SCNT embryos in a pattern similar to that of in vitro fertilized (IVF) embryos.”

According to the news reporters, the researchers concluded: “We demonstrated that VPA can significantly improve the in vitro developmental competence and enhance the nuclear reprogramming of bovine SCNT embryos.”

For more information on this research see: Valproic acid improves the in vitro development competence of bovine somatic cell nuclear transfer embryos. *Cellular Reprogramming*, 2012;14(2):138-45. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

Our news correspondents report that additional information may be obtained by contacting W. Xu, College of Veterinary Medicine, Northwest A&F University, Key Laboratory of Animal Reproductive Physiology & Embryo Technology, Ministry of Agriculture, Yangling, Shaanxi, People's Taiwan. (2012 Aug 01)

### **Agricultural Biotechnology Center, Godollo: Comparative analysis of nuclear transfer embryo-derived mouse embryonic stem cells. Part I: cellular characterization**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Stem Cell Research. According to news reporting originating in Godollo, Hungary, by NewsRx journalists, researchers stated “Embryonic stem cells derived from nuclear transfer embryos (ntESCs) are particularly valuable for regenerative medicine, as they are a patient-specific and histocompatible cell source for the treatment of varying diseases. However, currently, little is known about their cellular and molecular profile.”

The news reporters obtained a quote from the research by the authors from Agricultural Biotechnology Center, “In the present study, in a mouse model different donor cell-derived ntESCs from various genetic backgrounds were compared with reference ESCs and analyzed comprehensively at the cellular level. A number of pluripotency marker genes were compared by flow cytometry and immunocytochemistry analysis. Significant differences at the protein level were observed for POU5F1, SOX2, FGF4, NANOG, and SSEA-1. However, such differences had no effect on in vitro cell differentiation and cell fate: derivatives of the three germ layers were detected in all ntESC lines. The neural and cardiac in vitro differentiation revealed minor differences between the cell lines, both at the mRNA and protein level. Karyotype analyses and cell

growth studies did not reveal any significant variations. Despite some differences observed, the present study revealed that ntESC lines had similar differentiation competences compared to other ESCs.”

According to the news reporters, the researchers concluded: “The results indicate that the observed differences may be related to the genotype rather than to the nuclear transfer technology.”

For more information on this research see: Comparative analysis of nuclear transfer embryo-derived mouse embryonic stem cells. Part I: cellular characterization. *Cellular Reprogramming*, 2012;14(1):56-67. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

Our news correspondents report that additional information may be obtained by contacting J. Kobolak, Genetic Reprogramming Group, Agricultural Biotechnology Center, Godollo, Hungary. (2012 Jun 27)

### **Kinki University, Nara: Slight improvement in full-term development of mouse somatic cell nuclear-transferred embryos by cotransfer of fertilized embryos**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Cellular Reprogramming are discussed in a new report. According to news reporting out of Nara, Japan, by NewsRx editors, researchers stated “In our previous study (Tsuji et al., 2010 ), administration of hCG to recipients around the timing of implantation significantly increased the in vivo development of mouse embryos after somatic cell nuclear transfer (SCNT) until day 10.5, but did not increase the development to full term. The present study was undertaken to examine whether cotransfer of fertilized embryos or parthenogenetic embryos prevents the embryonic loss of SCNT embryos after day 10.5, allowing them to develop to full term.”

Our news journalists obtained a quote from the research by the authors from Kinki University, “We found that compared with SCNT embryo transfer alone, full-term development of SCNT embryos slightly, but not significantly, increased by cotransfer of mouse hybrid blastocysts derived from BDF1 (C57BL/6 x DBA) female x ICR male into the oviducts of recipients administered hCG (2.0% vs. 5.5%). This was not the case with the cotransfer of blastocysts from an ICR female x ICR male (2.5% vs. 2.2%) or parthenogenetic blastocysts from BDF1 female (3.0% vs. 2.0%). Furthermore, when SCNT blastocysts were transferred into the uteri of recipients, full-term development did not increase even with the cotransfer of hybrid blastocysts.”

According to the news editors, the researchers concluded: “The mechanisms of the effect of cotransfer of fertilized and parthenogenetic

embryos on the full-term development of SCNT mouse embryos are discussed.”

For more information on this research see: Slight improvement in full-term development of mouse somatic cell nuclear-transferred embryos by cotransfer of fertilized embryos. *Cellular Reprogramming*, 2012;14(1):38-44. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

Our news journalists report that additional information may be obtained by contacting Y. Tsuji, Laboratory of Animal Reproduction, College of Agriculture, Kinki University, Nara, Japan. (2012 Jun 27)

### **Ovine-induced pluripotent stem cells can contribute to chimeric lambs**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Cellular Reprogramming have been published. According to news reporting originating in Cremona, Italy, by NewsRx journalists, researchers stated “Pluripotential stem cells from livestock offer an exciting prospect for the biotechnology industry. Applying strategies established for the derivation of murine induced pluripotential stem cells (iPSCs), we have isolated ovine iPSCs that can give rise to cells characteristic of all three germ cell layers both in vitro from embryoid bodies and in teratomas in vivo.”

The news reporters obtained a quote from the research by the authors, “Furthermore, although at a low level, these ovine iPS cells can contribute to live-born chimeric lambs. Colonies derived from ovine embryonic fibroblasts transfected with murine cMyc, Klf4, Oct4, and Sox2 displayed smooth domes with sharp edges when grown in human embryonic stem cell (ESC) medium but not in mouse ESC medium. These ovine iPSCs were alkaline phosphatase positive, expressed Nanog, and had a normal karyotype.”

According to the news reporters, the researchers concluded: “These cells represent an important step in the understanding of mechanistic nature of pluripotency in ungulates.”

For more information on this research see: Ovine-induced pluripotent stem cells can contribute to chimeric lambs. *Cellular Reprogramming*, 2012;14(1):8-19. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

Our news correspondents report that additional information may be obtained by contacting C. Sartori, Avantea, Laboratory of Reproductive Technologies, Cremona, Italy. (2012 Jun 26)

### **Tokyo Medical and Dental University: Gene expression profile normalization in cloned mice by trichostatin A treatment**

By a News Reporter-Staff News Editor at Life Science Weekly – Researchers detail new data in Cellular Reprogramming. According to news reporting originating in Tokyo, Japan, by NewsRx journalists, researchers stated “Cloning mammals by somatic cell nuclear transfer (SCNT) has become an established procedure, but the success rate remains low and gene expression abnormalities are also observed. In addition, SCNT pups exhibited an abnormal gene expression profile with a high degree of heterogeneity among individuals.”

The news reporters obtained a quote from the research by the authors from Tokyo Medical and Dental University, “Recently, we reported that somatic clones treated with trichostatin A (TSA) exhibited a significantly improved success rate, probably due to its effects on chromatin remodeling and histone modification in early embryos. Here we show that the TSA treatment also improves the long-term consistency of genome-wide gene expression regulation: the total number of genes commonly exhibiting up-or downregulation in the TSA clone pups decreased to half of the conventional SCNT pups, and the variation among individuals observed in the SCNT pups was also reduced to the level of the pups produced by the intracytoplasmic sperm injection (ICSI) method.”

According to the news reporters, the researchers concluded: “Interestingly, the total gene expression profile of the TSA clones came to resemble that of the ICSI pups.”

For more information on this research see: Gene expression profile normalization in cloned mice by trichostatin A treatment. *Cellular Reprogramming*, 2012;14(1):45-55. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

Our news correspondents report that additional information may be obtained by contacting T. Kohda, Dept. of Epigenetics, Medical Research Institute, Tokyo Medical and Dental University, Tokyo, Japan. (2012 Jun 26)

**University of Connecticut, Storrs: Established preblastocyst- and blastocyst-derived ES cell lines have highly similar gene expression profiles, despite their differing requirements for derivation culture conditions**

By a News Reporter-Staff News Editor at Life Science Weekly – A new study on Cellular Reprogramming is now available. According to news reporting originating from Storrs, Connecticut, by NewsRx correspondents, researchers stated “The efficiency of embryonic stem (ES) cell derivation relies on an optimized culture medium and techniques for treating preimplantation stage embryos. Recently, ES cell derivation from the preblastocyst developmental stage was reported by removing the zona pellucida from embryos of the most efficient strain for ES cell derivation (129Sv) during early preimplantation.”

Our news editors obtained a quote from the research by the authors from the University of Connecticut, “Here, we showed that ES cells can be efficiently derived and maintained in a modified medium (MEMa), from preblastocysts of a low-efficiency mouse strain (a hybrid consisting of 50% B6, 25% CBA, and 25% DBA). Preblastocyst-derived ES cell lines were normal in terms of pluripotency-related protein expression, and chromosome number. Also, preblastocyst-derived ES cell lines from various culture conditions showed pluripotency in vivo through teratoma analysis.”

According to the news editors, the researchers concluded: “Interestingly, ES cell lines produced from preblastocysts and blastocysts, regardless of the derivation culture conditions, are nearly indistinguishable by their global gene expression profiles.”

For more information on this research see: Established preblastocyst- and blastocyst-derived ES cell lines have highly similar gene expression profiles, despite their differing requirements for derivation culture conditions. *Cellular Reprogramming*, 2012;14(1):1-7. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

The news editors report that additional information may be obtained by contacting C. Kim, Center for Regenerative Biology, University of Connecticut, Storrs, Connecticut 06269-4243, United States. (2012 Jun 26)

**Agricultural Biotechnology Center, Godollo: Comparative analysis of nuclear transfer embryo-derived mouse embryonic stem cells. Part II: gene regulation**

By a News Reporter-Staff News Editor at Stem Cell Week – New research on Stem Cell Research is the subject of a report. According to news reporting out of Godollo, Hungary, by NewsRx editors, researchers stated “In a mouse model nuclear transfer embryo-derived embryonic stem cell lines (ntESCs) of various genetic backgrounds and donor cell types were compared with reference ESCs and analyzed comprehensively at molecular level as a second part of a larger study. Expression profiles of ntESCs established by different NT-methods (piezo-electric microinjection or zona-free) were indistinguishable.”

Our news journalists obtained a quote from the research by the authors from Agricultural Biotechnology Center, “However, expression profiling analyses identified differentially regulated genes between reference ESCs and ntESCs from different genetic backgrounds. A number of pluripotency and stemness marker genes significantly differed at the mRNA level between the cell lines. However, cluster and lineage analyses revealed that such differences had no effect on cell differentiation and cell fate. Regardless of the donor cell type, gene expression profiles of ntESCs were more similar to each other than to their counterpart fertilized embryo-derived ESCs of the same genotype.”

According to the news editors, the researchers concluded: “Overall, the results indicated that expression profile differences may be related to the genotype rather than to technical variations.”

For more information on this research see: Comparative analysis of nuclear transfer embryo-derived mouse embryonic stem cells. Part II: gene regulation. *Cellular Reprogramming*, 2012;14(1):68-78. (Mary Ann Liebert, Inc. - [www.liebertpub.com](http://www.liebertpub.com); Cellular Reprogramming - <http://www.liebertpub.com/overview/cellular-reprogramming-formerly-cloning-and-stem-cells/9/>)

Our news journalists report that additional information may be obtained by contacting J. Kobolak, Genetic Reprogramming Group, Agricultural Biotechnology Center, Godollo, Hungary. (2012 Jun 25)



## Chapter 5

# Molecular Medicine

### **Fudan University, Shanghai: Rosuvastatin-attenuated heart failure in aged spontaneously hypertensive rats via PKCa/223;2 signal pathway**

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators publish new report on Heart Diseases and Conditions. According to news reporting originating in Shanghai, People's Republic of China, by NewsRx journalists, research stated, "There are controversies concerning the capacity of Rosuvastatin to attenuate heart failure in end-stage hypertension. The aim of the study was to show whether the Rosuvastatin might be effective or not for the heart failure treatment."

The news reporters obtained a quote from the research from Fudan University, "Twenty-one spontaneously hypertensive rats (SHRs) aged 52 weeks with heart failure were randomly divided into three groups: two receiving Rosuvastatin at 20 and 40 mg/kg/day, respectively, and the third, placebo for comparison with seven Wistar-Kyoto rats (WKYs) as controls. After an 8-week treatment, the systolic blood pressure (SBP) and echocardiographic features were evaluated; mRNA level of B-type natriuretic peptide (BNP) and plasma NT-proBNP concentration were measured; the heart tissues were observed under electron microscope (EM); myocardial sarcoplasmic reticulum Ca(2+) pump (SERCA-2) activity and mitochondria cytochrome C oxidase (CCO) activity were measured; the expressions of SERCA-2a, phospholamban (PLB), ryanodine receptor2 (RyR2), sodium-calcium exchanger 1 (NCX1), Ca(2+)/calmodulin-dependent protein kinase II (CaMKII) and protein phosphatase inhibitor-1 (PPI-1) were detected by Western blot and RT-qPCR; and the total and phosphorylation of protein kinase

Ca<sup>2+</sup>; (PKCa<sup>2+</sup>;) were measured. Aged SHR with heart failure was characterized by significantly decreased left ventricular ejection fraction and left ventricular fraction shortening, enhanced left ventricular end-diastolic diameter and LV Volume, accompanied by increased plasma NT-proBNP and elevated BNP gene expression. Damaged myofibrils, vacuolated mitochondria and swollen sarcoplasmic reticulum were observed by EM. Myocardium mitochondria CCO and SERCA-2 activity decreased. The expressions of PLB and NCX1 increased significantly with up-regulation of PPI-1 and down-regulation of CaMKII, whereas that of RyR2 decreased. Rosuvastatin was found to ameliorate the heart failure in aged SHR and to improve changes in SERCA-2a, PLB, RyR2, NCX1, CaMKII and PPI-1; PKCa<sup>2+</sup>;2 signal pathway to be suppressed; the protective effect of Rosuvastatin to be dose dependent.”

According to the news reporters, the research concluded: “The heart failure of aged SHR that was developed during the end stage of hypertension could be ameliorated by Rosuvastatin.”

For more information on this research see: Rosuvastatin-attenuated heart failure in aged spontaneously hypertensive rats via PKCa<sup>2+</sup>;2 signal pathway. *Journal of Cellular and Molecular Medicine*, 2012;16(12):3052-61. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting Z. Qiu, Shanghai Institute of Cardiovascular Diseases of Zhongshan Hospital, Fudan University, Shanghai, People's Taiwan.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2013 Feb 18)

### **Fudan University, Shanghai: Telocytes in the human kidney cortex**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Molecular Medicine is now available. According to news reporting from Shanghai, People's Republic of China, by NewsRx journalists, research stated, “Renal interstitial cells play an important role in the physiology and pathology of the kidneys. As a novel type of interstitial cell, telocytes (TCs) have been described in various tissues and organs, including the heart, lung, skeletal muscle, urinary tract, etc. ([www.telocytes.com](http://www.telocytes.com)).”

The news correspondents obtained a quote from the research from Fudan University, “However, it is not known if TCs are present in the kidney interstitium. We demonstrated the presence of TCs in human kidney cortex interstitium using primary cell culture, transmission electron microscopy (TEM) and in situ immunohistochemistry (IHC). Renal TCs were positive for CD34, CD117 and vimentin. They were localized in the kidney cortex interstitial compartment, partially covering the tubules and vascular walls. Morphologically, renal TCs resemble TCs described in other organs, with very long telopodes (Tps) composed of thin segments (podomers) and dilated segments (podoms).”

According to the news reporters, the research concluded: “However, their possible roles (beyond intercellular signalling) as well as their specific phenotype in the kidney remain to be established.”

For more information on this research see: Telocytes in the human kidney cortex. *Journal of Cellular and Molecular Medicine*, 2012;16(12):3116-3122. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting G.S. Qi, Fudan University, Zhongshan Hosp, Biomed Res Center, Shanghai 200433, People's Republic of China. (2013 Jan 30)

### **University of Heidelberg: The heart in Duchenne muscular dystrophy: early detection of contractile performance alteration**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Molecular Medicine have been published. According to news reporting out of Heidelberg, Germany, by NewsRx editors, research stated, “Progressive cardiomyopathy is a major cause of death in Duchenne muscular dystrophy (DMD) patients. Coupling between Ca<sup>2+</sup> handling and contractile properties in dystrophic hearts is poorly understood.”

Our news journalists obtained a quote from the research from the University of Heidelberg, “It is also not clear whether developing cardiac failure is dominated by alterations in Ca<sup>2+</sup> pathways or more related to the contractile apparatus. We simultaneously recorded force and Ca<sup>2+</sup> transients in field-stimulated papillary muscles from young (1014 weeks) wild-type (wt) and dystrophic mdx mice. Force amplitudes were fivefold reduced in mdx muscles despite only 30 % reduction in fura-2 ratio amplitudes. This indicated mechanisms other than systolic

Ca<sup>2+</sup> to additionally account for force decrements in mdx muscles. pCa-force relations revealed decreased mdx myofibrillar Ca<sup>2+</sup> sensitivity. In vitro motility assays, studied in mdx hearts here for the first time, showed significantly slower sliding velocities. mdx MLC/MHC isoforms were not grossly altered. Dystrophic hearts showed echocardiography signs of early ventricular wall hypertrophy with a significantly enlarged end-diastolic diameter in vivo. However, fractional shortening was still comparable to wt mice. Changes in the contractile apparatus satisfactorily explained force drop in mdx hearts.”

According to the news editors, the research concluded: “We give first evidence of early hypertrophy in mdx mice and possible mechanisms for already functional impairment of cardiac muscle in DMD.”

For more information on this research see: The heart in Duchenne muscular dystrophy: early detection of contractile performance alteration. *Journal of Cellular and Molecular Medicine*, 2012;16(12):3028-3036. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting S. Wagner, Heidelberg Univ, Dept. of Med Cardiol Angiol & Pneumonol 3, Heidelberg, Germany. (2013 Jan 30)

### **Yale University, New Haven: Cellularity and structure of fresh human coronary thrombectomy specimens; presence of cells with markers of progenitor cells**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Molecular Medicine. According to news originating from New Haven, Connecticut, by NewsRx correspondents, research stated, “Acute coronary syndromes and acute myocardial infarctions are often related to plaque rupture and the formation of thrombi at the site of the rupture. We examined fresh coronary thrombectomy specimens from patients with acute coronary syndromes and assessed their structure and cellularity.”

Our news journalists obtained a quote from the research from Yale University, “The thrombectomy specimens consisted of platelets, erythrocytes and inflammatory cells. Several specimens contained multiple cholesterol crystals. Culture of thrombectomy specimens yielded cells growing in various patterns depending on the culture medium used. Culture in serum-free stem cell enrichment medium yielded cells with features of endothelial progenitor cells which survived in culture for a year. Immunohistochemical analysis of the thrombi revealed cells positive for CD34, cells positive for CD15 and cells positive for desmin in

situ, whereas cultured cell from thrombi was desmin positive but pan-cytokeratin negative. Cells cultured in endothelial cell medium were von Willebrand factor positive. The content of coronary thrombectomy specimens is heterogeneous and consists of blood cells but also possibly cells from the vascular wall and cholesterol crystals.”

According to the news editors, the research concluded: “The culture of cells contained in the specimens yielded multiplying cells, some of which demonstrated features of haematopoietic progenitor cells and which differentiated into various cell-types.”

For more information on this research see: Cellularity and structure of fresh human coronary thrombectomy specimens; presence of cells with markers of progenitor cells. *Journal of Cellular and Molecular Medicine*, 2012;16(12):3022-3027. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news correspondents report that additional information may be obtained from I.S. Jovin, Yale University, Center Vasc Biol & Transplantat, New Haven, CT, United States. (2013 Jan 29)

### **King’s College, London: Akt- and Erk-mediated regulation of proliferation and differentiation during PDGFR beta-induced MSC self-renewal**

By a News Reporter-Staff News Editor at Biotech Week – Research findings on Molecular Medicine are discussed in a new report. According to news reporting originating in London, United Kingdom, by NewsRx journalists, research stated, “Understanding the mechanisms that direct mesenchymal stem cell (MSC) self-renewal fate decisions is a key to most tissue regenerative approaches. The aim of this study here was to investigate the mechanisms of action of platelet-derived growth factor receptor beta (PDGFR beta) signalling on MSC proliferation and differentiation.”

The news reporters obtained a quote from the research from King’s College, “MSC were cultured and stimulated with PDGF-BB together with inhibitors of second messenger pathways. Cell proliferation was assessed using ethynyl-2’-deoxyuridine and phosphorylation status of signalling molecules assessed by Western Blots. To assess differentiation potentials, cells were transferred to adipogenic or osteogenic media, and differentiation assessed by expression of differentiation association genes by qRT-PCR, and by long-term culture assays. Our results showed that distinct pathways with opposing actions were activated by PDGF. PI3K/Akt signalling was the main contributor to MSC

proliferation in response to activation of PDGFR beta. We also demonstrate a negative feedback mechanism between PI3K/Akt and PDGFR-beta expression. In addition, PI3K/Akt downstream signal cascades, mTOR and its associated proteins p70S6K and 4E-BP1 were involved. These pathways induced the expression of cyclin D1, cyclin D3 and CDK6 to promote cell cycle progression and MSC proliferation. In contrast, activation of Erk by PDGFR beta signalling potently inhibited the adipocytic differentiation of MSCs by blocking PPAR gamma and CEBP alpha expression. The data suggest that PDGFR beta-induced Akt and Erk pathways regulate opposing fate decisions of proliferation and differentiation to promote MSC self-renewal.”

According to the news reporters, the research concluded: “Thus, activation of multiple intracellular cascades is required for successful and sustainable MSC self-renewal strategies.”

For more information on this research see: Akt- and Erk-mediated regulation of proliferation and differentiation during PDGFR beta-induced MSC self-renewal. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2789-2801. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting B. Gharibi, Kings Coll London, Inst Dental, London SE1 9RT, United Kingdom. (2013 Jan 16)

## **Institute of Basic Medical Sciences, Beijing: Metastasis-associated gene, mag-1 improves tumour microenvironmental adaptation and potentiates tumour metastasis**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Cellular and Molecular Medicine. According to news reporting originating from Beijing, People’s Republic of China, by NewsRx correspondents, research stated, “Metastasis is a major cause of death from malignant diseases, and the underlying mechanisms are still largely not known. A detailed probe into the factors which may regulate tumor invasion and metastasis contributes to novel anti-metastatic therapies.”

Our news editors obtained a quote from the research from the Institute of Basic Medical Sciences, “We previously identified a novel metastasis-associated gene 1 (mag-1) by means of metastatic phenotype cloning. Then we characterized the gene expression profile of mag-1 and

showed that it promoted cell migration, adhesion and invasion in vitro. Importantly, the disruption of mag-1 via RNA interference not only inhibited cellular metastatic behaviours but also significantly reduced tumor weight and restrained mouse breast cancer cells to metastasize to lungs in spontaneous metastatic assay in vivo. Furthermore, we proved that mag-1 integrates dual regulating mechanisms through the stabilization of HIF-1a and the activation of mTOR signalling pathway. We also found that mag-1-induced metastatic promotion could be abrogated by mTOR specific inhibitor, rapamycin.”

According to the news editors, the research concluded: “Taken together, the findings identified a direct role that mag-1 played in metastasis and implicated its function in cellular adaptation to tumor microenvironment.”

For more information on this research see: Metastasis-associated gene, mag-1 improves tumour microenvironmental adaptation and potentiates tumour metastasis. *Journal of Cellular and Molecular Medicine*, 2012;16(12):3037-51. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news editors report that additional information may be obtained by contacting Y. Wang, Dept. of Advanced Interdisciplinary Studies, Institute of Basic Medical Sciences, Beijing, People’s Taiwan.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2013 Jan 11)

## **Iuliu Hatieganu University of Medicine and Pharmacy, Cluj Napoca: Analysis of CYP2C9\*2, CYP2C9\*3 and VKORC1 -1639 G>A polymorphisms in a population from South-Eastern Europe**

By a News Reporter-Staff News Editor at Health & Medicine Week – A new study on Cellular and Molecular Medicine is now available. According to news reporting from Cluj Napoca, Romania, by NewsRx journalists, research stated, “The CYP2C9 enzyme metabolizes a wide range of relevant drugs, among which are oral anticoagulants. VKORC1 is the pharmacodynamic target of the oral anticoagulants.”

The news correspondents obtained a quote from the research from the Iuliu Hatieganu University of Medicine and Pharmacy, “The genetic polymorphisms CYP2C9\*2, CYP2C9\*3 and VKORC1 -1639 G>A are the major determinants of the inter-individual variability in the dosage

requirements of oral anticoagulants. This study provides a first evaluation of these 3 polymorphisms in a Romanian population. A total of 332 Romanian individuals were genotyped for the CYP2C9\*2, CYP2C9\*3 and VKORC1 -1639 G>A polymorphisms using the PCR-RFLP technique. Sixty-two individuals (18.7%) were heterozygous for CYP2C9\*2, whereas 47 individuals (14.1%) were heterozygous for CYP2C9\*3. Fourteen individuals (4.2%) had a CYP2C9\*2 homozygous, CYP2C9\*3 homozygous or CYP2C9\*2/CYP2C9\*3 compound heterozygous genotype. These individuals are predicted to have the lowest CYP2C9 enzymatic activity. The allele frequencies of the CYP2C9\*2 and CYP2C9\*3 polymorphisms were 11.3% and 9.3% respectively. For the VKORC1 -1639 G>A polymorphism, there were 170 heterozygotes (51.2%) and 55 (16.6%) homozygotes for the A allele. The frequency of the A allele was 42.2%. Overall, the distribution of the CYP2C9\*2, CYP2C9\*3 and VKORC1 -1639 G>A polymorphisms observed in our cohort is in accordance with other Caucasian populations. A large number of Romanians are expected to harbour at least one CYP2C9 variant allele and/or one VKORC1 -1639 G>A allele.”

According to the news reporters, the research concluded: “This frequency has major implications in the pharmacogenomics of oral anticoagulants in Romanians.”

For more information on this research see: Analysis of CYP2C9\*2, CYP2C9\*3 and VKORC1 -1639 G>A polymorphisms in a population from South-Eastern Europe. *Journal of Cellular and Molecular Medicine*, 2012;16(12):2919-24. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting A.D. Buzoianu, Dept. of Clinical Pharmacology and Toxicology, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2013 Jan 11)



## **University of Malaga: What is known on angiogenesis-related rare diseases? A systematic review of literature**

By a News Reporter-Staff News Editor at Angiogenesis Weekly – Researchers detail new data in Cellular and Molecular Medicine. According to news reporting originating from Malaga, Spain, by NewsRx correspondents, research stated, “Angiogenesis, the formation of new vessels from pre-existing ones, is essential during ontogenetic development and is related to many important physio-pathological processes in the adult. In fact, a persistent and deregulated angiogenesis is a required event for many diseases and pathological situations, including cancer progression and metastasis.”

Our news editors obtained a quote from the research from the University of Malaga, “Some rare diseases are also angiogenesis-related pathologies. However, there is a lack of an exhaustive review on the topic. The main purpose of this work is to carry out a systematic review of literature to determine what (and how much) scientific information concerning angiogenesis-related rare diseases can be extracted from available sources. After exhaustive searches in bibliographic databases, preselected data were filtered by selecting only those articles on rare diseases with an Orpha number hosted in the Orphanet web. The selected bibliographic references were further curated manually.”

According to the news editors, the research concluded: “With the 187 selected references, a critical reading and analysis was carried out allowing for an identification and classification of angiogenesis-related rare diseases, the involved genes and the drugs available for their treatment, all on the basis of the information available in Orphanet database.”

For more information on this research see: What is known on angiogenesis-related rare diseases? A systematic review of literature. *Journal of Cellular and Molecular Medicine*, 2012;16(12):2872-93. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news editors report that additional information may be obtained by contacting L. Rodriguez-Caso, Departamento de Biología Molecular y Bioquímica, Facultad de Ciencias, Universidad de Malaga, Malaga, Spain.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2013 Jan 11)

## University of Warwick, Coventry: Characterization of the tissue-level $\text{Ca}(2+)$ signals in spontaneously contracting human myometrium

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Cellular and Molecular Medicine. According to news reporting originating in Coventry, United Kingdom, by NewsRx journalists, research stated, “In the labouring uterus, millions of myocytes forming the complex geometrical structure of myometrium contract in synchrony to increase intrauterine pressure, dilate the cervix and eventually expel the foetus through the birth canal. The mechanisms underlying the precise coordination of contractions in human myometrium are not completely understood.”

The news reporters obtained a quote from the research from the University of Warwick, “In the present study, we have characterized the spatio-temporal properties of tissue-level  $[\text{Ca}(2+)](i)$  transients in thin slices of intact human myometrium. We found that the waveform of  $[\text{Ca}(2+)](i)$  transients and isotonic contractions recorded from thin slices was similar to the waveform of isometric contractions recorded from the larger strips in traditional organ bath experiments, suggesting that the spatio-temporal information obtained from thin slices is representative of the whole tissue. By comparing the time course of  $[\text{Ca}(2+)](i)$  transients in individual cells to that recorded from the bundles of myocytes we found that the majority of myocytes produce rapidly propagating long-lasting  $[\text{Ca}(2+)](i)$  transients accompanied by contractions. We also found a small number of cells showing desynchronized  $[\text{Ca}(2+)](i)$  oscillations that did not trigger contractions. The  $[\text{Ca}(2+)](i)$  oscillations in these cells were insensitive to nifedipine, but readily inhibited by the T-type  $\text{Ca}(2+)$  channel inhibitor NNC55-0396.”

According to the news reporters, the research concluded: “Our data suggest that the spread of  $[\text{Ca}(2+)](i)$  signals in human myometrium is achieved via propagation of long-lasting action potentials. The propagation was fast when action potentials propagated along bundles of myocytes and slower when propagating between the bundles of uterine myocytes.”

For more information on this research see: Characterization of the tissue-level  $\text{Ca}(2+)$  signals in spontaneously contracting human myometrium. *Journal of Cellular and Molecular Medicine*, 2012;16(12):2990-3000. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting G. Bru-Mercier, Warwick Medical School, University of Warwick, Coventry, UK.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2013 Jan 11)

### **University of Medicine and Pharmacy, Cluj Napoca: Towards a roadmap in brain protection and recovery**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Cellular and Molecular Medicine have been published. According to news originating from Cluj Napoca, Romania, by NewsRx correspondents, research stated, “This article briefly reviews some of the mechanisms involved in the pathogenesis of neurological diseases, i.e. damage mechanisms (DM), and their interactions and overlap with protection and reparatory processes (i.e. endogenous defence activities). A relationship between DM and endogenous defence activity (EDA) regarding therapy principles will also be described.”

Our news journalists obtained a quote from the research from the University of Medicine and Pharmacy, “Currently, it is difficult to find the correct therapeutic approach for brain protection and recovery, especially because we do not fully understand all of the endogenous neurobiological processes, the complete nature of the pathophysiological mechanisms and the links between these two categories. Moreover, we continue to use a simplistic and reductionist approach in this respect. Endogenous neurobiological processes, such as neurotrophicity, neuroprotection, neuroplasticity and neurogenesis, are central to protection and recovery and represent the background of EDA. The biological reality of the nervous system is far more complex. In fact, there is an endogenous holistic process of neuroprotection and neurorecovery that should be approached therapeutically in an integrated way. The current tendency to exclusively frame drug activity in terms of single mechanisms and single focus effect might distract from other paradigms with greater explanatory power and hinder the development of more effective treatment strategies. A change of concept is required in pharmacological brain protection and recovery.”

According to the news editors, the research concluded: “Prospective considerations include an integrated pharmacological approach, focusing on drugs with multimodal activity and pleiotropic neuroprotective effect which are biological drugs, rather than single mechanism drugs, which usually are chemical drugs.”

For more information on this research see: Towards a roadmap in brain protection and recovery. *Journal of Cellular and Molecular Medicine*, 2012;16(12):2861-71. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news correspondents report that additional information may be obtained from D.F. Muresanu, Dept. of Clinical Neurosciences, University of Medicine and Pharmacy Iuliu Hatieganu, Cluj-Napoca, Romania.

The publisher's contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2013 Jan 09)

### **Victor Babes National Institute for Pathology and Biomedical Sciences, Bucharest: Human myometrium - the ultrastructural 3D network of telocytes**

By a News Reporter-Staff News Editor at Biotech Week – Current study results on Molecular Medicine have been published. According to news reporting originating in Bucharest, Romania, by NewsRx journalists, research stated, “Telocytes (TCs), a novel type of interstitial cells, were recently described in the interstitial space of tissues ([www.telocytes.com](http://www.telocytes.com)). Telocytes TCs have several very long, moniliform extensions, namely telopodes (Tps).”

The news reporters obtained a quote from the research from Victor Babes National Institute for Pathology and Biomedical Sciences, “However, the functional role(s) of TCs is not yet understood. Successive photomicrographs of ultrathin sections were concatenated to capture the entire length of Tps which usually measure tens to hundreds of micrometres. Besides the podoms (dilations) and podomers (thin segments), ultrastructural features of Tps include the dichotomous branching and establishing homo- and heterocellular contacts. Telopodes make a labyrinthine system by 3D convolution and overlapping, their number being roughly estimated at approximately 20 per 1000  $\mu\text{m}^2$ .”

According to the news reporters, the research concluded: “Moreover, the presence of extracellular vesicles (shedding vesicles/exosomes) along the Tps suggests an active intercellular signalling (micro- and macromolecules), with possible significance in regulating uterine contractility.”

For more information on this research see: Human myometrium - the ultrastructural 3D network of telocytes. *Journal of Cellular*

*and Molecular Medicine*, 2012;16(11):2844-2849. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting S.M. Cretoiu, Victor Babes Natl Inst Pathol, Dept. of Mol Med, Bucharest, Romania. (2013 Jan 09)

### **Fudan University, Shanghai: KGF-2 targets alveolar epithelia and capillary endothelia to reduce high altitude pulmonary oedema in rats**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Apoptosis. According to news originating from Shanghai, People's Republic of China, by NewsRx correspondents, research stated, "High altitude pulmonary oedema (HAPE) severely affects non-acclimatized individuals and is characterized by alveolar flooding with protein-rich oedema as a consequence of blood-gas barrier disruption. Limited choice for prophylactic treatment warrants effective therapy against HAPE."

Our news journalists obtained a quote from the research from Fudan University, "Keratinocyte growth factor-2 (KGF-2) has shown efficiency in preventing alveolar epithelial cell DNA damages in vitro. In the current study, the effects of KGF-2 intratracheal instillation on mortality, lung liquid balance and lung histology were evaluated in our previously developed rat model of HAPE. We found that pre-treatment with KGF-2 (5 mg/kg) significantly decreased mortality, improved oxygenation and reduced lung wet-to-dry weight ratio by preventing alveolar-capillary barrier disruption demonstrated by histological examination and increasing alveolar fluid clearance up to 150%. In addition, KGF-2 significantly inhibited decrease of transendothelial permeability after exposure to hypoxia, accompanied by a 10-fold increase of Akt activity and inhibited apoptosis in human pulmonary microvascular endothelial cells, demonstrating attenuated endothelial apoptosis might contribute to reduction of endothelial permeability. These results showed the efficacy of KGF-2 on inhibition of endothelial cell apoptosis, preservation of alveolar-capillary barrier integrity and promotion of pulmonary oedema absorption in HAPE."

According to the news editors, the research concluded: "Thus, KGF-2 may represent a potential drug candidate for the prevention of HAPE."

For more information on this research see: KGF-2 targets alveolar epithelia and capillary endothelia to reduce high altitude pulmonary oedema in rats. *Journal of Cellular and Molecular Medicine*,

2012;16(12):3074-84. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news correspondents report that additional information may be obtained from J. She, Dept. of Pulmonary Medicine, Zhongshan Hospital, Fudan University, Shanghai, People's Taiwan.

The publisher's contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2013 Jan 08)

### **Imperial College London: Cardiomyocyte Ca(2+) handling and structure is regulated by degree and duration of mechanical load variation**

By a News Reporter-Staff News Editor at Cardiovascular Week – Research findings on Cellular and Molecular Medicine are discussed in a new report. According to news reporting out of London, United Kingdom, by NewsRx editors, research stated, “Cardiac transverse (t)-tubules are altered during disease and may be regulated by stretch-sensitive molecules. The relationship between variations in the degree and duration of load and t-tubule structure remains unknown, as well as its implications for local Ca(2+) -induced Ca(2+) release (CICR).”

Our news journalists obtained a quote from the research from Imperial College London, “Rat hearts were studied after 4 or 8 weeks of moderate mechanical unloading [using heterotopic abdominal heart-lung transplantation (HAHLT)] and 6 or 10 weeks of pressure overloading using thoracic aortic constriction. CICR, cell and t-tubule structure were assessed using confocal-microscopy, patch-clamping and scanning ion conductance microscopy. Moderate unloading was compared with severe unloading [using heart-only transplantation (HAHT)]. Mechanical unloading reduced cardiomyocyte volume in a time-dependent manner. Ca(2+) release synchronicity was reduced at 8 weeks moderate unloading only. Ca(2+) sparks increased in frequency and duration at 8 weeks of moderate unloading, which also induced t-tubule disorganization. Overloading increased cardiomyocyte volume and disrupted t-tubule morphology at 10 weeks but not 6 weeks. Moderate mechanical unloading for 4 weeks had milder effects compared with severe mechanical unloading (37% reduction in cell volume at 4 weeks compared to 56% reduction after severe mechanical unloading) and did not cause depression and delay of the Ca(2+) transient, increased Ca(2+) spark frequency or impaired t-tubule and cell surface structure.”

According to the news editors, the research concluded: “These data suggest that variations in chronic mechanical load influence local CICR

and t-tubule structure in a time-and degree-dependent manner, and that physiological states of increased and reduced cell size, without pathological changes are possible.”

For more information on this research see: Cardiomyocyte Ca(2+) handling and structure is regulated by degree and duration of mechanical load variation. *Journal of Cellular and Molecular Medicine*, 2012;16(12):2910-8. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting M. Ibrahim, Heart Science Centre, National Heart and Lung Institute, Imperial College London, London, UK.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2013 Jan 07)

## **Ohio State University, Columbus: Hepatic miR-29ab1 expression modulates chronic hepatic injury**

By a News Reporter-Staff News Editor at Gastroenterology Week – Current study results on Hepatic Fibrosis have been published. According to news reporting from Columbus, Ohio, by NewsRx journalists, research stated, “MicroRNAs (miRNAs) are small, regulatory non-coding RNAs that have potent effects on gene expression. Several miRNA are deregulated in cellular processes involved in human liver diseases and regulation of cellular processes.”

The news correspondents obtained a quote from the research from Ohio State University, “Recent studies have identified the involvement of miR-29 in hepatic fibrosis and carcinogenesis. Although several targets of miR-29 have been identified, there is limited information regarding the cell-type specific roles of miR-29 in the liver, and we sought to evaluate the role of this miRNA in hepatic pathobiology. We report the generation of a tissue-specific knockout mouse to evaluate the role of miR-29 in hepatic fibrosis and carcinogenesis in response to injury. We hypothesized that miR-29 contributes to the hepatocyte driven response to chronic cellular injury that results in fibrosis. In support of this hypothesis, fibrosis and mortality were enhanced in miR29 knockout mice in response to carbon tetrachloride. Genome-wide gene expression analysis identified an over-representation of genes associated with fibrosis. The oncofetal RNA H19 was modulated in a miR-29 dependent manner following exposure to carbon tetrachloride in vivo. The impact of a hepatocyte specific miR-29 knockout on survival following chronic

hepatic injury in vivo implicates this miRNA as a potential target for intervention.”

According to the news reporters, the research concluded: “These results provide evidence of the involvement of miR-29 in chronic hepatic injury, and suggest a role for deregulated hepatocyte expression of miR-29 in the response to hepatic injury, fibrosis and carcinogenesis.”

For more information on this research see: Hepatic miR-29ab1 expression modulates chronic hepatic injury. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2647-2654. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting T. Kogure, Ohio State University, Coll Med, Columbus, OH 43210, United States. (2013 Jan 07)

### **Rush University Medical Center, Chicago: Regulation of dynamin-2 assembly-disassembly and function through the SH3A domain of intersectin-1s**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Cellular and Molecular Medicine have been published. According to news reporting from Chicago, Illinois, by NewsRx journalists, research stated, “Intersectin-1s (ITSN-1s), a five Src homology 3 (SH3) domain-containing protein, is critically required for caveolae and clathrin-mediated endocytosis (CME), due to its interactions with dynamin (dyn). Of the five SH3A-E domains, SH3A is unique because of its high affinity for dyn and potent inhibition of CME.”

The news correspondents obtained a quote from the research from Rush University Medical Center, “However, the molecular mechanism by which SH3A integrates in the overall function of ITSN-1s to regulate the endocytic process is not understood. Using biochemical and functional approaches as well as high-resolution electron microscopy, we show that SH3A exogenously expressed in human lung endothelial cells caused abnormal endocytic structures, distorted caveolae clusters, frequent staining-dense rings around the caveolar necks and 60% inhibition of caveolae internalization. In vitro studies further revealed that SH3A, similar to full-length ITSN-1s stimulates dyn2 oligomerization and guanosine triphosphatase (GTP)ase activity, effects not detected when other SH3 domains of ITSN-1s were used as controls. Strikingly, in the presence of SH3A, dyn2-dyn2 interactions are stabilized and despite continuous GTP hydrolysis, dyn2 oligomers cannot disassemble.



SH3A may hold up caveolae release from the plasma membrane and formation of free-transport vesicles, by prolonging the lifetime of assembled dyn2.”

According to the news reporters, the research concluded: “Altogether, our results indicate that ITSN-1s, via its SH3A has the unique ability to regulate dyn2 assembly-disassembly and function during endocytosis.”

For more information on this research see: Regulation of dynamin-2 assembly-disassembly and function through the SH3A domain of intersectin-1s. *Journal of Cellular and Molecular Medicine*, 2011;15(11):2364-76. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting I. Knezevic, Dept. of Pharmacology, Rush University Medical Center, Medical College, Vascular Biology Section, Chicago, IL 60612, United States.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Dec 07)

### **King's College, London: Akt- and Erk-mediated regulation of proliferation and differentiation during PDGFR&#223;-induced MSC self-renewal**

By a News Reporter-Staff News Editor at Health & Medicine Week – A new study on Cellular and Molecular Medicine is now available. According to news reporting originating from London, United Kingdom, by NewsRx correspondents, research stated, “Understanding the mechanisms that direct mesenchymal stem cell (MSC) self-renewal fate decisions is a key to most tissue regenerative approaches. The aim of this study here was to investigate the mechanisms of action of platelet-derived growth factor receptor &#223; (PDGFR&#223;) signalling on MSC proliferation and differentiation.”

Our news editors obtained a quote from the research from King's College, “MSC were cultured and stimulated with PDGF-BB together with inhibitors of second messenger pathways. Cell proliferation was assessed using ethynyl-2'-deoxyuridine and phosphorylation status of signalling molecules assessed by Western Blots. To assess differentiation potentials, cells were transferred to adipogenic or osteogenic media, and differentiation assessed by expression of differentiation association genes by qRT-PCR, and by long-term culture assays. Our results showed that distinct pathways with opposing actions were activated by

PDGF. PI3K/Akt signalling was the main contributor to MSC proliferation in response to activation of PDGFR<sup>223</sup>. We also demonstrate a negative feedback mechanism between PI3K/Akt and PDGFR<sup>223</sup> expression. In addition, PI3K/Akt downstream signal cascades, mTOR and its associated proteins p70S6K and 4E-BP1 were involved. These pathways induced the expression of cyclin D1, cyclin D3 and CDK6 to promote cell cycle progression and MSC proliferation. In contrast, activation of Erk by PDGFR<sup>223</sup> signalling potentially inhibited the adipocytic differentiation of MSCs by blocking PPAR $\gamma$  and CEBP $\alpha$  expression. The data suggest that PDGFR<sup>223</sup>-induced Akt and Erk pathways regulate opposing fate decisions of proliferation and differentiation to promote MSC self-renewal.”

According to the news editors, the research concluded: “Thus, activation of multiple intracellular cascades is required for successful and sustainable MSC self-renewal strategies.”

For more information on this research see: Akt- and Erk-mediated regulation of proliferation and differentiation during PDGFR<sup>223</sup>-induced MSC self-renewal. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2789-801. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news editors report that additional information may be obtained by contacting B. Gharibi, Periodontology, Dental Institute, King's College London, London, UK.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 30)

### **Sun Yat-Sen University, Guangzhou: Local activation of cardiac stem cells for post-myocardial infarction cardiac repair**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Cellular and Molecular Medicine. According to news reporting out of Guangzhou, People's Republic of China, by NewsRx editors, research stated, “The prognosis of patients with myocardial infarction (MI) and resultant chronic heart failure remains extremely poor despite continuous advancements in optimal medical therapy and interventional procedures. Animal experiments and clinical trials using adult stem cell therapy following MI have shown a global improvement of myocardial function.”

Our news journalists obtained a quote from the research from Sun Yat-Sen University, “The emergence of stem cell transplantation approaches has recently represented promising alternatives to stimulate myocardial regeneration. Regarding their tissue-specific properties, cardiac stem cells (CSCs) residing within the heart have advantages over other stem cell types to be the best cell source for cell transplantation. However, time-consuming and costly procedures to expand cells prior to cell transplantation and the reliability of cell culture and expansion may both be major obstacles in the clinical application of CSC-based transplantation therapy after MI. The recognition that the adult heart possesses endogenous CSCs that can regenerate cardiomyocytes and vascular cells has raised the unique therapeutic strategy to reconstitute dead myocardium via activating these cells post-MI. Several strategies, such as growth factors, microRNAs and drugs, may be implemented to potentiate endogenous CSCs to repair infarcted heart without cell transplantation. Most molecular and cellular mechanism involved in the process of CSC-based endogenous regeneration after MI is far from understanding.”

According to the news editors, the research concluded: “This article reviews current knowledge opening up the possibilities of cardiac repair through CSCs activation in situ in the setting of MI.”

For more information on this research see: Local activation of cardiac stem cells for post-myocardial infarction cardiac repair. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2549-63. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting Z. Wen, Sun Yat-sen Memorial Hospital of Sun Yat-sen University, Guangzhou, People's Taiwan.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 30)

## **University of Piemonte Orientale, Alessandria:**

### **Epigallocatechin-3-gallate induces mesothelioma cell death via H(2) O(2) -dependent T-type Ca(2+) channel opening**

By a News Reporter-Staff News Editor at Health & Medicine Week – Data detailed on Cellular and Molecular Medicine have been presented. According to news reporting originating in Alessandria, Italy, by NewsRx journalists, research stated, “Malignant mesothelioma (MMe) is a highly aggressive, lethal tumor requiring the development of

more effective therapies. The green tea polyphenol epigallocatechin-3-gallate (EGCG) inhibits the growth of many types of cancer cells.”

The news reporters obtained a quote from the research from the University of Piemonte Orientale, “We found that EGCG is selectively cytotoxic to MMe cells with respect to normal mesothelial cells. MMe cell viability was inhibited by predominant induction of apoptosis at lower doses and necrosis at higher doses. EGCG elicited  $H(2)O(2)$  release in cell cultures, and exogenous catalase (CAT) abrogated EGCG-induced cytotoxicity, apoptosis and necrosis. Confocal imaging of fluo 3-loaded, EGCG-exposed MMe cells showed significant  $[Ca(2+)](i)$  rise, prevented by CAT, dithiothreitol or the T-type  $Ca(2+)$  channel blockers mibefradil and  $NiCl(2)$ . Cell loading with dihydropyrene 123 revealed EGCG-induced ROS production, prevented by CAT, mibefradil or the  $Ca(2+)$  chelator BAPTA-AM. Direct exposure of cells to  $H(2)O(2)$  produced similar effects on  $Ca(2+)$  and ROS, and these effects were prevented by the same inhibitors. Sensitivity of REN cells to EGCG was correlated with higher expression of  $Ca(v)3.2$  T-type  $Ca(2+)$  channels in these cells, compared to normal mesothelium. Also,  $Ca(v)3.2$  siRNA on MMe cells reduced in vitro EGCG cytotoxicity and abated apoptosis and necrosis. Intriguingly,  $Ca(v)3.2$  expression was observed in malignant pleural mesothelioma biopsies from patients, but not in normal pleura.”

According to the news reporters, the research concluded: “Data showed the expression of T-type  $Ca(2+)$  channels in MMe tissue and their role in EGCG selective cytotoxicity to MMe cells, suggesting the possible use of these channels as a novel MMe pharmacological target.”

For more information on this research see: Epigallocatechin-3-gallate induces mesothelioma cell death via  $H(2)O(2)$ -dependent T-type  $Ca(2+)$  channel opening. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2667-78. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting E. Ranzato, Dipartimento di Scienze e Innovazione Tecnologica, DiSIT, University of Piemonte Orientale Amedeo Avogadro, Alessandria, Italy.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 30)

## **University of Siena: Cerebrolysin administration reduces oxidative stress-induced apoptosis in lymphocytes from healthy individuals**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Cellular and Molecular Medicine. According to news reporting originating in Siena, Italy, by NewsRx journalists, research stated, “Cerebrolysin is the only drug available for clinical use containing active fragments of some important neurotrophic factors obtained from purified porcine brain proteins, which has long been used for the treatment of dementia and stroke sequels. Cerebrolysin has growth factor-like activities and promotes neuronal survival and sprouting, however, its molecular mechanism still needs to be determined.”

The news reporters obtained a quote from the research from the University of Siena, “It has been shown that Cerebrolysin may interact with proteolytic pathways linked to apoptosis. Administration of Cerebrolysin significantly reduces the number of apoptotic neurons after glutamate exposure. Furthermore, it has been reported that Cerebrolysin inhibits free radicals formation and lipid peroxidation. In vitro we evaluated the protective effects of Cerebrolysin towards spontaneous and induced apoptotic death in cells from healthy individuals. Peripheral blood lymphocytes (PBLs) from 10 individuals were used as cell model; 2-deoxy-D-ribose (dRib), a highly reducing sugar, was used as paradigm pro-apoptotic stimulus. Apoptosis was analysed using flow cytometry and fluorescence microscopy. Our results showed that Cerebrolysin significantly reduced the number of apoptotic PBLs after dRib treatment, although it had no significative effects on cells cultured in standard conditions.”

According to the news reporters, the research concluded: “Our work showed a protective effect of Cerebrolysin on oxidative stress-induced apoptosis and suggested that PBLs can be used as an easy obtainable and handy cell model to verify Cerebrolysin effects in neurodegenerative pathologies.”

For more information on this research see: Cerebrolysin administration reduces oxidative stress-induced apoptosis in lymphocytes from healthy individuals. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2840-3. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting P. Formichi, Dept. of Neurological, Neurosurgical and Behavioural Sciences, University of Siena, Siena, Italy.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 30)

### **Harvard School of Medicine, West Roxbury: Termination and activation of store-operated cyclic AMP production**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators discuss new findings in Cellular and Molecular Medicine. According to news reporting originating in West Roxbury, Massachusetts, by NewsRx journalists, research stated, “Diverse pathophysiological processes (e.g. obesity, lifespan determination, addiction and male fertility) have been linked to the expression of specific isoforms of the adenylyl cyclases (AC1-AC10), the enzymes that generate cyclic AMP (cAMP). Our laboratory recently discovered a new mode of cAMP production, prominent in certain cell types, that is stimulated by any manoeuvre causing reduction of free  $[Ca(2+)]$  within the lumen of the endoplasmic reticulum (ER) calcium store.”

The news reporters obtained a quote from the research from the Harvard School of Medicine, “Activation of this ‘store-operated’ pathway requires the ER  $Ca(2+)$  sensor, STIM1, but the identity of the enzymes responsible for cAMP production and how this process is regulated is unknown. Here, we used sensitive FRET-based sensors for cAMP in single cells combined with silencing and overexpression approaches to show that store-operated cAMP production occurred preferentially via the isoform AC3 in NCM460 colonic epithelial cells.  $Ca(2+)$  entry via the plasma membrane  $Ca(2+)$  channel, Orai1, suppressed cAMP production, independent of store refilling.”

According to the news reporters, the research concluded: “These findings are an important first step towards defining the functional significance and to identify the protein composition of this novel  $Ca(2+)$ /cAMP crosstalk system.”

For more information on this research see: Termination and activation of store-operated cyclic AMP production. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2715-25. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN 1582-4934)

Our news correspondents report that additional information may be obtained by contacting I. Maiellaro, VA Boston Healthcare System, Dept. of Surgery, Brigham and Women’s Hospital, Harvard Medical School, West Roxbury, MA, United States.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 27)

### **Monocytic microparticles promote atherogenesis by modulating inflammatory cells in mice**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Cellular and Molecular Medicine. According to news originating from Bonn, Germany, by NewsRx correspondents, research stated, “Microparticles (MP) are generated during a vast number of biological processes such as inflammation, cell activation and apoptosis. Increasing evidence points towards an important role of MP as intercellular messengers of biological information.”

Our news journalists obtained a quote from the research, “During atherogenesis, monocytes infiltrate the vascular wall and foster inflammation, accompanied by the release of monocytic MP (mono-MP). To date, only little is known about the biological function of mono-MP in the vascular wall. Here, we investigated the role of mono-MP during atherogenesis. Mono-MP were generated by starvation of THP-1 monocytes and isolated by ultracentrifugation. To investigate whether mono-MP influence atherogenesis, ApoE(-/-) mice were fed a high-fat, cholesterol-rich diet for 8 weeks and simultaneously treated with mono-MP or vehicle twice a week. Mice treated with mono-MP showed significantly increased monocyte and T-cell infiltration into the vessel wall, as assessed by Moma-2 and CD3 staining, and enhanced plaque formation, as assessed by oil-red-O staining. However, atherosclerotic plaque composition was not influenced by mono-MP application. In vitro, incubation of mono-MP with murine macrophages and endothelial cells resulted in the uptake of calcein-labelled mono-MP. Mono-MP uptake initiated the generation of intracellular reactive oxygen species. Murine macrophages pre-treated with mono-MP showed significantly enhanced expression of CCR2, migration to MCP-1 and increased release of pro-inflammatory interleukin-6. Co-incubation of mono-MP with endothelial cells resulted in significantly increased expression of ICAM-1, as assessed by RT-PCR and ELISA.”

According to the news editors, the research concluded: “Mono-MP act as paracrine messengers that intensify inflammation during atherogenesis by stimulating vascular-bound and inflammatory cells in their vicinity.”

For more information on this research see: Monocytic microparticles promote atherogenesis by modulating inflammatory cells in mice. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2777-88. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news correspondents report that additional information may be obtained from F.F. Hoyer, Medizinische Klinik und Poliklinik II, Universitätsklinikum Bonn, Bonn, Germany.

The publisher's contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 27)

### **School of Medicine, Lebanon: PV1 down-regulation via shRNA inhibits the growth of pancreatic adenocarcinoma xenografts**

By a News Reporter-Staff News Editor at Ivy League Week – Researchers detail new data in Cellular and Molecular Medicine. According to news reporting from Lebanon, New Hampshire, by NewsRx journalists, research stated, “PV1 is an endothelial-specific protein with structural roles in the formation of diaphragms in endothelial cells of normal vessels. PV1 is also highly expressed on endothelial cells of many solid tumours.”

The news correspondents obtained a quote from the research from the School of Medicine, “On the basis of in vitro data, PV1 is thought to actively participate in angiogenesis. To test whether or not PV1 has a function in tumor angiogenesis and in tumor growth in vivo, we have treated pancreatic tumour-bearing mice by single-dose intratumoural delivery of lentiviruses encoding for two different shRNAs targeting murine PV1. We find that PV1 down-regulation by shRNAs inhibits the growth of established tumours derived from two different human pancreatic adenocarcinoma cell lines (AsPC-1 and BxPC-3). The effect observed is because of down-regulation of PV1 in the tumor endothelial cells of host origin, PV1 being specifically expressed in tumor vascular endothelial cells and not in cancer or other stromal cells. There are no differences in vascular density of tumours treated or not with PV1 shRNA, and gain and loss of function of PV1 in endothelial cells does not modify either their proliferation or migration, suggesting that tumor angiogenesis is not impaired.”

According to the news reporters, the research concluded: “Together, our data argue that down-regulation of PV1 in tumor endothelial cells



results in the inhibition of tumor growth via a mechanism different from inhibiting angiogenesis.”

For more information on this research see: PV1 down-regulation via shRNA inhibits the growth of pancreatic adenocarcinoma xenografts. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2690-700. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1582-4934](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1582-4934))

Our news journalists report that additional information may be obtained by contacting S.J. Deharvengt, Departments of Pathology, Geisel School of Medicine at Dartmouth, Lebanon, NH, United States.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 27)

### **University of Tübingen: Immortalization of neuronal progenitors using SV40 large T antigen and differentiation towards dopaminergic neurons**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Cellular and Molecular Medicine have been published. According to news originating from Tübingen, Germany, by NewsRx correspondents, research stated, “Transplantation is common in clinical practice where there is availability of the tissue and organ. In the case of neurodegenerative disease such as Parkinson’s disease (PD), transplantation is not possible as a result of the non-availability of tissue or organ and therefore, cell therapy is an innovation in clinical practice.”

Our news journalists obtained a quote from the research from the University of Tübingen, “However, the availability of neuronal cells for transplantation is very limited. Alternatively, immortalized neuronal progenitors could be used in treating PD. The neuronal progenitor cells can be differentiated into dopaminergic phenotype. Here in this article, the current understanding of the molecular mechanisms involved in the differentiation of dopaminergic phenotype from the neuronal progenitors immortalized with SV40 LT antigen is discussed. In addition, the methods of generating dopaminergic neurons from progenitor cells and the factors that govern their differentiation are elaborated.”

According to the news editors, the research concluded: “Recent advances in cell-therapy based transplantation in PD patients and future prospects are discussed.”

For more information on this research see: Immortalization of neuronal progenitors using SV40 large T antigen and differentiation towards dopaminergic neurons. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2592-610. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news correspondents report that additional information may be obtained from A. Alwin Prem Anand, Institute of Anatomy, University of Tübingen, Tübingen, Germany.

The publisher's contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 27)

### **First Affiliated Hospital, Wenzhou: Expression of microRNA-122 contributes to apoptosis in H9C2 myocytes**

By a News Reporter-Staff News Editor at Cardiovascular Week – Current study results on Cellular and Molecular Medicine have been published. According to news originating from Wenzhou, People's Republic of China, by NewsRx correspondents, research stated, "The microRNAs (miRNAs) can post-transcriptionally regulate gene expression and heart development. The Pax-8 gene knockout mice have apparent heart abnormalities."

Our news journalists obtained a quote from the research from First Affiliated Hospital, "This study investigated the role of miRNAs in regulation of cardiac apoptosis and development in the knockout mice. MicroRNA microarrays demonstrated differential expression of microRNAs between Pax-8(-/-) and Pax-8(&plusmn;) mice, confirmed by real-time PCR. The miR-122 was up-regulated by 1.92 folds in Pax-8(-/-) mice. There were ventricular septum defects in Pax-8(-/-) mice, and increased numbers of apoptotic cells in the left ventricular wall and interventricular septum in Pax-8(-/-) mice. In H9C2 myocytes, treatment with miR-122 mimics or miR-122 inhibitor affects the expression of CCK-8 and activity of Caspase-3."

According to the news editors, the research concluded: "The miR-122 is up-regulated in the myocytes of Pax-8(-/-) mice and may participate in the apoptotic gene expression and pathogenesis of heart development defect."

For more information on this research see: Expression of microRNA-122 contributes to apoptosis in H9C2 myocytes. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2637-46. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing

Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news correspondents report that additional information may be obtained from X. Huang, Division of Cardiology, The First Affiliated Hospital of Wenzhou Medical College, Wenzhou, People's Taiwan.

The publisher's contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 26)

### **University of Rostock: Senescence determines the fate of activated rat pancreatic stellate cells**

By a News Reporter-Staff News Editor at Gastroenterology Week – Researchers detail new data in Inflammation. According to news reporting out of Rostock, Germany, by NewsRx editors, research stated, “In chronic pancreatitis (CP), persistent activation of pancreatic stellate cells (PSC) converts wound healing into a pathological process resulting in organ fibrosis. Here, we have analysed senescence as a novel mechanism involved in the termination of PSC activation and tissue repair.”

Our news journalists obtained a quote from the research from the University of Rostock, “PSC senescence was first studied in vitro by establishing long-term cultures and by applying chemical triggers, using senescence-associated  $\beta$ -Galactosidase (SA  $\beta$ -Gal) as a surrogate marker. Subsequently, susceptibility of PSC to immune cell-mediated cytotoxicity was investigated employing cocultures. Using the model of dibutyltin dichloride-induced CP in rats, appearance of senescent cells was monitored by immunohistochemistry and immunofluorescence, and correlated with the progression of tissue damage and repair, immune cell infiltration and fibrosis. The results indicated that long-term culture and exposure of PSC to stressors (doxorubicin, H<sub>2</sub>O<sub>2</sub> and staurosporine) induced senescence. Senescent PSC highly expressed CDKN1A/p21, mdm2 and interleukin (IL)-6, but displayed low levels of  $\alpha$ -smooth muscle actin. Senescence increased the susceptibility of PSC to cytotoxicity. In CP, the number of senescent cells correlated with the severity of inflammation and the extension of fibrosis. Areas staining positive for SA  $\beta$ -Gal overlapped with regions of fibrosis and dense infiltrates of immune cells. Furthermore, a close physical proximity of immune cells and activated PSC was observed. We conclude that inflammation, PSC activation and cellular senescence are timely coupled processes which take place in the same microenvironment of the inflamed pancreas.”

According to the news editors, the research concluded: “Lymphocytes may play a dual-specific role in pancreatic fibrogenesis, triggering

both the initiation of wound healing by activating PSC, and its completion by killing senescent stellate cells.”

For more information on this research see: Senescence determines the fate of activated rat pancreatic stellate cells. *Journal of Cellular and Molecular Medicine*, 2012;16(11):2620-30. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting B. Fitzner, Dept. of Medicine II, Division of Gastroenterology, University of Rostock, Rostock, Germany.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 26)

### **Leiden University: Shear induced collateral artery growth modulated by endoglin but not by ALK1**

By a News Reporter-Staff News Editor at Angiogenesis Weekly – A new study on Molecular Medicine is now available. According to news reporting originating in Leiden, Netherlands, by NewsRx journalists, research stated, “Transforming growth factor-beta (TGF-beta) stimulates both ischaemia induced angiogenesis and shear stress induced arteriogenesis by signalling through different receptors. How these receptors are involved in both these processes of blood flow recovery is not entirely clear.”

The news reporters obtained a quote from the research from Leiden University, “In this study the role of TGF-beta receptors 1 and endoglin is assessed in neovascularization in mice. Unilateral femoral artery ligation was performed in mice heterozygous for either endoglin or ALK1 and in littermate controls. Compared with littermate controls, blood flow recovery, monitored by laser Doppler perfusion imaging, was significantly hampered by maximal 40% in endoglin heterozygous mice and by maximal 49% in ALK1 heterozygous mice. Collateral artery size was significantly reduced in endoglin heterozygous mice compared with controls but not in ALK1 heterozygous mice. Capillary density in ischaemic calf muscles was unaffected, but capillaries from endoglin and ALK1 heterozygous mice were significantly larger when compared with controls. To provide mechanistic evidence for the differential role of endoglin and ALK1 in shear induced or ischaemia induced neovascularization, murine endothelial cells were exposed to shear stress in vitro. This induced increased levels of endoglin mRNA but not ALK1.

In this study it is demonstrated that both endoglin and ALK1 facilitate blood flow recovery.”

According to the news reporters, the research concluded: “Importantly, endoglin contributes to both shear induced collateral artery growth and to ischaemia induced angiogenesis, whereas ALK1 is only involved in ischaemia induced angiogenesis.”

For more information on this research see: Shear induced collateral artery growth modulated by endoglin but not by ALK1. *Journal of Cellular and Molecular Medicine*, 2012;16(10):2440-2450. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting L. Seghers, Leiden University, Medical Center, Dept. of Mol Cell Biol, NL-2300 RC Leiden, Netherlands. (2012 Nov 16)

### **Peoples Hospital, Guangdong: Overexpression of mouse TTF-2 gene causes cleft palate**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Molecular Medicine. According to news reporting out of Guangdong, People’s Republic of China, by NewsRx editors, research stated, “In humans, mutations of the gene encoding for thyroid transcription factor-2 (TTF-2 or FOXE1) result in Bamforth syndrome. Bamforth syndrome is characterized by agenesis, cleft palate, spiky hair and choanal atresia.”

Our news journalists obtained a quote from the research from Peoples Hospital, “TTF-2 null mice (TTF-2<sup>-/-</sup>) also exhibit cleft palate, suggesting its involvement in the palatogenesis. However, the molecular pathology and genetic regulation by TTF2 remain largely unknown. In the present study, the recombinant expression vector pBROAD3-TTF-2 containing the promoter of the mouse ROSA26 gene was created to form the structural gene of mouse TTF-2 and was microinjected into the male pronuclei of fertilized ova. Sequence analysis confirmed that the TTF-2 transgenic mouse model was established successfully. The transgenic mice displayed a phenotype of cleft palate. In addition, we found that TTF-2 was highly expressed in the medial edge epithelium (MEE) from the embryonic day 12.5 (E12.5) to E14.5 in TTF-2 transgenic mice.”

According to the news editors, the research concluded: “These observations suggest that overexpression of TTF-2 during palatogenesis may contribute to formation of cleft palate.”

For more information on this research see: Overexpression of mouse TTF-2 gene causes cleft palate. *Journal of Cellular and Molecular Medicine*, 2012;16(10):2362-2368. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting T. Meng, Guangzhou First Municipal Peoples Hosp, Dept. of Oral & Maxillofacial Surg, Guangzhou, Guangdong, People's Republic of China. (2012 Nov 14)

### **Ludwig-Maximilians-University, Munich: Myocardial regeneration by transplantation of modified endothelial progenitor cells expressing SDF-1 in a rat model**

By a News Reporter-Staff News Editor at Life Science Weekly – Investigators publish new report on Molecular Medicine. According to news originating from Munich, Germany, by NewsRx correspondents, research stated, “Cell based therapy has been shown to attenuate myocardial dysfunction after myocardial infarction (MI) in different acute and chronic animal models. It has been further shown that stromal-cell derived factor-1a (SDF-1a) facilitates proliferation and migration of endogenous progenitor cells into injured tissue.”

Our news journalists obtained a quote from the research from Ludwig-Maximilians-University, “The aim of the present study was to investigate the role of exogenously applied and endogenously mobilized cells in a regenerative strategy for MI therapy. Lentivirally SDF-1a-infected endothelial progenitor cells (EPCs) were injected after 90 min. of ligation and reperfusion of the left anterior descending artery (LAD) intramyocardial and intracoronary using a new rodent catheter system. Eight weeks after transplantation, echocardiography and isolated heart studies revealed a significant improvement of LV function after intramyocardial application of lentiviral with SDF-1 infected EPCs compared to medium control. Intracoronary application of cells did not lead to significant differences compared to medium injected control hearts. Histology showed a significantly elevated rate of apoptotic cells and augmented proliferation after transplantation of EPCs and EPCs + SDF-1 alpha in infarcted myocardium. In addition, a significant increased density of CD31+ vessel structures, a lower collagen content and higher numbers of inflammatory cells after transplantation of SDF-1 transgenic cells were detectable. Intramyocardial application of lentiviral-infected EPCs is associated with a significant improvement

of myocardial function after infarction, in contrast to an intracoronary application.”

According to the news editors, the research concluded: “Histological results revealed a significant augmentation of neovascularization, lower collagen content, higher numbers of inflammatory cells and remarkable alterations of apoptotic/proliferative processes in infarcted areas after cell transplantation.”

For more information on this research see: Myocardial regeneration by transplantation of modified endothelial progenitor cells expressing SDF-1 in a rat model. *Journal of Cellular and Molecular Medicine*, 2012;16(10):2311-2320. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news correspondents report that additional information may be obtained from A. Schuh, Ludwig Maximilians Univ LMU Munich, Munich Heart Alliance, Munich, Germany. (2012 Nov 13)

### **Eindhoven University of Technology: MiR-155 inhibits cell migration of human cardiomyocyte progenitor cells (hCMPCs) via targeting of MMP-16**

By a News Reporter-Staff News Editor at Cardiovascular Week – Data detailed on Molecular Medicine have been presented. According to news reporting originating from Eindhoven, Netherlands, by NewsRx correspondents, research stated, “Undesired cell migration after targeted cell transplantation potentially limits beneficial effects for cardiac regeneration. MicroRNAs are known to be involved in several cellular processes, including cell migration.”

Our news editors obtained a quote from the research from the Eindhoven University of Technology, “Here, we attempt to reduce human cardiomyocyte progenitor cell (hCMPC) migration via increasing microRNA-155 (miR-155) levels, and investigate the underlying mechanism. Human cardiomyocyte progenitor cells (hCMPCs) were transfected with pre-miR-155, anti-miR-155 or control-miR (ctrl-miR), followed by scratch- and transwell-assays. These functional assays displayed that miR-155 over-expression efficiently inhibited cell migration by 38 +/- 3.6% and 59 +/- 3.7% respectively. Conditioned medium from miR-155 transfected cells was collected and zymography analysis showed a significant decrease in MMP-2 and MMP-9 activities. The predicted 3'-UTR of MMP-16, an activator of MMP-2 and -9, was cloned into the pMIR-REPORT vector and luciferase assays were performed. Introduction of miR-155 significantly reduced luciferase activity which could

be abolished by cotransfection with anti-miR-155 or target site mutagenesis. By using MMP-16 siRNA to reduce MMP-16 levels or by using an MMP-16 blocking antibody, hCMPC migration could be blocked as well. By directly targeting MMP-16, miR-155 efficiently inhibits cell migration via a reduction in MMP-2 and -9 activities.”

According to the news editors, the research concluded: “Our study shows that miR-155 might be used to improve local retention of hCMPCs after intramyocardial delivery.”

For more information on this research see: MiR-155 inhibits cell migration of human cardiomyocyte progenitor cells (hCMPCs) via targeting of MMP-16. *Journal of Cellular and Molecular Medicine*, 2012;16(10):2379-2386. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news editors report that additional information may be obtained by contacting J. Liu, Eindhoven University of Technology, Dept. of Biomed Engrn, Biomed NMR, NL-5600 MB Eindhoven, Netherlands. (2012 Nov 12)

### **Fudan University, Shanghai: Up-regulation of BMP-2 antagonizes TGF-beta 1/ROCK-enhanced cardiac fibrotic signalling through activation of Smurf1/Smad6 complex**

By a News Reporter-Staff News Editor at Cardiovascular Week – Fresh data on Molecular Medicine are presented in a new report. According to news reporting from Shanghai, People’s Republic of China, by NewsRx journalists, research stated, “Rho-associated kinase (ROCK) plays a critical role in pressure overload-induced left ventricular remodelling. However, the underlying mechanism remains unclear.”

The news correspondents obtained a quote from the research from Fudan University, “Here, we reported that TGF-beta 1-induced ROCK elevation suppressed BMP-2 level and strengthened fibrotic response. Exogenous BMP-2 supply effectively attenuated TGF-beta 1 signalling pathway through Smad6-Smurf-1 complex activation. In vitro cultured cardiomyocytes, mechanical stretch up-regulated cardiac TGF-beta 1, TGF-beta 1-dependent ROCK and down-regulated BMP-2, but BMP-2 level could be reversed through blocking TGF-beta 1 receptor by SB-431542 or inhibition of ROCK by Y-27632. TGF-beta 1 could also activate ROCK and suppress endogenous BMP-2 level in a dose-dependent manner. Knock-down BMP-2 enhanced TGF-beta 1-mediated PKC-d and Smad3 signalling cascades. In contrast, treatment with Y-27632 or SB-431542, respectively suppressed ROCK-dependent PKC-d and Smad3 activation, but BMP-2 was only up-regulated by Y-27632. In



addition, BMP-2 silencing abolished the effect of Y-27632, but not SB-431542 on suppression of TGF-beta 1 pathway. Further experiments showed that Smad6 Smurf1 interaction were required for BMP-2-evoked antagonizing effects. Smad6 overexpression attenuated TGF-beta 1-induced activation of PKC-d and Smad3, promoted TGF-beta RI degradation in BMP-2 knock-down cardiomyocytes, and could be abolished after knocking-down Smurf-1, in which Smad6/Smurf1 complex formation was critically involved. In vivo data showed that pressure overload-induced collagen deposition was attenuated, cardiac function was improved and TGF-beta 1-dependent activation of PKC-d and Smad3 was reduced after 2 weeks treatment with rhBMP-2(0.5 mg/kg) or Y-27632 (10 mg/kg) in mice that underwent surgical transverse aortic constriction."

According to the news reporters, the research concluded: "We propose that BMP-2, as a novel fibrosis antagonizing cytokine, may have potential beneficial effect in attenuating pressure overload-induced cardiac fibrosis."

For more information on this research see: Up-regulation of BMP-2 antagonizes TGF-beta 1/ROCK-enhanced cardiac fibrotic signalling through activation of Smurf1/Smad6 complex. *Journal of Cellular and Molecular Medicine*, 2012;16(10):2301-2310. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting S.J. Wang, Fudan University, Inst Biomed Sci, Shanghai 200032, People's Republic of China. (2012 Nov 12)

### **University Hospital, Leuven: Identification of telocytes in the upper lamina propria of the human urinary tract**

By a News Reporter-Staff News Editor at Health & Medicine Week – Investigators publish new report on Urinary Tract. According to news reporting out of Leuven, Belgium, by NewsRx editors, research stated, "The upper lamina propria (ULP) area of interstitial cells (IC) has been studied extensively in bladder, but is rather unexplored in the rest of the urinary tract. This cell layer is intriguing because of the localization directly underneath the urothelium, the intercellular contacts and the close relationship with nerve endings and capillaries."

Our news journalists obtained a quote from the research from University Hospital, "In this study, we examine the ULP layer of IC in human renal pelvis, ureter and urethra, and we make a comparison with

ULP IC in bladder. Tissue was obtained from normal areas in nephrectomy, cystectomy and prostatectomy specimens, and processed for morphology, immunohistochemistry and electron microscopy. A morphological and immunohistochemical phenotype for the ULP IC was assessed and region-dependent differences were looked for. The ULP IC in renal pelvis, ureter and urethra had a similar ultrastructural phenotype, which differed somehow from that of bladder IC, that is, thinner and longer cytoplasmic processes, no peripheral actin filaments and presence of dense core granules and microtubules. Together with their immunohistochemical profile, these features are most compatible with the phenotype of telocytes, a recently discovered group of stromal cells. Based on their global ultrastructural and immunohistochemical phenotype, ULP IC in human bladder should also be classified as telocytes. The most striking immunohistochemical finding was the variable expression of oestrogen receptor (ER) and progesterone receptor (PR)."

According to the news editors, the research concluded: "The functional relevance of ULP telocytes in the urinary tract remains to be elucidated, and ER and PR might therefore be promising pharmacological research targets."

For more information on this research see: Identification of telocytes in the upper lamina propria of the human urinary tract. *Journal of Cellular and Molecular Medicine*, 2012;16(9):2085-93. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1582-4934](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1582-4934))

Our news journalists report that additional information may be obtained by contacting T. Gevaert, Dept. of Urology, KU Leuven, University Hospitals Gasthuisberg, Leuven, Belgium.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Nov 09)

### **University of Manitoba, Winnipeg: Suppression of high lipid diet induced by atherosclerosis sarpogrelate**

By a News Reporter-Staff News Editor at Health & Medicine Week – Researchers detail new data in Cellular and Molecular Medicine. According to news reporting originating in Winnipeg, Canada, by NewsRx journalists, research stated, "Sarpogrelate (SP), a serotonin (5-HT<sub>2A</sub>) receptor antagonist, is used as an anti-platelet agent for the treatment of some vascular diseases. SP has been reported to inhibit 5-HT induced coronary artery spasm, increase in intracellular calcium and smooth muscle cells proliferation."

The news reporters obtained a quote from the research from the University of Manitoba, “This study was undertaken to test that SP suppresses the development of atherosclerosis due to high cholesterol diet (HCD) by decreasing blood viscosity and oxidative stress. For this purpose, 29 rabbits were divided into four groups: control group (normal diet); normal diet group with SP at the dose of 5 mg/kg/day; HCD group fed 1% cholesterol; and HCD group with SP at the dose of 5 mg/kg/day. After 90 days of the experiment, blood samples were collected and the animals were killed; the thoracic aorta was stained by the Oil Red O staining method. The results indicate that plasma levels of cholesterol, triglycerides and malondialdehyde were increased in rabbits fed HCD. Plasma viscosity and whole blood viscosity were also higher in the HCD group than that in normal diet group. Treatment with SP prevented these alterations induced by HCD whereas this agent had no significant effect in rabbits fed normal diet. Morphological examination of the aorta revealed that SP treatment prevented the formation of foam cells and atherosclerotic plaque.”

According to the news reporters, the researchers concluded: “It is suggested that the beneficial effects of SP in atherosclerosis may be due to actions on blood viscosity, lipid levels and oxidative stress.”

For more information on this research see: Suppression of high lipid diet induced by atherosclerosis sarpogrelate. *Journal of Cellular and Molecular Medicine*, 2012;16(10):2394-400. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting Y.J. Xu, Institute of Cardiovascular Sciences, St Boniface Hospital Research, Dept. of Physiology, Faculty of Medicine, University of Manitoba, Winnipeg, MB, Canada.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Oct 19)

### **German Cancer Research Center, Heidelberg: The plaque protein myozap identified as a novel major component of adhering junctions in endothelia of the blood and the lymph vascular systems**

By a News Reporter-Staff News Editor at Life Science Weekly – Current study results on Cellular and Molecular Medicine have been published. According to news reporting from Heidelberg, Germany, by NewsRx

journalists, research stated, “Recently the protein myozap, a 54-kD polypeptide which is not a member of any of the known cytoskeletal and junctional protein multigene families, has been identified as a constituent of the plaques of the composite junctions in the intercalated disks connecting the cardiomyocytes of mammalian hearts. Using a set of novel, highly sensitive and specific antibodies we now report that myozap is also a major constituent of the cytoplasmic plaques of the adherens junctions (AJs) connecting the endothelial cells of the mammalian blood and lymph vascular systems, including the desmoplakin-containing complexus adhaerentes of the virgular cells of lymph node sinus.”

The news correspondents obtained a quote from the research from German Cancer Research Center, “In light and electron microscopic immunolocalization experiments we show that myozap colocalizes with several proteins of desmosomal plaques as well as with AJ-specific transmembrane molecules, including VE-cadherin. In biochemical analyses, rigorous immunoprecipitation experiments have revealed N-cadherin, desmoplakin, desmoglein-2, plakophilin-2, plakoglobin and plectin as very stably bound complex partners. We conclude that myozap is a general component of cell-cell junctions not only in the myocardium but also in diverse endothelia of the blood and lymph vascular systems of adult mammals, suggesting that this protein not only serves a specific role in the heart but also a broader set of functions in the vessel systems.”

According to the news reporters, the researchers concluded: “We also propose to use myozap as an endothelial cell type marker in diagnoses.”

For more information on this research see: The plaque protein myozap identified as a novel major component of adhering junctions in endothelia of the blood and the lymph vascular systems. *Journal of Cellular and Molecular Medicine*, 2012;16(8):1709-19. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting S. Pieperhoff, Helmholtz Group Cell Biology, German Cancer Research Center, DKFZ, Heidelberg, Germany.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Oct 16)

**Charles University, Prague: Duodenal expression of iron transport molecules in patients with hereditary hemochromatosis or iron deficiency**

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators discuss new findings in Cellular and Molecular Medicine. According to news originating from Prague, Czech Republic, by NewsRx correspondents, research stated, “Disturbances of iron metabolism are observed in chronic liver diseases. In the present study, we examined gene expression of duodenal iron transport molecules and hepcidin in patients with hereditary hemochromatosis (HHC) (treated and untreated), involving various genotypes (genotypes which represent risk for HHC were examined), and in patients with iron deficiency anaemia (IDA).”

Our news journalists obtained a quote from the research from Charles University, “Gene expressions of DMT1, ferroportin, Dcytb, hephaestin, HFE and TFR1 were measured in duodenal biopsies using real-time PCR and Western blot. Serum hepcidin levels were measured using ELISA. DMT1, ferroportin and TFR1 mRNA levels were significantly increased in post-phlebotomized hemochromatics relative to controls. mRNAs of all tested molecules were significantly increased in patients with IDA compared to controls. The protein expression of ferroportin was increased in both groups of patients but not significantly. Spearman rank correlations showed that DMT1 versus ferroportin, Dcytb versus hephaestin and DMT1 versus TFR1 mRNAs were positively correlated regardless of the underlying cause, similarly to protein levels of ferroportin versus Dcytb and ferroportin versus hephaestin. Serum ferritin was negatively correlated with DMT1 mRNA in investigated groups of patients, except for HHC group. A decrease of serum hepcidin was observed in IDA patients, but this was not statistically significant. Our data showed that although untreated HHC patients do not have increased mRNA levels of iron transport molecules when compared to normal subjects, the expression is relatively increased in relation to body iron stores.”

According to the news editors, the researchers concluded: “On the other hand, post-phlebotomized HHC patients had increased DMT1 and ferroportin mRNA levels possibly due to stimulated erythropoiesis after phlebotomy.”

For more information on this research see: Duodenal expression of iron transport molecules in patients with hereditary hemochromatosis or iron deficiency. *Journal of Cellular and Molecular Medicine*, 2012;16(8):1816-26. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of*

Cellular and Molecular Medicine - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news correspondents report that additional information may be obtained from M. Dostalíková-Cimburová, Dept. of Cell and Molecular Biology & Center for Research of Diabetes, Metabolism and Nutrition, Third Faculty of Medicine, Charles University, Prague, Czech Republic.

The publisher's contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Oct 15)

### **Fudan University, Shanghai: Up-regulation of BMP-2 antagonizes TGF- $\beta$ 1/ROCK-enhanced cardiac fibrotic signalling through activation of Smurf1/Smad6 complex**

By a News Reporter-Staff News Editor at Cardiovascular Week – Fresh data on Cellular and Molecular Medicine are presented in a new report. According to news reporting originating in Shanghai, People's Republic of China, by NewsRx journalists, research stated, "Rho-associated kinase (ROCK) plays a critical role in pressure overload-induced left ventricular remodelling. However, the underlying mechanism remains unclear."

The news reporters obtained a quote from the research from Fudan University, "Here, we reported that TGF- $\beta$ 1-induced ROCK elevation suppressed BMP-2 level and strengthened fibrotic response. Exogenous BMP-2 supply effectively attenuated TGF- $\beta$ 1 signalling pathway through Smad6-Smurf-1 complex activation. In vitro cultured cardiomyocytes, mechanical stretch up-regulated cardiac TGF- $\beta$ 1, TGF- $\beta$ 1-dependent ROCK and down-regulated BMP-2, but BMP-2 level could be reversed through blocking TGF- $\beta$ 1 receptor by SB-431542 or inhibition of ROCK by Y-27632. TGF- $\beta$ 1 could also activate ROCK and suppress endogenous BMP-2 level in a dose-dependent manner. Knock-down BMP-2 enhanced TGF- $\beta$ 1-mediated PKC- $\delta$  and Smad3 signalling cascades. In contrast, treatment with Y-27632 or SB-431542, respectively suppressed ROCK-dependent PKC- $\delta$  and Smad3 activation, but BMP-2 was only up-regulated by Y-27632. In addition, BMP-2 silencing abolished the effect of Y-27632, but not SB-431542 on suppression of TGF- $\beta$ 1 pathway. Further experiments showed that Smad6 Smurf1 interaction were required for BMP-2-evoked antagonizing effects. Smad6 overexpression attenuated TGF- $\beta$ 1-induced activation of PKC- $\delta$  and Smad3, promoted TGF- $\beta$ 1 degradation in BMP-2 knock-down cardiomyocytes, and could be abolished after knocking-down Smurf-1, in which Smad6/Smurf1 complex formation was critically involved.

In vivo data showed that pressure overload-induced collagen deposition was attenuated, cardiac function was improved and TGF- $\beta$ 1-dependent activation of PKC-d and Smad3 was reduced after 2 weeks treatment with rhBMP-2(0.5 mg/kg) or Y-27632 (10 mg/kg) in mice that underwent surgical transverse aortic constriction.”

According to the news reporters, the researchers concluded: “We propose that BMP-2, as a novel fibrosis antagonizing cytokine, may have potential beneficial effect in attenuating pressure overload-induced cardiac fibrosis.”

For more information on this research see: Up-regulation of BMP-2 antagonizes TGF- $\beta$ 1/ROCK-enhanced cardiac fibrotic signalling through activation of Smurf1/Smad6 complex. *Journal of Cellular and Molecular Medicine*, 2012;16(10):2301-10. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting S. Wang, Shanghai Institute of Cardiovascular Diseases, Zhongshan Hospital and Institutes of Biomedical Sciences, Fudan University, Shanghai, People's Taiwan.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Oct 15)

### **University Hospital, Valencia: Cardiac protein changes in ischaemic and dilated cardiomyopathy: a proteomic study of human left ventricular tissue**

By a News Reporter-Staff News Editor at Hematology Week – Data detailed on Cardiology have been presented. According to news reporting originating in Valencia, Spain, by NewsRx journalists, research stated, “The development of heart failure (HF) is characterized by progressive alteration of left ventricle structure and function. Previous works on proteomic analysis in cardiac tissue from patients with HF remain scant.”

The news reporters obtained a quote from the research from University Hospital, “The purpose of our study was to use a proteomic approach to investigate variations in protein expression of left ventricle tissue from patients with ischaemic (ICM) and dilated cardiomyopathy (DCM). Twenty-four explanted human hearts, 12 from patients with ICM and 12 with DCM undergoing cardiac transplantation and six non-diseased donor hearts (CNT) were analysed by 2DE. Proteins of interest were identified by mass spectrometry and validated by Western blotting

and immunofluorescence. We encountered 35 differentially regulated spots in the comparison CNT versus ICM, 33 in CNT versus DCM, and 34 in ICM versus DCM. We identified glyceraldehyde 3-phosphate dehydrogenase up-regulation in both ICM and DCM, and alpha-crystallin B down-regulation in both ICM and DCM. Heat shock 70 protein 1 was up-regulated only in ICM. Ten of the eleven differentially regulated proteins common to both aetiologies are interconnected as a part of a same network. In summary, we have shown by proteomics analysis that HF is associated with changes in proteins involved in the cellular stress response, respiratory chain and cardiac metabolism. Although we found altered expression of eleven proteins common to both ischaemic and dilated aetiology, we also observed different proteins altered in both groups.”

According to the news reporters, the researchers concluded: “Furthermore, we obtained that seven of these eleven proteins are involved in cell death and apoptosis processes, and therefore in HF progression.”

For more information on this research see: Cardiac protein changes in ischaemic and dilated cardiomyopathy: a proteomic study of human left ventricular tissue. *Journal of Cellular and Molecular Medicine*, 2012;16(10):2471-86. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting E. Rosello-Lleti, Cardiocirculatory Unit, Research Center, Hospital Universitario La Fe, Valencia, Spain.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Oct 15)

### **Baylor University College of Medicine, Houston: Repertoire of endothelial progenitor cells mobilized by femoral artery ligation: a nonhuman primate study**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Molecular Medicine. According to news originating from Houston, Texas, by NewsRx correspondents, research stated, “To determine in the baboon model the identities and functional characteristics of endothelial progenitor cells (EPCs) mobilized in response to artery ligation, we collected peripheral blood mononuclear cells (PBMNCs) before and 3 days after a segment of femoral artery was removed. Our goal was to find EPC subpopulations with highly regenerative capacity.”



Our news journalists obtained a quote from the research from the Baylor University College of Medicine, “We identified 12 subpopulations of putative EPCs that were altered >1.75-fold; two subpopulations (CD146+/CD54/CD45 at 6.63-fold, and CD146+/UEA-1/CD45 at 12.21-fold) were dramatically elevated. To investigate the regenerative capacity of putative EPCs, we devised a new assay that maximally resembled their in vivo scenario, we purified CD34+ and CD146+ cells and co-cultured them with basal and mobilized PBMNCs; both cell types took up Dil-LDL, but purified CD146+ cells exhibited accelerated differentiation by increasing expression of CD31 and CD144, and by exhibiting more active cord-like structure formation by comparison to the CD34+ subpopulation in a co-culture with mobilized PBMNCs. We demonstrate that ischaemia due to vascular ligation mobilizes multiple types of cells with distinct roles.”

According to the news editors, the researchers concluded: “Baboon CD146+ cells exhibit higher reparative capacity than CD34+ cells, and thus are a potential source for therapeutic application.”

For more information on this research see: Repertoire of endothelial progenitor cells mobilized by femoral artery ligation: a nonhuman primate study. *Journal of Cellular and Molecular Medicine*, 2012;16(9):2060-2073. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news correspondents report that additional information may be obtained from Q. Shi, Baylor College of Medicine, Texas Heart Inst, Cardiothorac Res Lab, Houston, TX 77030, United States. (2012 Oct 10)

### **Institute of Molecular Pathology and Immunology, Porto: Identification of new cancer biomarkers based on aberrant mucin glycoforms by in situ proximity ligation**

By a News Reporter-Staff News Editor at Cancer Weekly – Investigators publish new report on Proteins. According to news reporting out of Porto, Portugal, by NewsRx editors, research stated, “Mucin glycoproteins are major secreted or membrane-bound molecules that, in cancer, show modifications in both the mucin proteins expression and in the O-glycosylation profile, generating some of the most relevant tumor markers in clinical use for decades. Thus far, the identification of these biomarkers has been based on the detection of either the protein or the O-glycan modifications.”

Our news journalists obtained a quote from the research from the Institute of Molecular Pathology and Immunology, “We therefore aimed to

identify the combined mucin and O-glycan features, that is, specific glycoforms, in an attempt to increase specificity of these cancer biomarkers. Using in situ proximity ligation assays (PLA) based on existing monoclonal antibodies directed to MUC1, MUC2, MUC5AC and MUC6 mucins and to cancer-associated carbohydrate antigens Tn, Sialyl-Tn (STn), T, Sialyl-Le(a) (SLe(a)) and Sialyl-Le(x) (SLe(x)) we screened a series of 28 mucinous adenocarcinomas from different locations (stomach, ampulla of Vater, colon, lung, breast and ovary) to detect specific mucin glycoforms. We detected Tn/STn/SLe(a)/SLe(x)-MUC1 and STn/SLe(a)/SLe(x)-MUC2 glycoforms in=50% of the cases, with a variable distribution among organs. Some new glycoforms-T/SLe(a)-MUC2, STn/T/SLe(a) SLe(x)-MUC5AC and STn/T/SLe(a)/SLe(x)-MUC6-were identified for the first time in the present study in a variable percentage of cases from different organs.”

According to the news editors, the researchers concluded: “Application of the PLA technique allowed sensitive detection of specific aberrant mucin glycoforms in cancer, increasing specificity to the use of antibodies either to the mucin protein backbone or to the O-glycan haptens alone.”

For more information on this research see: Identification of new cancer biomarkers based on aberrant mucin glycoforms by in situ proximity ligation. *Journal of Cellular and Molecular Medicine*, 2012;16(7):1474-84. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting R. Pinto, Institute of Molecular Pathology and Immunology of the University of Porto, Porto, Portugal.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Sep 18)

### **University of Helsinki: Distinct overlapping sequences at the carboxy-terminus of merlin regulate its tumour suppressor and morphogenic activity**

By a News Reporter-Staff News Editor at Health & Medicine Week – Data detailed on Neurofibromatosis have been presented. According to news reporting originating from Helsinki, Finland, by NewsRx correspondents, research stated, “The Neurofibromatosis 2 (NF2) gene product merlin is a tumor suppressor, which in addition to inhibiting cell proliferation regulates cell morphology. The morphogenic properties of

merlin may play a role in tumor suppression, as patient-derived tumor cells demonstrate cytoskeletal abnormalities.”

Our news editors obtained a quote from the research from the University of Helsinki, “However, it is still unclear how these functions are linked. The N-terminal FERM-domain of merlin is highly homologous to the oncogenic protein ezrin, while the C-termini are less conserved, suggesting that the opposite effect of the proteins on proliferation could be mediated by their distinct C-terminal regions. In this study we characterize the role of the most C-terminal residues of merlin in the regulation of proliferation, cytoskeletal organization, phosphorylation and intramolecular associations. In addition to the two full-length merlin isoforms and truncating mutations found in patients, we focused on the evolutionally conserved C-terminal residues 545-547, also harbouring disease-causing mutations. We demonstrate that merlin induces cell extensions, which result from impaired retraction of protrusions rather than from increased formation of filopodia. The residues 538-568 were found particularly important for this morphogenic activity. The results further show that both merlin isoforms are able to equally inhibit proliferation, whereas C-terminal mutants affecting residues 545-547 are less effective in growth suppression.”

According to the news editors, the researchers concluded: “This study demonstrates that the C-terminus contains distinct but overlapping functional domains important for regulation of the morphogenic activity, intramolecular associations and cell proliferation.”

For more information on this research see: Distinct overlapping sequences at the carboxy-terminus of merlin regulate its tumour suppressor and morphogenic activity. *Journal of Cellular and Molecular Medicine*, 2012;16(9):2161-75. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news editors report that additional information may be obtained by contacting M. Laulajainen, Biomedicum Helsinki, Dept. of Pathology, University of Helsinki, Helsinki, Finland.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Sep 14)

## University of Palermo: Analysis of molecular mechanisms and anti-tumoural effects of zoledronic acid in breast cancer cells

By a News Reporter-Staff News Editor at Women's Health Weekly – Research findings on Breast Cancer are discussed in a new report. According to news reporting originating from Palermo, Italy, by NewsRx correspondents, research stated, “Zoledronic acid (ZOL) is the most potent nitrogen-containing bisphosphonate (N-BPs) that strongly binds to bone mineral and acts as a powerful inhibitor of bone resorption, already clinically available for the treatment of patients with osteolytic metastases. Recent data also suggest that ZOL, used in breast cancer, may provide more than just supportive care modifying the course of the disease, though the possible molecular mechanism of action is still unclear. As breast cancer is one of the primary tumours with high propensity to metastasize to the bone, we investigated, for the first time, differential gene expression profile on Michigan Cancer Foundation-7 (MCF-7) breast cancer cells treated with low doses of ZOL (10 M).”

Our news editors obtained a quote from the research from the University of Palermo, “Microarrays analysis was used to identify, describe and summarize evidence regarding the molecular basis of actions of ZOL and of their possible direct anti-tumour effects. We validated gene expression results of specific transcripts involved in major cellular process by Real Time and Western Blot analysis and we observed inhibition of proliferation and migration through 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) and Matrigel assay. We then focused on changes in the cytoskeletal components as fibronectin 1 (FN1), actin, and anti angiogenic compounds as transforming growth factor- $\beta$ 1 (TGF- $\beta$ 1) and thrombospondin 1 (THBS1).”

According to the news editors, the researchers concluded: “The up-regulation of these products may have an important role in inhibiting proliferation, invasion and angiogenesis mediated by ZOL.”

For more information on this research see: Analysis of molecular mechanisms and anti-tumoural effects of zoledronic acid in breast cancer cells. *Journal of Cellular and Molecular Medicine*, 2012;16(9):2186-95. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news editors report that additional information may be obtained by contacting L. Insalaco, Section of Medical Oncology, Dept. of Surgical and Oncology, University of Palermo, Palermo, Italy.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Sep 13)

### **Third Military Medical University, Chongqing: Activation of the prolyl-hydroxylase oxygen-sensing signal cascade leads to AMPK activation in cardiomyocytes**

By a News Reporter-Staff News Editor at Cardiovascular Week – Current study results on Chalcogens have been published. According to news reporting originating in Chongqing, People's Republic of China, by NewsRx journalists, research stated, "The proline hydroxylase domain-containing enzymes (PHD) act as cellular oxygen sensors and initiate a hypoxic signal cascade to induce a range of cellular responses to hypoxia especially in the aspect of energy and metabolic homeostasis regulation. AMP-activated protein kinase (AMPK) is recognized as a major energetic sensor and regulator of cardiac metabolism."

The news reporters obtained a quote from the research from Third Military Medical University, "However, the effect of PHD signal on AMPK has never been studied before. A PHD inhibitor (PHI), dimethylloxalylglycine and PHD2-specific RNA interference (RNAi) have been used to activate PHD signalling in neonatal rat cardiomyocytes. Both PHI and PHD2-RNAi activated AMPK pathway in cardiomyocytes effectively. In addition, the increased glucose uptake during normoxia and enhanced myocyte viability during hypoxia induced by PHI pre-treatment were abrogated substantially upon AMPK inhibition with an adenoviral vector expressing a dominant negative mutant of AMPK- $\alpha 1$ . Furthermore, chelation of intracellular  $\text{Ca}^{2+}$  by BAPTA, inhibition of calmodulin-dependent kinase kinase (CaMKK) with STO-609, or RNAi-mediated down-regulation of CaMKK  $\alpha$  inhibited PHI-induced AMPK activation significantly. In contrast, down-regulation of LKB1 with adenoviruses expressing the dominant negative form did not affect PHI-induced AMPK activation. We establish for the first time that activation of PHD signal cascade can activate AMPK pathway mainly through a  $\text{Ca}^{2+}$ /CaMKK-dependent mechanism in cardiomyocytes."

According to the news reporters, the researchers concluded: "Furthermore, activation of AMPK plays an essential role in hypoxic protective responses induced by PHI."

For more information on this research see: Activation of the prolyl-hydroxylase oxygen-sensing signal cascade leads to AMPK activation in cardiomyocytes. *Journal of Cellular and Molecular Medicine*, 2012;16(9):2049-59. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of*

Cellular and Molecular Medicine - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting H. Yan, Institute of Burn Research, Southwest Hospital, State Key Laboratory of Trauma, Burns and Combined Injury, The Third Military Medical University, Chongqing, People's Taiwan.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Sep 10)

### **University of Siena: Altered apoptosis regulation in Kufor-Rakeb syndrome patients with mutations in the ATP13A2 gene**

By a News Reporter-Staff News Editor at Health & Medicine Week – Research findings on Apoptosis are discussed in a new report. According to news reporting out of Siena, Italy, by NewsRx editors, research stated, “ATP13A2 gene encodes for a protein of the group 5 P-type ATPase family. ATP13A2 mutations are responsible for Kufor-Rakeb syndrome (KRS), a rare autosomal recessive juvenile parkinsonism characterized by the subacute onset of extrapyramidal, pyramidal and cognitive dysfunction with secondary nonresponsiveness to levodopa.”

Our news journalists obtained a quote from the research from the University of Siena, “FBXO7 protein is an F-box-containing protein. Recessive FBXO7 mutations are responsible for PARK15, a rare juvenile parkinsonism characterized by progressive neurodegeneration with extrapyramidal and pyramidal system involvement. Our aim was to evaluate apoptosis in cells from two KRS siblings carrying a homozygous ATP13A2 mutation and a heterozygous FBXO7 mutation. We also analysed apoptosis in the patients' healthy parents. Peripheral blood lymphocytes from the KRS patients and parents were exposed to 2-deoxy-D-ribose; apoptosis was analysed by flow cytometry and fluorescence microscopy. Apoptosis was much higher in lymphocytes from the KRS patients and parents than in controls, both in standard conditions and after induction with a pro-apoptotic stimulus. The lack of correlation between increased apoptosis and the presence of the mutated FBXO7 gene rules out the involvement of FBXO7 in apoptosis regulation. The altered apoptotic pattern of subjects with mutated ATP13A2 suggests a correlation between apoptosis alteration and the mutated ATP13A2 protein. We hypothesize that ATP13A2 mutations may compromise protein function, disrupting cell cation balance and rendering cells prone to apoptosis.”

According to the news editors, the researchers concluded: "However, the deregulation of apoptosis in KRS patients displaying different disease severity suggested that the altered apoptotic pathway probably does not have a pathogenetic role in KRS by itself."

For more information on this research see: Altered apoptosis regulation in Kufor-Rakeb syndrome patients with mutations in the ATP13A2 gene. *Journal of Cellular and Molecular Medicine*, 2012;16(8):1916-23. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1582-4934](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1582-4934))

Our news journalists report that additional information may be obtained by contacting E. Radi, Dept. of Neurological, Neurosurgical and Behavioural Sciences, University of Siena, Siena, Italy.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Aug 24)

## Mitochondrial connexin 43 impacts on respiratory complex I activity and mitochondrial oxygen consumption

By a News Reporter-Staff News Editor at Cardiovascular Week – Investigators discuss new findings in Chalcogens. According to news reporting originating in Essen, Germany, by NewsRx journalists, research stated, "Connexin 43 (Cx43) is present at the sarcolemma and the inner membrane of cardiomyocyte subsarcolemmal mitochondria (SSM). Lack or inhibition of mitochondrial Cx43 is associated with reduced mitochondrial potassium influx, which might affect mitochondrial respiration."

The news reporters obtained a quote from the research, "Therefore, we analysed the importance of mitochondrial Cx43 for oxygen consumption. Acute inhibition of Cx43 in rat left ventricular (LV) SSM by 18a glycyrrhetic acid (GA) or Cx43 mimetic peptides (Cx43-MP) reduced ADP-stimulated complex I respiration and ATP generation. Chronic reduction of Cx43 in conditional knockout mice (Cx43(Cre-ER(T)/fl) + 4-OHT, 5-10% of Cx43 protein compared with control Cx43(fl/fl) mitochondria) reduced ADP-stimulated complex I respiration of LV SSM to 47.8 ± 2.4 nmol O<sub>2</sub> /min.\*mg protein (n = 8) from 61.9 ± 7.4 nmol O<sub>2</sub> /min.\*mg protein in Cx43(fl/fl) mitochondria (n = 10, P < 0.05), while complex II respiration remained unchanged. The LV complex I activities (% of citrate synthase activity) of Cx43(Cre-ER(T)/fl) + 4-OHT mice (16.1 ± 0.9%, n = 9) were lower than in Cx43(fl/fl) mice (19.8 ± 1.3%, n = 8, P < 0.05); complex II activities were similar between genotypes. Supporting the importance of Cx43 for respiration,

in Cx43-overexpressing HL-1 cardiomyocytes complex I respiration was increased, whereas complex II respiration remained unaffected.”

According to the news reporters, the researchers concluded: “Taken together, mitochondrial Cx43 is required for optimal complex I activity and respiration and thus mitochondrial ATP-production.”

For more information on this research see: Mitochondrial connexin 43 impacts on respiratory complex I activity and mitochondrial oxygen consumption. *Journal of Cellular and Molecular Medicine*, 2012;16(8):1649-55. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting K. Boengler, Institut fur Pathophysiologie, Universitätsklinikum Essen, Essen, Germany.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Aug 20)

### **University of California, La Jolla: Measuring passive myocardial stiffness in *Drosophila melanogaster* to investigate diastolic dysfunction**

By a News Reporter-Staff News Editor at Cardiovascular Week – A new study on Cellular and Molecular Medicine is now available. According to news reporting originating from La Jolla, California, by NewsRx correspondents, research stated, “Aging is marked by a decline in LV diastolic function, which encompasses abnormalities in diastolic relaxation, chamber filling and/or passive myocardial stiffness. Genetic tractability and short life span make *Drosophila melanogaster* an ideal organism to study the effects of aging on heart function, including senescent-associated changes in gene expression and in passive myocardial stiffness.”

Our news editors obtained a quote from the research from the University of California, “However, use of the *Drosophila* heart tube to probe deterioration of diastolic performance is subject to at least two challenges: the extent of genetic homology to mammals and the ability to resolve mechanical properties of the bilayered fly heart, which consists of a ventral muscle layer that covers the contractile cardiomyocytes. Here, we argue for widespread use of *Drosophila* as a novel myocardial aging model by (1) describing diastolic dysfunction in flies, (2) discussing how critical pathways involved in dysfunction are conserved across species and (3) demonstrating the advantage of an atomic force



microscopy-based analysis method to measure stiffness of the multilayered *Drosophila* heart tube versus isolated myocytes from other model systems.”

According to the news editors, the researchers concluded: “By using powerful *Drosophila* genetic tools, we aim to efficiently alter changes observed in factors that contribute to diastolic dysfunction to understand how one might improve diastolic performance at advanced ages in humans.”

For more information on this research see: Measuring passive myocardial stiffness in *Drosophila melanogaster* to investigate diastolic dysfunction. *Journal of Cellular and Molecular Medicine*, 2012;16(8):1656-62. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news editors report that additional information may be obtained by contacting G. Kaushik, Dept. of Bioengineering, University of California, San Diego, La Jolla, CA, United States.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Aug 20)

### **University of Michigan, Ann Arbor: Features of protein-protein interactions that translate into potent inhibitors: topology, surface area and affinity**

By a News Reporter-Staff News Editor at Clinical Trials Week – Investigators discuss new findings in Proteomics. According to news reporting originating in Ann Arbor, Michigan, by NewsRx journalists, research stated, “Protein-protein interactions (PPIs) control the assembly of multi-protein complexes and, thus, these contacts have enormous potential as drug targets. However, the field has produced a mix of both exciting success stories and frustrating challenges.”

The news reporters obtained a quote from the research from the University of Michigan, “Here, we review known examples and explore how the physical features of a PPI, such as its affinity, hotspots, off-rates, buried surface area and topology, might influence the chances of success in finding inhibitors. This analysis suggests that concise, tight binding PPIs are most amenable to inhibition. However, it is also clear that emerging technical methods are expanding the repertoire of ‘drug-gable’ protein contacts and increasing the odds against difficult targets. In particular, natural product-like compound libraries, high throughput screens specifically designed for PPIs and approaches that favour discovery of allosteric inhibitors appear to be attractive routes.”

According to the news reporters, the researchers concluded: “The first group of PPI inhibitors has entered clinical trials, further motivating the need to understand the challenges and opportunities in pursuing these types of targets.”

For more information on this research see: Features of protein-protein interactions that translate into potent inhibitors: topology, surface area and affinity. *Expert Reviews In Molecular Medicine*, 2012;14():e16. *Expert Reviews In Molecular Medicine* can be contacted at: Cambridge University Press, 32 Avenue of the Americas, New York, NY 10013-2473. (Cambridge University Press - [www.cambridge.org](http://www.cambridge.org); Expert Reviews In Molecular Medicine - <http://journals.cambridge.org/action/displayJournal?jid=ERM>)

Our news correspondents report that additional information may be obtained by contacting M.C. Smith, Departments of Pathology and Biological Chemistry and The Life Sciences Institute, University of Michigan, Ann Arbor, MI, United States.

The publisher of the journal *Expert Reviews In Molecular Medicine* can be contacted at: Cambridge University Press, 32 Avenue of the Americas, New York, NY 10013-2473. (2012 Aug 20)

### **Wayne State University School of Medicine, Detroit: Lysophosphatidylcholine inhibits membrane-associated SNARE complex disassembly**

By a News Reporter-Staff News Editor at Biotech Business Week – Investigators discuss new findings in Drugs and Therapies. According to news reporting originating from Detroit, Michigan, by NewsRx correspondents, research stated, “In cells, N-ethylmaleimide-sensitive factor (NSF) attachment protein receptors called SNAREs are involved in membrane fusion. In neurons, for example, target membrane proteins SNAP-25 and syntaxin called t-SNAREs present at the pre-synaptic membrane, and a synaptic vesicle-associated membrane protein (VAMP) or v-SNARE, is part of the conserved protein complex involved in neurotransmission.”

Our news editors obtained a quote from the research from the Wayne State University School of Medicine, “Cholesterol and LPC (L- $\alpha$ -lysophosphatidylcholine) are known to contribute to the negative and positive curvature respectively of membranes. In this study, using purified recombinant neuronal membrane-associated SNAREs, we demonstrate for the first time that membrane-curvature-influencing lipids profoundly influence SNARE complex disassembly. Exposure of cholesterol-associated t-SNARE and v-SNARE liposome mixtures to

NSF-ATP results in dissociated vesicles. In contrast, exposure of LPC-associated t-SNARE and v-SNARE liposome mixtures to NSF-ATP, results in inhibition of t-/v-SNARE disassembly and the consequent accumulation of clustered vesicles. Similarly, exposure of isolated rat brain slices and pancreas to cholesterol or LPC, also demonstrates LPC-induced inhibition of SNARE complex disassembly. Earlier studies demonstrate a strong correlation between altered plasma LPC levels and cancer.”

According to the news editors, the researchers concluded: “The altered plasma LPC levels observed in various cancers may in part contribute to defects in SNARE assembly-disassembly and membrane fusion, consequently affecting protein maturation and secretion in cancer cells.”

For more information on this research see: Lysophosphatidylcholine inhibits membrane-associated SNARE complex disassembly. *Journal of Cellular and Molecular Medicine*, 2012;16(8):1701-8. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news editors report that additional information may be obtained by contacting L. Shin, Dept. of Physiology, Wayne State University School of Medicine, Detroit, MI USA. Dept. of Chemical Engineering & Materials Science, College of Engineering, Detroit, MI, United States.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Aug 20)

### **University of Munich: Repetitive transplantation of different cell types sequentially improves heart function after infarction**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Cardiology is now available. According to news reporting originating from Munich, Germany, by NewsRx correspondents, researchers stated “Cell-based therapy is considered a novel and potentially new strategy in regenerative medicine. But the efficacy of cell-based therapy has been limited by the poor survival of the transplanted cells in an ischaemic environment.”

Our news editors obtained a quote from the research from the University of Munich, “The goal of the present study is to present a possibility to increase survival of the transplanted cardiomyocytes, by increasing the vascularization of the infarcted area. First, we injected endothelial progenitor cells (EPCs) to augment the vascular density in

infarcted areas and to improve the benefit of a subsequent Tx of foetal cardiomyocytes. Serial echocardiography indeed showed significant improvement of the left ventricular function after application of EPC and a significant additive improvement after Tx of foetal cardiomyocytes. In contrast, repetitive EPC transplantation as a control group did not show an additional improvement after the second transplantation. Histologically, cells could be readily detected after Tx by BrdU-staining for EPC and by carboxy-fluorescein diacetate succinimidyl ester (CFSE)-staining for foetal cardiomyocytes. Staining for CD31 revealed a significant increase in vessel density in the infarction area compared with medium controls, possibly contributing to the benefit of transplanted foetal cardiomyocytes. Notably, a significant increase in the number of apoptotic cells was observed in cell-transplanted hearts accompanied by an increase in proliferation, collagen content and neutrophil infiltration, suggesting an active remodelling concomitant with sustained inflammatory processes.”

According to the news editors, the researchers concluded: “Repetitive Tx of different cell types after myocardial infarction in rat hearts significantly improved left ventricular function and could represent a feasible option to enhance the benefit of cell therapy.”

For more information on this research see: Repetitive transplantation of different cell types sequentially improves heart function after infarction. *Journal of Cellular and Molecular Medicine*, 2012;16(7):1640-1647. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1582-4934](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1582-4934))

The news editors report that additional information may be obtained by contacting S. Alexander, University of Munich, Inst Cardiovasc Prevent, D-80539 Munich, Germany. (2012 Aug 01)

### **University of Toronto: Culture of rat endometrial telocytes**

By a News Reporter-Staff News Editor at Life Science Weekly – A new study on Molecular Medicine is now available. According to news reporting originating in Toronto, Canada, by NewsRx journalists, researchers stated “Previous studies have shown that telocytes are found in a variety of tissues. Here, we report the presence of telocytes in the human endometrium.”

The news reporters obtained a quote from the research from the University of Toronto, “In addition, telocytes were isolated from the rat endometrium and cultured. Immunohistochemistry was performed in vitro and in vivo. Cultured cells showed that telocytes expressed CD34, and similar results were found in the uterine tissue. In both species,

telocytes also stained positive for vimentin and connexin 43. Telopodes were observed connecting cell colonies and connecting distant cells.”

According to the news reporters, the researchers concluded: “Our findings suggest that telocytes may have a role in cell-to-cell communication over short and long distances within the endometrium.”

For more information on this research see: Culture of rat endometrial telocytes. *Journal of Cellular and Molecular Medicine*, 2012;16(7):1392-1396. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting K. Hattá, University of Toronto, Inst Med Sci, Toronto, ON M5S 1A1, Canada. (2012 Jul 31)

### **Carol Davila University of Medicine and Pharmacy, Bucharest: Telocytes in human skin - are they involved in skin regeneration?**

By a News Reporter-Staff News Editor at Stem Cell Week – Investigators discuss new findings in Stem Cell Research. According to news originating from Bucharest, Romania, by NewsRx correspondents, researchers stated “Telocytes (TCs), a particular interstitial cell type, have been recently described in a wide variety of mammalian organs (). The TCs are identified morphologically by a small cell body and extremely long (tens to hundreds of  $\mu$  m), thin prolongations (less than 100 nm in diameter, below the resolving power of light microscopy) called telopodes.”

Our news journalists obtained a quote from the research from the Carol Davila University of Medicine and Pharmacy, “Here, we demonstrated with electron microscopy and immunofluorescence that TCs were present in human dermis. In particular, TCs were found in the reticular dermis, around blood vessels, in the perifollicular sheath, outside the glassy membrane and surrounding sebaceous glands, arrector pili muscles and both the secretory and excretory portions of eccrine sweat glands. Immunofluorescence screening and laser scanning confocal microscopy showed two subpopulations of dermal TCs; one expressed c-kit/CD117 and the other was positive for CD34. Both subpopulations were also positive for vimentin. The TCs were connected to each other by homocellular junctions, and they formed an interstitial 3D network. We also found TCs adjoined to stem cells in the bulge region of hair follicles. Moreover, TCs established atypical heterocellular junctions with stem cells (clusters of undifferentiated cells). Given the frequency of allergic skin pathologies, we would like to emphasize the

finding that close, planar junctions were frequently observed between TCs and mast cells.”

According to the news editors, the researchers concluded: “Based on TC distribution and intercellular connections, our results suggested that TCs might be involved in skin homeostasis, skin remodelling, skin regeneration and skin repair.”

For more information on this research see: Telocytes in human skin - are they involved in skin regeneration? *Journal of Cellular and Molecular Medicine*, 2012;16(7):1405-1420. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news correspondents report that additional information may be obtained from L. Ceafalan, Carol Davila Univ Med & Pharm, Dept. of Dermatol, Colentina Univ Hosp, Bucharest, Romania. (2012 Jul 30)

### **National Institute of Diabetes, Digestive and Kidney Diseases, Bethesda: Ultrastructural differences between diabetic and idiopathic gastroparesis**

By a News Reporter-Staff News Editor at Diabetes Week – Investigators publish new report on Diabetes. According to news reporting out of Bethesda, Maryland, by NewsRx editors, researchers stated “The ultrastructural changes in diabetic and idiopathic gastroparesis are not well studied and it is not known whether there are different defects in the two disorders. As part of the Gastroparesis Clinical Research Consortium, full thickness gastric body biopsies from 20 diabetic and 20 idiopathic gastroparetics were studied by light microscopy.”

Our news journalists obtained a quote from the research from the National Institute of Diabetes, Digestive and Kidney Diseases, “Abnormalities were found in many (83%) but not all patients. Among the common defects were loss of interstitial cells of Cajal (ICC) and neural abnormalities. No distinguishing features were seen between diabetic and idiopathic gastroparesis. Our aim was to provide a detailed description of the ultrastructural abnormalities, compare findings between diabetic and idiopathic gastroparesis and determine if patients with apparently normal immunohistological features have ultrastructural abnormalities. Tissues from 40 gastroparetic patients and 24 age- and sex-matched controls were examined by transmission electron microscopy (TEM). Interstitial cells of Cajal showing changes suggestive of injury, large and empty nerve endings, presence of lipofuscin and lamellar bodies in the smooth muscle cells were found in all patients.

However, the ultrastructural changes in ICC and nerves differed between diabetic and idiopathic gastroparesis and were more severe in idiopathic gastroparesis. A thickened basal lamina around smooth muscle cells and nerves was characteristic of diabetic gastroparesis whereas idiopathic gastroparetics had fibrosis, especially around the nerves.”

According to the news editors, the researchers concluded: “In all the patients TEM showed abnormalities in ICC, nerves and smooth muscle consistent with the delay in gastric emptying. The significant differences found between diabetic and idiopathic gastroparesis offers insight into pathophysiology as well as into potential targeted therapies.”

For more information on this research see: Ultrastructural differences between diabetic and idiopathic gastroparesis. *Journal of Cellular and Molecular Medicine*, 2012;16(7):1573-1581. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting M.S. Faussone-Pellegrini, NIDDK, Bethesda, MD, United States. (2012 Jul 30)

### **Third Military Medical University, Chongqing: Cyclic AMP increases COX-2 expression via mitogen-activated kinase in human myometrial cells**

By a News Reporter-Staff News Editor at Proteomics Weekly – Investigators publish new report on Molecular Medicine. According to news reporting from Chongqing, People’s Republic of China, by NewsRx journalists, researchers stated “Cyclic AMP (cAMP) is the archetypal smooth muscle relaxant, mediating the effects of many hormones and drugs. However, recently PGI<sub>2</sub>, acting via cAMP/PKA, was found to increase contraction-associated protein expression in myometrial cells and to promote oxytocin-driven myometrial contractility.”

The news correspondents obtained a quote from the research from Third Military Medical University, “Cyclo-oxygenase-2 (COX-2) is the rate-limiting enzyme in prostaglandin synthesis, which is critical to the onset and progression of human labour. We have investigated the impact of cAMP on myometrial COX-2 expression, synthesis and activity. Three cAMP agonists (8-bromo-cAMP, forskolin and rolipram) increased COX-2 mRNA expression and further studies confirmed that this was associated with COX-2 protein synthesis and activity (increased PGE<sub>2</sub> and PGI<sub>2</sub> in culture supernatant) in primary cultures of human myometrial cells. These effects were neither reproduced by

specific agonists nor inhibited by specific inhibitors of known cAMP-effectors (PKA, EPAC and AMPK). We then used shRNA to knockdown the same effectors and another recently described cAMP-effector PDZ-GEF1-2, without changing the response to cAMP. We found that MAPK activation mediated the cAMP effects on COX-2 expression and that PGE2 acts through EP-2 to activate MAPK and increase COX-2.”

According to the news reporters, the researchers concluded: “These data provide further evidence in support of a dual role for cAMP in the regulation of myometrial function.”

For more information on this research see: Cyclic AMP increases COX-2 expression via mitogen-activated kinase in human myometrial cells. *Journal of Cellular and Molecular Medicine*, 2012;16(7):1447-1460. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1582-4934](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1582-4934))

Our news journalists report that additional information may be obtained by contacting L. Chen, Third Military Medical University, Dept. of Obstet & Gynecol, Southwest Hosp, Chongqing, People’s Republic of China. (2012 Jul 30)

### **University Medical Center, Utrecht: Cardiomyogenic differentiation-independent improvement of cardiac function by human cardiomyocyte progenitor cell injection in ischaemic mouse hearts**

By a News Reporter-Staff News Editor at Hematology Week – Current study results on Cardiology have been published. According to news reporting from Utrecht, Netherlands, by NewsRx journalists, researchers stated “We previously showed that human cardiomyocyte progenitor cells (hCMPCs) injected after myocardial infarction (MI) had differentiated into cardiomyocytes in vivo 3 months after MI. Here, we investigated the short-term (2 weeks) effects of hCMPCs on the infarcted mouse myocardium.”

The news correspondents obtained a quote from the research from University Medical Center, “MI was induced in immunocompromised (NOD/scid) mice, immediately followed by intramyocardial injection of hCMPCs labelled with enhanced green fluorescent protein (hCMPC group) or vehicle only (control group). Sham-operated mice served as reference. Cardiac performance was measured 2 and 14 days after MI by magnetic resonance imaging at 9.4 T. Left ventricular (LV) pressure-volume measurements were performed at day 15 followed by extensive immunohistological analysis. Animals injected with hCMPCs



demonstrated a higher LV ejection fraction, lower LV end-systolic volume and smaller relaxation time constant than control animals 14 days after MI. hCMPCs engrafted in the infarcted myocardium, did not differentiate into cardiomyocytes, but increased vascular density and proliferation rate in the infarcted and border zone area of the hCMPC group. Injected hCMPCs engraft into murine infarcted myocardium where they improve LV systolic function and attenuate the ventricular remodelling process 2 weeks after MI. Since no cardiac differentiation of hCMPCs was evident after 2 weeks, the observed beneficial effects were most likely mediated by paracrine factors, targeting amongst others vascular homeostasis.”

According to the news reporters, the researchers concluded: “These results demonstrate that hCMPCs can be applied to repair infarcted myocardium without the need to undergo differentiation into cardiomyocytes.”

For more information on this research see: Cardiomyogenic differentiation-independent improvement of cardiac function by human cardiomyocyte progenitor cell injection in ischaemic mouse hearts. *Journal of Cellular and Molecular Medicine*, 2012;16(7):1508-1521. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting M.C. den Haan, Univ Med Center Utrecht, Dept. of Cardiol, Utrecht, Netherlands. (2012 Jul 30)

### **Shandong University, Jinan: MicroRNA-155 prevents necrotic cell death in human cardiomyocyte progenitor cells via targeting RIP1**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Apoptosis is now available. According to news reporting from Jinan, People’s Republic of China, by NewsRx journalists, researchers stated “To improve regeneration of the injured myocardium, cardiomyocyte progenitor cells (CMPCs) have been put forward as a potential cell source for transplantation therapy. Although cell transplantation therapy displayed promising results, many issues need to be addressed before fully appreciating their impact.”

The news correspondents obtained a quote from the research by the authors from Shandong University, “One of the hurdles is poor graft-cell survival upon injection, thereby limiting potential beneficial effects.

Here, we attempt to improve CMPCs survival by increasing microRNA-155 (miR-155) levels, potentially to improve engraftment upon transplantation. Using quantitative PCR, we observed a 4-fold increase of miR-155 when CMPCs were exposed to hydrogen-peroxide stimulation. Flow cytometric analysis of cell viability, apoptosis and necrosis showed that necrosis is the main cause of cell death. Overexpressing miR-155 in CMPCs revealed that miR-155 attenuated necrotic cell death by 40 ± 2.3% via targeting receptor interacting protein 1 (RIP1). In addition, inhibiting RIP1, either by pre-incubating the cells with a RIP1 specific inhibitor, Necrostatin-1 or siRNA mediated knockdown, reduced necrosis by 38 ± 2.5% and 33 ± 1.9%, respectively. Interestingly, analysing gene expression using a PCR-array showed that increased miR-155 levels did not change cell survival and apoptotic related gene expression. By targeting RIP1, miR-155 repressed necrotic cell death of CMPCs, independent of activation of Akt pro-survival pathway.”

According to the news reporters, the researchers concluded: “MiR-155 provides the opportunity to block necrosis, a conventionally thought non-regulated process, and might be a potential novel approach to improve cell engraftment for cell therapy.”

For more information on this research see: MicroRNA-155 prevents necrotic cell death in human cardiomyocyte progenitor cells via targeting RIP1. *Journal of Cellular and Molecular Medicine*, 2011;15(7):1474-82. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting J. Liu, Dept. of Endocrinology, Provincial Hospital, Shandong University, Jinan, People's Taiwan.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Jul 25)

### **Fudan University, Shanghai: Selection of disease-specific biomarkers by integrating inflammatory mediators with clinical informatics in AECOPD patients: a preliminary study**

By a News Reporter-Staff News Editor at Computer Weekly News – Fresh data on Chronic Obstructive Pulmonary Disease are presented in a new report. According to news reporting from Shanghai, People's

Republic of China, by VerticalNews journalists, researchers stated “Systemic inflammation is a major factor influencing the outcome and quality of patient with chronic obstructive pulmonary disease (COPD) and acute exacerbations (AECOPD). Because of the inflammatory complexity, a great challenge is still confronted to optimize the identification and validation of disease-specific biomarkers.”

The news correspondents obtained a quote from the research by the authors from Fudan University, “This study aimed at developing a new protocol of specific biomarker evaluation by integrating proteomic profiles of inflammatory mediators with clinical informatics in AECOPD patients, understand better their function and signal networks. Plasma samples were collected from healthy non-smokers or patients with stable COPD (sCOPD) or AECOPD on days 1 and 3 of the admission and discharging day (day 710). Forty chemokines were measured using a chemokine multiplex antibody array. Clinical informatics was achieved by a Digital Evaluation Score System (DESS) for assessing severity of patients. Chemokine data was compared among different groups and its correlation with DESS scores was performed by SPSS software. Of 40 chemokines, 30 showed significant difference between sCOPD patients and healthy controls, 16 between AECOPD patients and controls and 13 between AECOPD patients and both sCOPD and controls, including BTC, IL-9, IL-18Bpa, CCL22, CCL23, CCL25, CCL28, CTACK, LIGHT, MSPa, MCP-3, MCP-4 and OPN. Of them, some had significant correlation with DESS scores. There is a disease-specific profile of inflammatory mediators in COPD and AECOPD patients which may have a potential diagnostics together with clinical informatics of patients.”

According to the news reporters, the researchers concluded: “Our preliminary study suggested that integration of proteomics with clinical informatics can be a new way to validate and optimize disease-special biomarkers.”

For more information on this research see: Selection of disease-specific biomarkers by integrating inflammatory mediators with clinical informatics in AECOPD patients: a preliminary study. *Journal of Cellular and Molecular Medicine*, 2012;16(6):1286-1297. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news journalists report that additional information may be obtained by contacting H. Chen, Fudan University, Zhongshan Hosp, Emergency Department, Shanghai 200032, People's Republic of China. (2012 Jul 05)

## **Rice University, Houston: Injectable biodegradable hydrogels for embryonic stem cell transplantation: improved cardiac remodelling and function of myocardial infarction**

By a News Reporter-Staff News Editor at Cardiovascular Week – Research findings on Stem Cell Research are discussed in a new report. According to news reporting originating in Houston, Texas, by NewsRx journalists, researchers stated “In this study, an injectable, biodegradable hydrogel composite of oligo[poly(ethylene glycol) fumarate] (OPF) was investigated as a carrier of mouse embryonic stem cells (mESCs) for the treatment of myocardial infarction (MI). The OPF hydrogels were used to encapsulate mESCs.”

The news reporters obtained a quote from the research by the authors from Rice University, “The cell differentiation in vitro over 14 days was determined via immunohistochemical examination. Then, mESCs encapsulated in OPF hydrogels were injected into the LV wall of a rat MI model. Detailed histological analysis and echocardiography were used to determine the structural and functional consequences after 4 weeks of transplantation. With ascorbic acid induction, mESCs could differentiate into cardiomyocytes and other cell types in all three lineages in the OPF hydrogel. After transplantation, both the 24-hr cell retention and 4-week graft size were significantly greater in the OPF + ESC group than that of the PBS + ESC group ( $P \leq 0.01$ ). Four weeks after transplantation, OPF hydrogel alone significantly reduced the infarct size and collagen deposition and improved the cardiac function. The heart function and revascularization improved significantly, while the infarct size and fibrotic area decreased significantly in the OPF + ESC group compared with that of the PBS + ESC, OPF and PBS groups ( $P \leq 0.01$ ). All treatments had significantly reduced MMP2 and MMP9 protein levels compared to the PBS control group, and the OPF + ESC group decreased most by Western blotting. Transplanted mESCs expressed cardiovascular markers.”

According to the news reporters, the researchers concluded: “This study suggests the potential of a method for heart regeneration involving OPF hydrogels for stem cell encapsulation and transplantation.”

For more information on this research see: Injectable biodegradable hydrogels for embryonic stem cell transplantation: improved cardiac remodelling and function of myocardial infarction. *Journal of Cellular and Molecular Medicine*, 2012;16(6):1310-1320. *Journal of Cellular and Molecular Medicine* can be contacted at: Wiley-Blackwell, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN 1582-4934)

Our news correspondents report that additional information may be obtained by contacting H.B. Wang, Rice University, Dept. of Chem & Biomol Engn, Houston, TX, United States. (2012 Jul 02)

### **University of Medicine and Pharmacy, Bucharest: Apoptosis in seborrheic keratoses: an open door to a new dermoscopic score**

By a News Reporter-Staff News Editor at Health & Medicine Week – Research findings on Apoptosis are discussed in a new report. According to news reporting originating from Bucharest, Romania, by NewsRx correspondents, researchers stated “The aetiology of seborrheic keratoses (SK), the most common benign epithelial tumours, and any relationship with malignancy are not yet known. As a protective anti-cancer mechanism, apoptosis reflects cellular loss as a reaction to proliferative activity.”

Our news editors obtained a quote from the research by the authors from the University of Medicine and Pharmacy, “The objective of this study was to quantify apoptosis in different SK types (acanthotic, hyperkeratotic, reticulated, irritated and clonal) and correlate the dermoscopic picture with apoptosis rate. After a qualitative and quantitative analysis of dermoscopic images, we defined a new quantitative dermoscopic score (C3V2F, crypts, millia cysts, colours, hairpin vessels, irregular vessels, fissures) from 0 to 22, which enabled us to establish cut-offs correlating with apoptosis rates. All five SK forms were associated with lower apoptosis rates compared with normal skin. A C3V2F score  $\geq 10$  and greater number of crypts and colours reflected a higher apoptosis rate, which implies a benign character of evolution. In contrast, the presence of irregular vessels on more than 50% of the lesion surface implied a lower rate of apoptosis and probably associated with a risk of malignant transformation. On the basis of dermoscopic information, we used multiple regression to establish a model for estimating the rate of apoptosis with a 0.7 prediction interval (approximately 1S.D.).”

According to the news editors, the researchers concluded: “The new C3V2F score could be valuable for the clinical evaluation of possible SK prognosis and decisions regarding excision.”

For more information on this research see: Apoptosis in seborrheic keratoses: an open door to a new dermoscopic score. *Journal of Cellular and Molecular Medicine*, 2012;16(6):1223-31. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

The news editors report that additional information may be obtained by contacting O. Simionescu, Dept. of Dermatology, Colentina University Hospital, 'Carol Davila' University of Medicine and Pharmacy, Bucharest, Romania.

Publisher contact information for the *Journal of Cellular and Molecular Medicine* is: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Jun 29)

### **Institute of Clinical Neurobiology, Vienna: Interaction between pathogenic proteins in neurodegenerative disorders**

By a News Reporter-Staff News Editor at Life Science Weekly – Fresh data on Peptides and Proteins are presented in a new report. According to news reporting originating in Vienna, Austria, by NewsRx journalists, researchers stated “Introduction The proteopathic basis of AD Protein interactions in PD Induction and spread of protein aggregates in NDDs Conclusions The misfolding and progressive aggregation of specific proteins in selective regions of the nervous system is a seminal occurrence in many neurodegenerative disorders, and the interaction between pathological/toxic proteins to cause neurodegeneration is a hot topic of current neuroscience research. Despite clinical, genetic and experimental differences, increasing evidence indicates considerable overlap between synucleinopathies, tauopathies and other protein-misfolding diseases.”

The news reporters obtained a quote from the research by the authors from the Institute of Clinical Neurobiology, “Inclusions, often characteristic hallmarks of these disorders, suggest interactions of pathological proteins engaging common downstream pathways. Novel findings that have shifted our understanding in the role of pathologic proteins in the pathogenesis of Alzheimer, Parkinson, Huntington and prion diseases, have confirmed correlations/overlaps between these and other neurodegenerative disorders. Emerging evidence, in addition to synergistic effects of tau protein, amyloid- $\beta$ ,  $\alpha$ -synuclein and other pathologic proteins, suggests that prion-like induction and spreading, involving secreted proteins, are major pathogenic mechanisms in various neurodegenerative diseases, depending on genetic backgrounds and environmental factors.”

According to the news reporters, the researchers concluded: “The elucidation of the basic molecular mechanisms underlying the interaction and spreading of pathogenic proteins, suggesting a dualism or triad of neurodegeneration in protein-misfolding disorders, is a major challenge for modern neuroscience, to provide a deeper insight into their pathogenesis as a basis of effective diagnosis and treatment.”

For more information on this research see: Interaction between pathogenic proteins in neurodegenerative disorders. *Journal of Cellular and Molecular Medicine*, 2012;16(6):1166-83. *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (Wiley-Blackwell - <http://www.wiley.com/>; *Journal of Cellular and Molecular Medicine* - <http://onlinelibrary.wiley.com/journal/10.1111/> (ISSN) 1582-4934)

Our news correspondents report that additional information may be obtained by contacting K.A. Jellinger, Institute of Clinical Neurobiology, Vienna, Austria.

The publisher of the *Journal of Cellular and Molecular Medicine* can be contacted at: Blackwell Publishing Inc, 350 Main St, Malden, MA 02148, USA. (2012 Jun 26)

### **Texas A&M University, Temple: Molecular pathogenesis of malignant mesothelioma**

By a News Reporter-Staff News Editor at Clinical Trials Week – New research on Mesotheliomas is the subject of a report. According to news reporting from Temple, Texas, by NewsRx journalists, researchers stated “Malignant mesothelioma is a rare, highly aggressive cancer arising from mesothelial cells that line the pleural cavities. Approximately 80% of mesothelioma cases can be directly attributed to asbestos exposure.”

The news correspondents obtained a quote from the research by the authors from Texas A&M University, “Additional suspected causes or co-carcinogens include other mineral fibres, simian virus 40 (SV40) and radiation. A mesothelioma epidemic in Turkey has demonstrated a probable genetic predisposition to mineral fibre carcinogenesis and studies of human tissues and animal models of mesothelioma have demonstrated genetic and epigenetic events that contribute to the multistep process of mineral fibre carcinogenesis. Several growth factors and their receptors have a significant role in the oncogenesis, progression and resistance to therapy of mesothelioma. Epidermal growth factor (EGF), hepatocyte growth factor (HGF), vascular endothelial growth factor (VEGF) and insulin-like growth factor (IGF) have been shown as targets for therapy based on promising preclinical data. However, clinical trials of tyrosine kinase inhibitors in mesothelioma have been disappointing. Bcl-XL is an important antiapoptotic member of the Bcl-2 family and is overexpressed in several solid tumours, including mesothelioma. Reduction of Bcl-XL expression in mesothelioma induces apoptosis and engenders sensitisation to cytotoxic chemotherapeutic agents.”

According to the news reporters, the researchers concluded: “Pharmacological inhibitors of antiapoptotic Bcl-2 family members continue to undergo refinement and have shown promise in mesothelioma.”

For more information on this research see: Molecular pathogenesis of malignant mesothelioma. *Expert Reviews In Molecular Medicine*, 2012;14():e12. *Expert Reviews In Molecular Medicine* can be contacted at: Cambridge University Press, 32 Avenue of the Americas, New York, NY 10013-2473. (Cambridge University Press - [www.cambridge.org](http://www.cambridge.org); Expert Reviews In Molecular Medicine - <http://journals.cambridge.org/action/displayJournal?jid=ERM>)

Our news journalists report that additional information may be obtained by contacting P.A. Rascoe, Texas A&M Health Science Center College of Medicine, Temple, TX, United States.

Publisher contact information for the journal *Expert Reviews In Molecular Medicine* is: Cambridge University Press, 32 Avenue of the Americas, New York, NY 10013-2473. (2012 Jun 25)

### **Washington University School of Medicine, St. Louis: Antiangiogenic and anticancer molecules in cartilage**

By a News Reporter-Staff News Editor at Life Science Weekly – Data detailed on Angiostatic Proteins have been presented. According to news reporting out of St. Louis, Missouri, by NewsRx editors, researchers stated “Cartilage is one of the very few naturally occurring avascular tissues where lack of angiogenesis is the guiding principle for its structure and function. This has attracted investigators who have sought to understand the biochemical basis for its avascular nature, hypothesizing that it could be used in designing therapies for treating cancer and related malignancies in humans through antiangiogenic applications.”

Our news journalists obtained a quote from the research by the authors from the Washington University School of Medicine, “Cartilage encompasses primarily a specialised extracellular matrix synthesised by chondrocytes that is both complex and unique as a result of the myriad molecules of which it is composed. Of these components, a few such as thrombospondin-1, chondromodulin-1, the type XVIII-derived endostatin, SPARC (secreted protein acidic and rich in cysteine) and the type II collagen-derived N-terminal propeptide (PIIBNP) have demonstrated antiangiogenic or antitumour properties in vitro and in vivo preclinical trials that involve several complicated mechanisms that are not completely understood. Thrombospondin-1, endostatin and the shark-cartilage-derived Neovastat preparation have also been investigated in human clinical trials to treat several different kinds of cancers, where, despite the tremendous success seen in preclinical trials, these molecules are yet to show success as anticancer agents.”



According to the news editors, the researchers concluded: “This review summarises the current state-of-the-art antiangiogenic characterisation of these molecules, highlights their most promising aspects and evaluates the future of these molecules in antiangiogenic applications.”

For more information on this research see: Antiangiogenic and anticancer molecules in cartilage. *Expert Reviews In Molecular Medicine*, 2012;14():e10. *Expert Reviews In Molecular Medicine* can be contacted at: Cambridge University Press, 32 Avenue of the Americas, New York, NY 10013-2473. (Cambridge University Press - [www.cambridge.org](http://www.cambridge.org); Expert Reviews In Molecular Medicine - <http://journals.cambridge.org/action/displayJournal?jid=ERM>)

Our news journalists report that additional information may be obtained by contacting D. Patra, Dept. of Orthopaedic Surgery, Washington University School of Medicine, St Louis, MO, United States.

Publisher contact information for the journal *Expert Reviews In Molecular Medicine* is: Cambridge University Press, 32 Avenue of the Americas, New York, NY 10013-2473. (2012 Jun 05)

## Chapter 6

# Reproductive Biomedicine

### **University of Debrecen: Correlation study between sperm concentration, hyaluronic acid-binding capacity and sperm aneuploidy in Hungarian patients**

By a News Reporter-Staff News Editor at Biotech Week – Researchers detail new data in Reproductive Biomedicine. According to news reporting originating from Debrecen, Hungary, by NewsRx correspondents, research stated, “Infertile men with low sperm concentration and/or less motile spermatozoa have an increased risk of producing aneuploid spermatozoa. Selecting spermatozoa by hyaluronic acid (HA) binding may reduce genetic risks such as chromosomal rearrangements and numerical aberrations.”

Our news editors obtained a quote from the research from the University of Debrecen, “Fluorescence in-situ hybridization (FISH) has been used to evaluate the presence of aneuploidies. This study examined spermatozoa of 10 oligozoospermic, 9 asthenozoospermic, 9 oligoasthenozoospermic and 17 normozoospermic men by HA binding and FISH. Mean percentage of HA-bound spermatozoa in the normozoospermic group was 81%, which was significantly higher than in the oligozoospermic ( $p < 0.001$ ), asthenozoospermic ( $p < 0.001$ ) and oligoasthenozoospermic ( $p < 0.001$ ) groups. Disomy of sex chromosomes ( $p=0.014$ ) and chromosome 17 ( $p=0.0019$ ), diploidy ( $p=0.03$ ) and estimated numerical chromosome aberrations ( $p=0.004$ ) were significantly higher in the oligoasthenozoospermic group compared with the other groups. There were statistically significant relationships ( $p < 0.001$ ) between sperm concentration and HA binding ( $r=0.658$ ), between sperm concentration and estimated numerical chromosome aberrations ( $r=-0.668$ ) and between HA binding and estimated numerical

chromosome aberrations ( $r=-0.682$ ). HA binding and aneuploidy studies of spermatozoa in individual cases allow prediction of reproductive prognosis and provision of appropriate genetic counselling. Infertile men with normal karyotypes and low sperm concentrations and/or less motile spermatozoa have significantly increased risks of producing aneuploid (diminished mature) spermatozoa. Selecting spermatozoa by hyaluronic acid (HA) binding, based on a binding between sperm receptors for zona pellucida and HA, may reduce the potential genetic risks such as chromosomal rearrangements and numerical aberrations. In the present study we examined sperm samples of 45 men with different sperm parameters by HA-binding assay and fluorescence in-situ hybridization (FISH). Mean percentage of HA-bound spermatozoa in the normozoospermic group was significantly higher than the oligozoospermic, the asthenozoospermic and the oligoasthenozoospermic groups. Using FISH, disomy of sex chromosomes and chromosome 17, diploidy and estimated numerical chromosome aberration frequencies were significantly higher in the oligoasthenozoospermic group compared with the three other groups. A significant positive correlation was found between the sperm concentration and the HA-binding capacity, and significant negative correlations between the sperm concentration and the estimated numerical chromosomes aberrations as well as between the HA-binding ability and the estimated numerical chromosome aberrations were identified."

According to the news editors, the research concluded: "HA-binding assay and sperm aneuploidy study using FISH may help to predict the reproductive ability of selected infertile male patients and to provide appropriate genetic counselling."

For more information on this research see: Correlation study between sperm concentration, hyaluronic acid-binding capacity and sperm aneuploidy in Hungarian patients. *Reproductive Biomedicine*, 2012;25(6):620-6. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Reproductive Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

The news editors report that additional information may be obtained by contacting A. Mokanszki, Clinical Genetic Center, Dept. of Pediatrics, Medical and Health Science Center, University of Debrecen, Debrecen, Hungary. (2013 Jan 02)

## **Cleavage kinetics analysis of human embryos predicts development to blastocyst and implantation**

By a News Reporter-Staff News Editor at Biotech Week – New research on Reproductive Biomedicine is the subject of a report. According to news reporting out of Monza, Italy, by NewsRx editors, research stated, "Cleavage kinetics of human embryos is indicative of ability to develop

to blastocyst and implant. Recent advances in time-lapse microscopy have opened new and important research opportunities.”

Our news journalists obtained a quote from the research, “In this study involving infertile couples requiring standard IVF/intracytoplasmic sperm injection treatment, zygotes were cultured by integrated embryo-culture time-lapse microscopy to analyse cleavage times from the 2-to the 8-cell stages in relation to the ability to develop to blastocyst, expand and implant. In comparison to embryos arresting after 8-cell stage, times of cleavage to 7-and 8-cell stages of embryos developing to blastocyst were shorter (56.5±8.1 versus 58.8±10.4h,  $p=0.03$  and 61.0±9.4 versus 65.2±13.0h,  $p=0.0008$ , respectively). In embryos developing to blastocyst, absence of blastocoele expansion on day 5 was associated with progressive cleavage delay. Implanting embryos developed to 8-cell stage in a shorter period compared with those unable to implant (54.9±5.2 and 58.0±7.2h, respectively,  $p=0.035$ ). cleavage from 2-to 8-cell stage occurs progressively earlier in embryos with the ability to develop to blastocyst, expand and implant. Conventional observation times on days 2 and 3 are inappropriate for accurate embryo evaluation. The speed at which human embryos cleave is known to be suggestive of their ability to develop in vitro to the blastocyst stage and implant after transfer into the uterus. Recent advances in time-lapse microscopy, which allows acquisition of images every 15-20min, have opened new and important research opportunities. In a retrospective study involving infertile couples requiring standard IVF or intracytoplasmic sperm injection treatment, fertilized oocytes were cultured by an integrated embryo-culture time-lapse microscopy system in order to perform an analysis of cleavage times from the 2-to the 8-cell stage in relation to the ability to develop to blastocyst, expand and implant. In comparison to embryos arresting after the 8-cell stage, times of cleavage to the 7-and 8-cell stage of embryos that developed to blastocyst were significantly shorter (56.5±8.1h versus 58.8±10.4h and 61.0±9.4h versus 65.2±13.0h, respectively). In embryos developing to the blastocyst stage, absence of blastocoele expansion on day 5 was associated with a progressive cleavage delay. Implanting embryos developed to the 8-cell stage in a shorter period compared to those unable to implant (54.9±5.2h and 58.0±7.2h, respectively,  $p=0.035$ ).”

According to the news editors, the research concluded: “Cleavage from the 2-to the 8-cell stage occurs progressively earlier in embryos with the ability to develop to blastocyst, expand and implant. Conventional observation times on day 2 and 3 are appropriate for accurate embryo evaluation.”

For more information on this research see: Cleavage kinetics analysis of human embryos predicts development to blastocyst and

implantation. *Reproductive Biomedicine*, 2012;25(5):474-80. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Reproductive Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

Our news journalists report that additional information may be obtained by contacting M. Dal Canto, Biogenesi Reproductive Medicine Centre, Istituti Clinici Zucchi, Via Zucchi 24, Monza, Italy. (2012 Dec 05)

### **Reproductive Medicine Center, Palo Alto: Outcomes of trophectoderm biopsy on cryopreserved blastocysts: a case series**

By a News Reporter-Staff News Editor at Biotech Week – Investigators discuss new findings in Reproductive Biomedicine. According to news reporting from Palo Alto, California, by NewsRx journalists, research stated, “Preimplantation genetic diagnosis (PGD) is an increasingly common adjunct to IVF. The information gained from PGD may be used to reduce the incidence of chromosomally abnormal pregnancies and augment the current selection process of embryos.”

The news correspondents obtained a quote from the research from Reproductive Medicine Center, “As such, patients may choose to utilize PGD in either fresh or cryopreserved IVF cycles. It is a common practice to cryopreserve excess embryos at the blastocyst stage. In these cases, trophectoderm biopsy is the only technique available for PGD. This articles reports this study centre’s experience with trophectoderm biopsies of cryopreserved blastocysts in 12 patients who underwent 13 cycles of PGD. The implantation rate per embryo transferred was 46% and the ongoing pregnancy rate per embryo transfer was 63%. The results from this case series demonstrate that trophectoderm biopsy on cryopreserved blastocysts to perform PGD is logistically feasible. In addition, the rate of implantation and ongoing pregnancy were maintained within a reasonable range to justify the procedure. Preimplantation genetic diagnosis (PGD) is an increasingly common adjunct to IVF and is used to evaluate the genetic makeup of the embryo prior to transfer of the embryo into the uterus. The information gained from PGD may be used to identify single-gene disorders that result in genetic disease, reduce the incidence of chromosomally abnormal pregnancies and/or augment the selection process of embryos to be transferred. In order to perform PGD, a biopsy of the embryo is the performed and cells are removed for testing. PGD may be performed in either fresh or frozen (cryopreserved) IVF cycles. Patients who have cryopreserved embryos remaining in storage from a previous fresh cycle may wish to have these embryos tested with PGD. Many embryos are frozen on day 5 of development, referred to as the blastocyst stage. At this stage of development, embryo biopsy is performed via a technique known as ‘trophectoderm

biopsy', in which 1-3 of the cells destined to become the placenta are removed from the embryo for chromosomal testing. We report our experience with trophectoderm biopsy of frozen blastocysts in 12 patients who underwent 13 cycles of PGD. The implantation rate per embryo transferred was 46% and the ongoing pregnancy rate per embryo transfer was 63%. The results from this case series demonstrate that trophectoderm biopsy on cryopreserved blastocysts to perform PGD is logistically feasible."

According to the news reporters, the research concluded: "In addition, the rate of implantation and ongoing pregnancy were maintained within a reasonable range to justify the procedure."

For more information on this research see: Outcomes of trophectoderm biopsy on cryopreserved blastocysts: a case series. *Reproductive Biomedicine*, 2012;25(5):504-7. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Reproductive Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

Our news journalists report that additional information may be obtained by contacting R.B. Lathi, Stanford Fertility and Reproductive Medicine Center, 900 Welch Road, Suite 350, Palo Alto, CA 94304, United States. (2012 Dec 05)

### **Walter Reed National Military Medical Center, Washington: GnRH antagonist rescue in high responders at risk for OHSS results in excellent assisted reproduction outcomes**

By a News Reporter-Staff News Editor at Health & Medicine Week – New research on Women's Health - Ovarian Diseases is the subject of a report. According to news originating from Washington, District of Columbia, by NewsRx correspondents, research stated, "Gonadotrophin-releasing hormone (GnRH) antagonist rescue is performed by replacing a GnRH agonist with a GnRH antagonist in patients with rapidly rising serum oestradiol who are at risk of ovarian hyperstimulation syndrome (OHSS) during stimulation. It results in a rapid reduction in serum oestradiol, allowing for the avoidance of cycle cancellation and the continuation of exogenous gonadotrophin administration."

Our news journalists obtained a quote from the research from Walter Reed National Military Medical Center, "A total of 387 patients who underwent GnRH antagonist rescue for ovarian hyperresponse were compared with 271 patients who did not receive GnRH antagonist rescue and had oestradiol concentrations  $>4000$  pg/ml on the day of human chorionic gonadotrophin (HCG) administration. GnRH antagonist rescue decreased the mean oestradiol concentration by 35% on the first

day of use. There was no difference in oocyte maturity (82% versus 83%) or fertilization rate (69% versus 67%) between the antagonist rescue and comparison groups, respectively. The percentage of high-grade embryos on day 3 and the blastocyst development rate were also similar between groups. The live-birth rate was 41.9% in the antagonist rescue group and 36.9% in the comparison group. GnRH antagonist rescue enabled cycle completion with high live-birth rates in patients at risk for OHSS. GnRH antagonist was associated with high oocyte quality, blastocyst development and pregnancy. Gonadotrophin-releasing hormone (GnRH) antagonist rescue is a protocol to reduce the risk of ovarian hyperstimulation syndrome (OHSS) in assisted reproduction treatment. Patients who have a hyperresponse to medication during their treatment cycle have their GnRH agonist discontinued and a GnRH antagonist started in its place. This causes a rapid reduction in oestrogen concentrations and allows for the continuation of stimulation medication. We evaluated the effectiveness of this protocol by comparing patients who had GnRH antagonist rescue against high-responding patients who did not receive GnRH antagonist rescue. GnRH antagonist rescue resulted in a 35% reduction in oestrogen concentration and only a 1.5% cycle cancellation rate. There were no differences in oocyte maturity or fertilization between the two groups. There were no differences in the quality of day-3 and day-5 embryos between the two groups. The live birth rate was 41.9% in the antagonist rescue group and 36.9% in the comparison group. GnRH antagonist rescue reduced serum oestradiol concentrations and enabled cycle completion with high live-birth rates in patients at risk for OHSS.”

According to the news editors, the research concluded: “GnRH antagonist was associated with high oocyte quality, blastocyst development and pregnancy.”

For more information on this research see: GnRH antagonist rescue in high responders at risk for OHSS results in excellent assisted reproduction outcomes. *Reproductive Biomedicine*, 2012;25(3):284-91. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Reproductive Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

The news correspondents report that additional information may be obtained from M.J. Hill, Walter Reed National Military Medical Center, Washington, DC, United States. (2012 Nov 30)

### **Surgically retrieved spermatozoa versus ejaculated spermatozoa in modified natural IVF-ICSI cycles**

By a News Reporter-Staff News Editor at Life Science Weekly – Research findings on Embryo Transfer are discussed in a new report. According to news reporting out of Montreal, Canada, by NewsRx editors,

research stated, “A retrospective cohort study was performed to evaluate the outcome of modified natural IVF-intracytoplasmic sperm injection (mnIVF-ICSI) cycles to compare 81 mnIVF-ICSI first cycles using ejaculated spermatozoa with 44 mnIVF-ICSI first cycles using surgically retrieved spermatozoa. There were no differences between the two groups in terms of number of oocytes retrieved, oocyte maturity or female age.”

Our news journalists obtained a quote from the research, “However, male age was significantly higher in the surgically retrieved compared with the ejaculated group (41.5 versus 36.5 years,  $p=0.001$ ). There were no significant differences in fertilization rate or cleavage rate between the ejaculated and the surgically retrieved groups; however the prevalence of embryo transfer was higher in the surgically retrieved group (65.9% versus 45.7%,  $p=0.03$ ). Only single-embryo transfer was performed. Biochemical (34.5% versus 37.8%) and clinical (31.0% versus 35.1%) pregnancy rates per embryo transfer were similar between the ejaculated and the surgically retrieved groups. The data suggest that mnIVF-ICSI is an alternative treatment option in couples with severe male factor infertility where surgical sperm retrieval is required. The aim of the present study was to evaluate and compare the outcomes of modified natural IVF-intracytoplasmic sperm injection (mnIVF-ICSI) with surgically retrieved spermatozoa (in male partners with obstructive azoospermia) and ejaculated spermatozoa (in couples with mild-to-moderate male factor). Eighty-one mnIVF-ICSI first cycles using ejaculated spermatozoa were compared with forty-four mnIVF-ICSI first cycles using surgically retrieved spermatozoa. There were no differences between the two groups in terms of number of oocytes retrieved, oocyte maturity or female age. However, male age was significantly higher in the surgically retrieved compared with the ejaculated group. There were no significant differences in fertilization rate, or cleavage rate between the two groups; however, there were more patients having embryo transfers in the surgically retrieved group. Only single-embryo transfer was performed. Biochemical and clinical pregnancy rates per embryo transfer were similar between both groups.”

According to the news editors, the research concluded: “The data suggest that mnIVF-ICSI is an alternative treatment option in couples with severe male factor infertility where surgical sperm retrieval is required.”

For more information on this research see: Surgically retrieved spermatozoa versus ejaculated spermatozoa in modified natural IVF-ICSI cycles. *Reproductive Biomedicine*, 2012;25(3):242-7. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Reproductive Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))



Our news journalists report that additional information may be obtained by contacting W. Jamal, OVO Clinic, 8000 boulevard Decarie, Montreal, Quebec, Canada. (2012 Nov 27)

### **Fourth Military Medical University, Xi'an: Evidence that miR-133a causes recurrent spontaneous abortion by reducing HLA-G expression**

By a News Reporter-Staff News Editor at Health & Medicine Week – Current study results on Reproductive Biomedicine have been published. According to news reporting originating from Xi'an, People's Republic of China, by NewsRx correspondents, research stated, "Human leukocyte antigen (HLA)-G is thought to confer fetal-maternal tolerance and play a crucial role in ensuring a successful pregnancy. There is increasing evidence that HLA-G is regulated at the post-transcriptional level."

Our news editors obtained a quote from the research from Fourth Military Medical University, "This study investigated the role of miR-133a in regulating HLA-G expression and the pathogenesis of recurrent spontaneous abortion (RSA). Twelve patients (25-30years) with RSA at 7 gestational weeks were screened by array-based comparative genome hybridization: 16.7% were found to have an abnormal karyotype and all induced abortion (IA) patients had normal karyotype. The villi of RSA and IA patients with normal karyotype were further screened by miRNA microarrays. Multi-software prediction and real-time PCR confirmed that miR-133a was most likely to bind to HLA-G 3' untranslated region (UTR). Relevance analysis showed that, compared with IA villi, miR-133a was greatly overexpressed in RSA villi with normal karyotype ( $p < 0.01$ ), but not in abnormal RSA villi. A luciferase reporter assay suggested that miR-133a interacted with HLA-G 3' UTR. Overexpression of miR-133a in JEG-3 cells decreased HLA-G expression at the protein level, with no effect on mRNA. These findings provide strong evidence that miR-133a regulates HLA-G expression by reducing translation and is involved in the pathogenesis of RSA. Human leukocyte antigen (HLA)-G is supposed to confer fetal-maternal tolerance and plays a crucial role in successful pregnancy. Accumulating evidence indicates that HLA-G is mainly regulated at the post-transcriptional level. Our study aimed to further investigate the key role of a microRNA, miR-133a, in regulating HLA-G expression and the pathogenesis of recurrent spontaneous abortion (RSA)."

According to the news editors, the research concluded: "Our findings indicated that miR-133a regulates HLA-G expression by inhibiting its translation, and suggest that it is involved in the pathogenesis of RSA."

For more information on this research see: Evidence that miR-133a causes recurrent spontaneous abortion by reducing HLA-G

expression. *Reproductive Biomedicine*, 2012;25(4):415-24. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Reproductive Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

The news editors report that additional information may be obtained by contacting X. Wang, Dept. of Obstetrics and Gynecology, Tangdu Hospital, The Fourth Military Medical University, Xi'an 710038, People's Taiwan. (2012 Nov 02)

### **Research Hospital, Ankara: Office hysteroscopy improves pregnancy rates following IVF**

By a News Reporter-Staff News Editor at OBGYN & Reproduction Week – New research on Reproductive Biomedicine is the subject of a report. According to news reporting out of Ankara, Turkey, by NewsRx editors, research stated, “The aim of the study was to evaluate the effect of office hysteroscopy (OH) on pregnancy rate in patients undergoing IVF. A total of 1258 patients attending an IVF clinic with normal hysteroscopic findings were enrolled.”

Our news journalists obtained a quote from the research from Research Hospital, “The impact of timing of OH before embryo transfer on pregnancy rate was investigated. The women were evaluated in three groups: group 1, OH performed 50days or less before embryo transfer (n=407), group 2, OH between 51days to 6months, (n=280) and group 3, OH more than 6months before embryo transfer (n=571). The implantation rates were 22.1%, 16.1% and 11.1% in groups 1, 2 and 3, respectively. Overall pregnancy rates were 48.2%, 38.9% and 29.9% in groups 1, 2 and 3, respectively. The clinical pregnancy rates were 45.2%, 34.3% and 27.1% and the live birth rates were 36.9%, 27.9% and 22.6%, respectively. Implantation, pregnancy, clinical pregnancy and live birth rates were significantly higher in group 1 compared with groups 2 and 3 (all  $p < 0.05$ ). OH may improve pregnancy rates, but timing of the procedure is important. The endometrial effect is highest when hysteroscopy is performed 50days or less before embryo transfer. Office hysteroscopy (OH), which helps the clinician for the evaluation of the uterine cavity before IVF treatment, may affect the pregnancy rates depending on when the procedure is performed. A total of 1258 patients attending an outpatient IVF clinic were enrolled in the study. The women were evaluated in three groups: group 1, OH performed 50days or less before embryo transfer (n=407), group 2, OH between 51days to 6months, (n=280) and group 3, OH more than 6months before embryo transfer (n=571). The implantation, pregnancy and clinical pregnancy rates were significantly higher in group 1 compared with groups 2 and 3.”

According to the news editors, the researchers concluded: “OH may improve pregnancy rates when performed 50days or less before embryo transfer.”

For more information on this research see: Office hysteroscopy improves pregnancy rates following IVF. *Reproductive Biomedicine*, 2012;25(3):261-6. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Reproductive Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

Our news journalists report that additional information may be obtained by contacting R. Karayalcin, Zekai Tahir Burak Women's Health Education and Research Hospital, Dept. of Reproductive Endocrinology, Ankara, Turkey. (2012 Sep 24)

### **University Hospital, Copenhagen: Long-term duration of function of ovarian tissue transplants: case reports**

By a News Reporter-Staff News Editor at Women's Health Weekly – Current study results on *Reproductive Biomedicine* have been published. According to news reporting originating from Copenhagen, Denmark, by NewsRx correspondents, research stated, “These three case reports describe the long-term duration of function of ovarian cortical tissue grafts among patients in a university fertility preservation programme in Europe and in a private practice programme in the USA. One woman underwent sterilizing cancer treatment and had frozen ovarian tissue transplanted, and two women underwent fresh ovarian tissue transplants.”

Our news editors obtained a quote from the research from University Hospital, “The function of ovarian cortical strips has continued for more than 7years in these three women, with the birth of eight healthy babies following a single graft per patient. In addition to these three cases, transplantation (repeatedly in some cases) of cryopreserved ovarian tissue has restored reproductive function to all other women in the study centres' programmes for some years. The sustained longevity of function of the transplanted tissue suggests that it may also be possible to postpone the normal time of menopause or to alleviate its symptoms. These three case reports describe the long-term duration of function of ovarian cortical tissue grafts among patients in a university fertility preservation programme in Europe and in a private practice programme in the USA. One woman underwent sterilizing cancer treatment and had frozen ovarian tissue transplanted, and two women underwent fresh ovarian tissue transplants. Function of ovarian cortical strips has continued for more than 7years in these three women, with the birth of eight healthy babies following a single graft per patient. In addition to these three cases, transplantation (repeatedly in some cases) of cryopreserved ovarian tissue has restored reproductive function to all other women in our programmes for some years.”

According to the news editors, the researchers concluded: “The sustained longevity of function of the transplanted tissue suggests that it

may also be possible to postpone the normal time of menopause or to alleviate its symptoms.”

For more information on this research see: Long-term duration of function of ovarian tissue transplants: case reports. *Reproductive Biomedicine*, 2012;25(2):128-32. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Reproductive Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

The news editors report that additional information may be obtained by contacting C.Y. Andersen, Laboratory of Reproductive Biology, The Juliane Marie Centre for Women, Children and Reproduction, University Hospital of Copenhagen, Faculty of Health Science, University of Copenhagen, Copenhagen, Denmark. (2012 Aug 30)

### **Reliance Life Sciences, Navi Mumbai: Chromosomal aberrations in 2000 couples of Indian ethnicity with reproductive failure**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Reproductive Biomedicine. According to news reporting originating in Navi Mumbai, India, by NewsRx journalists, research stated, “Constitutional chromosomal aberrations contribute to infertility and repeated miscarriage leading to reproductive failure in couples. These aberrations may show no obvious clinical manifestations and remain undetected across multiple generations.”

The news reporters obtained a quote from the research from Reliance Life Sciences, “However, infertility or recurrent spontaneous pregnancy loss, and/or genotypic/phenotypic aberrations may be manifested in the progeny during gametogenesis. The current study was a retrospective analysis to examine the chromosomal aberrations and prevalence in 2000 couples of Indian ethnicity with reproductive failure. Cytogenetic analysis via conventional G-band karyotyping analysis was carried out on phytohaemagglutinin stimulated peripheral blood lymphocytes, cultured in RPMI1640 medium. The chromosomes were enumerated as per International System for Human Cytogenetic Nomenclature at 500-550 band resolution, and recorded in the screening sheets. Chromosomal aberrations were detected in a total of 110 (2.78%) couples, with structural chromosomal aberrations in 88 cases including reciprocal translocations in 56 cases, Robertsonian translocations in 16 cases, inversions in eight cases, deletions in three cases, derivative chromosomes in five cases and numerical chromosome aberrations in 23 cases. The study emphasizes the importance of cytogenetic work up in both the partners associated with a history of reproductive failure. Genetic counselling with an option of prenatal diagnosis should be offered to couples with chromosomal aberrations. Alteration in the

number or structure of chromosomes is associated with adverse obstetric outcome in the form of infertility or recurrent miscarriages. Most of these aberrations are balanced and hence, the person does not manifest any obvious clinical signs and symptoms. However, because of the formation of abnormal gametes (i.e. the eggs and sperm), these chromosomal aberrations result in infertility and recurrent spontaneous pregnancy losses. In the present study, we studied 2000 couples of Indian ethnicity with reproductive failure. Karyotyping was done on the blood sample of these couples using standard protocols. Chromosomal aberrations were detected in a total of 110 (2.78%) couples with structural chromosomal aberrations in 88 cases including reciprocal translocations in 56 cases, Robertsonian translocations in 16 cases, inversions in eight cases, deletions in three cases, derivative chromosomes in five cases and numerical chromosome aberrations in 23 cases.”

According to the news reporters, the researchers concluded: “Thus, our study emphasizes the importance of cytogenetic work up in both the associated partners with history of reproductive failure which would help in better patient counselling and management.”

For more information on this research see: Chromosomal aberrations in 2000 couples of Indian ethnicity with reproductive failure. *Reproductive Biomedicine*, 2012;25(2):209-18. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Reproductive Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

Our news correspondents report that additional information may be obtained by contacting S. Gada Saxena, Molecular Medicine, Reliance Life Sciences Pvt Ltd, Dhirubhai Ambani Life Sciences Centre, Thane-Belapur Road, Rabale, Navi Mumbai 400 701, India. (2012 Aug 29)

### **University of Kentucky, Lexington: Methodology matters: IVF versus ICSI and embryonic gene expression**

By a News Reporter-Staff News Editor at Biotech Week – A new study on Assisted Reproduction is now available. According to news reporting from Lexington, Kentucky, by NewsRx journalists, research stated, “The use of assisted reproduction treatment, especially intracytoplasmic sperm injection (ICSI), is now linked to a range of adverse consequences, the aetiology of which remains largely undefined. Our objective of this study was to determine differences in gene expression of blastocysts generated by ICSI as well as ICSI with artificial oocyte activation (ICSI-A) versus the less manipulative IVF, providing fundamental genetic information that can be used to aid in the diagnosis or treatment of those adversely affected by assisted reproduction treatment, as well as stimulate research to further refine these techniques.”

The news correspondents obtained a quote from the research from the University of Kentucky, “Murine blastocysts were generated by

ICSI, ICSI-A and IVF, and processed for a microarray-based analysis of gene expression. Ten blastocysts were pooled for each procedure and three independent replicates generated. The data were then processed to determine differential gene expression and to identify biological pathways affected by the procedures. In blastocysts derived by ICSI versus IVF, the expression of 197 genes differed ( $p < 0.01$ ). In blastocysts derived by ICSI-A versus IVF and ICSI-A versus ICSI, the expression of 132 and 65 genes differed respectively ( $p < 0.01$ ). Procedural-induced changes in genes regulating specific biological pathways revealed some consistency to known adverse consequences.”

According to the news reporters, the researchers concluded: “Detailed investigation of procedure-specific dysfunction is therefore warranted.”

For more information on this research see: Methodology matters: IVF versus ICSI and embryonic gene expression. *Reproductive Biomedicine*, 2011;23(2):234-44. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Reproductive Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

Our news journalists report that additional information may be obtained by contacting P.J. Bridges, Division of Clinical and Reproductive Sciences, University of Kentucky, Lexington, KY 40536, United States. (2012 Aug 22)

## **St. Bartholomew’s Hospital, London: Can the fall in serum FSH during coasting in IVF/ICSI predict clinical outcomes?**

By a News Reporter-Staff News Editor at OBGYN & Reproduction Week – Current study results on Women’s Health have been published. According to news originating from London, United Kingdom, by NewsRx correspondents, researchers stated “This retrospective cohort study determined whether the total falls in serum FSH and oestradiol concentrations from start to end of coasting in IVF/intracytoplasmic sperm injection could predict clinical outcomes. Ninety-nine cycles, with gonadotrophin-releasing hormone-agonist down-regulation where coasting with serial serum oestradiol and FSH monitoring was adopted due to risk of severe ovarian hyperstimulation syndrome, were consecutively included.”

Our news journalists obtained a quote from the research by the authors from St. Bartholomew’s Hospital, “The primary clinical outcome was live-birth rate (LBR); other outcomes measured were number of oocytes retrieved and fertilization, implantation and clinical pregnancy rates. LBR for FSH fall  $> 10$  IU/l compared with 5-10 and  $< 5$  IU/l were 45.4% versus 22.0% and 25.0%, respectively. Mean serum FSH fall was similar with and without live birth (8.4  $\pm$  7.3 versus 7.3  $\pm$  5.0 IU/l) as were mean oestradiol and FSH concentrations on

HCG administration, oestradiol fall, percentage fall in FSH/oestradiol and duration of coasting. None of the variables efficiently predicted live birth on regression analysis. The AUC of FSH fall was 0.53 at 11.0 IU/l. Basal FSH, starting and total gonadotrophin dose and duration of coasting were positively correlated with FSH fall. A potentially clinically important association between live birth and FSH fall during coasting was apparent, which requires further evaluation. The purpose of this retrospective cohort study was to determine whether the magnitude of fall in the serum FSH and oestradiol concentrations from start to end of coasting in IVF/intracytoplasmic sperm injection cycles could predict the clinical outcomes. Gonadotrophin-releasing hormone-agonist down-regulated cycles (n=99), where coasting with serial serum oestradiol and FSH monitoring was adopted due to risk of ovarian hyperstimulation, were consecutively included. Live birth was the primary clinical outcome measured; number of oocytes retrieved and fertilization, implantation and clinical pregnancy rates were the other outcomes examined. Live-birth rate tended to be high when FSH fall was  $\geq 10$  IU/l, compared with 5-10 IU/l and  $\leq 5$  IU/l, although not statistically significantly. Mean serum FSH fall were similar in live-birth and no-live-birth cycles (8.4  $\pm$  6.2 versus 7.3  $\pm$  5.0) as were mean oestradiol and FSH concentrations on hCG administration, oestradiol fall, percentage fall in FSH and oestradiol and duration of coasting. None of the variables efficiently predicted live birth. The area under the curve of FSH fall was 0.53. FSH fall of  $\leq 11.0$  IU/l was found to be more likely to predict negative outcome (specificity 84.72%) than predicting positive outcome when FSH fall was  $\geq 11$  IU/l (sensitivity 34.48%). Women's basal FSH, starting and total gonadotrophin dose of ovarian stimulation and duration of coasting had direct positive correlation with the magnitude of FSH fall."

According to the news editors, the researchers concluded: "A potentially clinically important rise in live birth in association with greater FSH fall during coasting was apparent, which requires further evaluation."

For more information on this research see: Can the fall in serum FSH during coasting in IVF/ICSI predict clinical outcomes? *Reproductive Biomedicine*, 2012;24(5):503-10. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Reproductive Biomedicine* - [http://www.elsevier.com/ups/product/cws\\_home/721149](http://www.elsevier.com/ups/product/cws_home/721149))

The news correspondents report that additional information may be obtained from A.K. Datta, Centre for Reproductive Medicine, St Bartholomew's Hospital, West Smithfield, London EC1A 7BE, UK. (2012 Jul 23)

## Medical University, Vienna: Contraceptive counselling and factors affecting women's contraceptive choices: results of the CHOICE study in Austria

By a News Reporter-Staff News Editor at Women's Health Weekly – Investigators discuss new findings in Women's Health. According to news reporting from Vienna, Austria, by NewsRx journalists, researchers stated "Empirical evidence of the impact of contraceptive counselling and factors affecting women's contraceptive choices are limited. CHOICE (Contraceptive Health Research Of Informed Choice Experience) was a large-scale study in 11 European countries."

The news correspondents obtained a quote from the research by the authors from Medical University, "Women in Austria aged 15-40 years considering a short-acting, reversible form of combined hormonal contraceptive were eligible to participate. The choices included the combined daily pill, weekly transdermal patch, and monthly vaginal ring. This study assessed and compared 2478 women's original preferences with their post-counselling choices and evaluated their perceptions and criteria for their choice. Women who were 'undecided' decreased from 18.1% pre-counselling to 3.2% post-counselling; significantly more women post-counselling chose the monthly ring (8.7% to 23.8%; difference 15.1%, 95% CI 13.3-16.8%;  $p < 0.0001$ ) or the weekly patch (6.2% to 7.8%; difference 1.7%, 95% CI 0.5-2.9%;  $p = 0.0014$ ). Women's primary reasons for choosing a method included 'easy to use' (daily pill, weekly patch and monthly ring) and 'still effective if I experience vomiting, diarrhoea' (weekly patch and monthly ring). Structured and balanced counselling led to changes in the method chosen. The impact of contraceptive counselling and factors affecting women's contraceptive choices are not well investigated. In the present study, women in Austria aged 15-40 years considering a short-acting, reversible form of combined hormonal contraceptive were eligible to participate. We assessed and compared women's original preferences with their choices after extensive counselling and evaluated their perceptions and criteria for their choice. Women who were 'undecided' decreased from 18.1% before counselling to 3.2% after counselling; significantly more women chose the monthly ring after counselling or the weekly patch. Women's primary reasons for choosing a method included 'easy to use' (pill, patch and ring) and 'still effective if I experience vomiting, diarrhoea' (patch and ring)."

According to the news reporters, the researchers concluded: "A balanced counselling led to changes in the method chosen, even in women possessing profound knowledge about their preferred method."

For more information on this research see: Contraceptive counselling and factors affecting women's contraceptive choices: results of the CHOICE study in Austria. *Reproductive Biomedicine*, 2012;24(7):692-7. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Reproductive



Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

Our news journalists report that additional information may be obtained by contacting C. Egarter, Medical University of Vienna, Dept. of Gynaecological Endocrinology and Reproduction, Wahringer Gurtel 18-20, 1090 Vienna, Austria. (2012 Jul 19)

### **University of Warwick, Coventry: Disclosure patterns of embryo donation mothers compared with adoption and IVF**

By a News Reporter-Staff News Editor at Biotech Week – Investigators publish new report on Reproductive Biomedicine. According to news originating from Coventry, United Kingdom, by NewsRx correspondents, researchers stated “Attitudes towards information sharing in donor conception have changed in recent years in some parts of the world, with a move towards openness. This study follows up a sample of embryo donation mothers, examining their current disclosure patterns and comparing them with adoptive and IVF mothers to investigate any influence of the method of family creation.”

Our news journalists obtained a quote from the research by the authors from the University of Warwick, “This study compared 17 mothers with an embryo donation child aged 5-9years with 24 mothers with an adopted child and 28 mothers with a genetically related IVF child. Embryo donation mothers were far less likely to share information with the child; 43% were inclined towards disclosing, compared with all adoptive mothers and nearly 90% of IVF mothers. Furthermore, embryo donation and IVF mothers who had disclosed had often only given partial explanations of the child’s conception.”

According to the news editors, the researchers concluded: “Differences between embryo donation and adoption in particular should be taken into account when advising embryo recipients.”

For more information on this research see: Disclosure patterns of embryo donation mothers compared with adoption and IVF. *Reproductive Biomedicine*, 2012;24(7):745-8. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Reproductive Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

The news correspondents report that additional information may be obtained from F. Maccallum, Dept. of Psychology, University of Warwick, Coventry CV4 7AL, UK. (2012 Jul 18)

## **Reprogenetics, Livingston: Validation of array comparative genome hybridization for diagnosis of translocations in preimplantation human embryos**

By a News Reporter-Staff News Editor at Biotech Week – New research on Reproductive Biomedicine is the subject of a report. According to news reporting originating in Livingston, New Jersey, by NewsRx journalists, researchers stated “Fluorescent in-situ hybridization (FISH) for preimplantation genetic diagnosis (PGD) of structural chromosome abnormalities has limitations, including carrier testing, inconclusive results and limited aneuploidy screening. Array comparative genome hybridization (CGH) was used in PGD cases for translocations.”

The news reporters obtained a quote from the research by the authors from Reprogenetics, “Unbalances could be identified if three fragments were detectable. Smallest detectable fragments were ~6Mbp and ~5Mbp for blastomeres and trophectoderm, respectively. Cases in which three or more fragments were detectable by array CGH underwent PGD by FISH and concordance was obtained in 53/54 (98.1%). The error rate for array CGH was 1.9% (1/54). Of 402 embryos analysed, 81 were normal or balanced, 92 unbalanced but euploid, 123 unbalanced and aneuploid and 106 balanced but aneuploid. FISH with additional probes to detect other aneuploidies would have missed 28 abnormal embryos in the reciprocal group and 10 in the Robertsonian group. PGD cases (926) were retrospectively reviewed for reciprocal translocations performed by FISH to identify which could have been analysed by array CGH. This study validates array CGH in PGD for translocations and shows that it can identify all embryos with unbalanced reciprocal and Robertsonian translocations. Array CGH is a better approach than FISH since it allows simultaneous screening of all chromosomes for aneuploidy. Fluorescent in-situ hybridization (FISH) has been used in preimplantation genetic diagnosis (PGD) for structural chromosome abnormalities. This approach has limitations such as the need for testing of carriers, poor fixation and no possibility for aneuploidy screening of all chromosomes. The use of array comparative genome hybridization (CGH) can solve these limitations. Array CGH was used in 47 PGD cases for Robertsonian or reciprocal translocations. The smallest detectable fragment size was ~6Mbp for single blastomeres (day-3) and ~5Mbp for trophectoderm (day-5) biopsies. Translocation cases in which three or more translocated fragments were detectable by array CGH underwent PGD. Of those, a total of 54 non-transferred embryos analysed by array CGH were reanalysed by FISH. The error rate for array CGH was 1.9% (1/54). Of the 402 embryos analysed by array CGH, 81 embryos were normal or balanced, 92 were unbalanced but euploid, 123 unbalanced and aneuploid and 106 balanced but aneuploid. We retrospectively reviewed 926 PGD cases for reciprocal translocations

performed by FISH in order to identify those in which fewer than two fragments were less than ~6Mbp.”

According to the news reporters, the researchers concluded: “This study validates the use of array CGH in PGD for translocations showing a low error rate and shows that array CGH can identify all embryos with unbalanced reciprocal and Robertsonian translocations. Array CGH is a better approach than FISH or single-nucleotide polymorphism arrays because it allows simultaneous screening of all chromosomes for aneuploidy and does not require previous genetic testing of the parents.”

For more information on this research see: Validation of array comparative genome hybridization for diagnosis of translocations in preimplantation human embryos. *Reproductive Biomedicine*, 2012;24(6):621-9. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Reproductive Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

Our news correspondents report that additional information may be obtained by contacting P. Colls, Reprogenetics, Livingston, NJ 07039, United States. (2012 Jul 04)

### **Shiga University of Medical Sciences: Successful delivery following ICSI with macrocephalic sperm head syndrome: a case report**

By a News Reporter-Staff News Editor at Biotech Week – Data detailed on Biomedical Engineering have been presented. According to news reporting out of Shiga, Japan, by NewsRx editors, researchers stated “This article reports a case of macrocephalic sperm head syndrome, which is defined as the presence of a very high percentage of spermatozoa with enlarged heads and multiple flagellae, together with detailed morphological analysis. After a couple presented with infertility, sperm analysis showed severe teratozoospermia and almost all of the spermatozoa had macrocephaly with multiple tails.”

Our news journalists obtained a quote from the research by the authors from the Shiga University of Medical Sciences, “The morphological analysis revealed that most of the sperm heads contained several nuclei and had a similar number of tails as that of nuclei. However, detailed analysis revealed that there were a very few spermatozoa with an almost normal morphology. After genetic counselling, intracytoplasmic sperm injection was performed using a few spermatozoa that had an almost normal morphology, resulting in pregnancy and successful delivery.”

According to the news editors, the researchers concluded: “Even in macrocephalic sperm head syndrome, which may be caused by meiotic division failure, pregnancy is possible if some spermatozoa with almost normal morphology can be utilized, although there may be genetic risks.”

For more information on this research see: Successful delivery following ICSI with macrocephalic sperm head syndrome: a case report. *Reproductive Biomedicine*, 2012;24(6):603-5. (Elsevier - [www.elsevier.com](http://www.elsevier.com); Reproductive Biomedicine - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

Our news journalists report that additional information may be obtained by contacting Y. Shimizu, Dept. of Obstetrics and Gynecology, Shiga University of Medical Science, Setatsukinowa-cho, Ohtsu, Shiga 520-2192, Japan. (2012 Jul 04)

### **Central Food Technological Research Institute, Mysore: Taurine attenuates maternal and embryonic oxidative stress in a streptozotocin-diabetic rat model**

By a News Reporter-Staff News Editor at Life Science Weekly – A new study on Diabetes is now available. According to news reporting originating from Mysore, India, by NewsRx correspondents, researchers stated “Oxidative stress mechanisms have been implicated in congenital anomalies and morbidity/mortality of fetus/newborn in diabetic pregnancy. Numerous antioxidant treatments have shown varied beneficial effects in improving both maternal and fetal outcomes.”

Our news editors obtained a quote from the research by the authors from Central Food Technological Research Institute, “The present study examined the propensity of taurine to attenuate the degree of embryopathy and oxidative stress among pregnant diabetic rats. Adult rats (CFT-Wistar) were rendered diabetic with an acute dose of streptozotocin (STZ; 45mg/kg bodyweight) on gestation day (GD) 4. Both Diabetic and non-diabetic dams were given oral supplements of taurine (0.5 and 1g/kg bodyweight/day) from GD 5 to GD 12. Maternal diet intake, bodyweight gain and urine output were monitored and dams were killed on GD 13. Markers of oxidative stress were determined in embryos and maternal livers. STZ treatment induced marked embryopathy (32%) and taurine supplements markedly reduced the degree of embryopathy (54% protection). The STZ-induced higher oxidative stress was significantly attenuated in rats given taurine supplements ( $p < 0.05$ ) and a similar effect was seen in embryos ( $p < 0.05$ ). These data suggest that dietary taurine during pregnancy provides significant protection against diabetes-induced oxidative stress in both the mother and the embryos and thus may serve as a therapeutic supplement during diabetic pregnancy. Diabetes during pregnancy affects >5% of all pregnancies, causing reproductive abnormalities that enhance spontaneous abortion -congenital anomalies, morbidity and mortality of both mother and fetus/newborn. One of the major mechanisms is increased

oxidative stress caused by hyperglycaemia and the most prominent anti-teratogenic effect was achieved using antioxidative agents. Management of oxidative stress is considered, along with tight glycaemic control, to be beneficial both before conception and during pregnancy. Taurine, a ubiquitous amino acid found in almost all mammalian tissues, constitutes more than 50% of free amino acids. The aim of the study was to determine whether oral taurine supplementation given to pregnant diabetic rats during the post-implantation period could reduce embryo lethality and protect the developing embryos against maternal hyperglycaemia-induced oxidative stress. Adult rats were rendered diabetic with an acute dose of streptozotocin on gestation day (GD) 4. Both diabetic and non-diabetic dams were administered oral taurine for a period of 8 days (GD 5-13). Maternal diet intake, bodyweight gain and urine output were monitored and dams were killed on GD 13. Markers of oxidative stress and antioxidant defences were studied in embryos and maternal livers. STZ induced marked embryopathy (32%) and taurine supplementation offered significant protection (54%). Taurine significantly offset diabetes-associated oxidative stress in the embryos of diabetic rats.”

According to the news editors, the researchers concluded: “These data suggest that dietary taurine supplementation during pregnancy provides significant protection against diabetes-induced oxidative stress both in mother and embryos and thus may serve as a therapeutic supplement under diabetic pregnancy.”

For more information on this research see: Taurine attenuates maternal and embryonic oxidative stress in a streptozotocin-diabetic rat model. *Reproductive Biomedicine*, 2012;24(5):558-66. (Elsevier - [www.elsevier.com](http://www.elsevier.com); *Reproductive Biomedicine* - [http://www.elsevier.com/wps/product/cws\\_home/721149](http://www.elsevier.com/wps/product/cws_home/721149))

The news editors report that additional information may be obtained by contacting M.M. Shivananjappa, Dept. of Biochemistry and Nutrition, Central Food Technological Research Institute, Mysore 570 020, India. (2012 Jun 12)

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