Final Program

International Conference on Biomedical and Health Informatics (ICBHI 2015)

Theme: "The Convergence: Integrating Information and Communication Technologies with Biomedicine for Global Health"

Time & Venue:
October 9-10, Sheraton Haikou Resort, Grand World Ballroom, 2/F
Haikou, Hainan Province, China

Co-Sponsors:
International Federation of Medical and Biological Engineering (IFMBE)
IEEE-Engineering in Medicine and Biology Society (IEEE-EMBS)

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Conference Co-Chairs: Dr. Ratko Magjarević (University of Zagreb, Croatia)
Dr. Bruce Wheeler (University of Florida, USA)

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Invited Keynote Speaker I

Andrew Laine

Percy K. and Vida L.W. Hudson Professor of Biomedical Engineering
Professor, Department of Radiology (Physcis)
Chair, Department of Biomedical Engineering
Columbia University, New York, NY,USA

Andrew F. Laine received his D.Sc. degree from Washington University (St. Louis) School of Engineering and Applied Science in Computer Science, in 1989 and BS degree from Cornell University (Ithaca, NY). He was a Professor in the Department of Computer and Information Sciences and Engineering at the University of Florida (Gainesville, FL) from 1990-1997. He joined the Department of Biomedical Engineering in 1997 and served as Vice Chair of the Department of Biomedical Engineering at Columbia University since 2003 - 2011. He is currently Chair of the Department of Biomedical Engineering and Director of the Heffner Biomedical Imaging at Columbia University and the Percy K. and Vida L. W. Hudson Professor of Biomedical Engineering and Professor of Radiology (Physics).

He has served on the program committee for the IEEE-EMBS Workshop on Wavelet Applications in Medicine in 1994, 1998, 1999, and 2004. He was the founding chair of the SPIE conference on "Mathematical Imaging: Wavelet Application in Signal and Image Processing", and served as co-chair during the years 1993-2003. Dr. Laine has served as Chair of Technical Committee (TC-BIIP) on Biomedical Imaging and Image Processing for EMBS 2004-2009, and has been a member of the TC of IEEE Signal Processing Society, TC-BISP (Biomedical Imaging and Signal Processing) 2003-present. Professor Laine served on the IEEE ISBI (International Symposium on Biomedical Imaging) steering committee, 2006-2009 and 2009 – 2012. He was the Program Chair for the IEEE EMBS annual conference in 2006 held in New York City and served as Program Co-Chair for IEEE ISBI in 2008 (Paris, France). He served as Area Editor for IEEE Reviews in BME in Biomedical Imaging since 2007-2013. He was Program Chair for the EMBS annual conference for 2011 (Boston, MA). Professor Laine Chaired the Steering committee for IEEE ISBI, 2011-2013, and Chairs the Council of Societies for AIMBE (American Institute for Medical and Biological Engineers). Finally, he served as the IEEE EMBS Vice President of Publications 2008 – 2012, and currently the President of IEEE EMBS (Engineering in Biology and Medicine Society), 2015 - 2016. He is a Fellow of IEEE and AIMBE.

Invited Keynote Speaker II

Marc Nyssen

Professor of Medical Informatics
Free University Brussels (VUB)
Fellow of the International Academy for
Medical and Biological Engineering (IAMBE)

Studied Electrical Engineering at the Free University Brussels (V.U.B.), graduating in Electronics in 1975. In 1978, he obtained an Engineering degree in "Computer Science". In 1983, he obtained a Ph. D. degree in Electrical Engineering, after defending a thesis entitled: "New Architectures for Optoelectronic Signal Processing". From 1976 to 1977 research assistant in the Electronics Dept. at the V.U.B.

From 1978 to 1983 he was appointed in the Medical Informatics Dept., responsible for the research network and server computing infrastructure of the new medical campus of the Brussels Free University, in Jette. First as a research assistant, from 1983 then as Associate Professor, currently as Professor. As National Secretary he represents Belgium in the International Federation for Medical and Biological Engineering and Computing (IFMBE), of which he is a board member. Co-founder and Secretary General of the Belgian National Committee on Biomedical Engineering within the Belgian Royal Academy of Sciences and Fine Arts. His interests lie in different aspects of the computerized production lines, mainly for the scientist, with emphasis on network communication aspects.Image processing related hardware and software systems were studied and realized under his guidance, as research projects or as thesis for students in Engineering or Bio-Engineering and Medical Research. Medical Internet applications are a second field of interest and expertise, this field is now known as E-health. Several projects were accomplished regarding the introduction of electronic medical records and the exchange of medical data via the Internet, currently his main project consists of the introduction of electronic medical prescriptions in Belgium: the Recip-e project, as project leader. Member of several Phd commissions and promoter of Masters and PhD students.

Invited Keynote Speaker III

Dimitrios I. Fotiadis

Professor of Biomedical Engineering
Unit of Medical Technology and Intelligent Information Systems
Dept. of Materials Science and Engineering
University of Ioannina and Institute of Molecular Biology and Biotechnology
Dept. of Biomedical Research, Ioannina, GREECE

Dimitrios I. Fotiadis has received the Diploma degree in chemical engineering from the National Technical University of Athens, Athens, Greece, in 1985, and the Ph. D. degree in chemical engineering and materials science from the University of Minnesota, Minneapolis, in 1990. He is currently a Professor of Biomedical Engineering in the Department of Materials Science and Engineering, University of Ioannina, Ioannina, Greece, and the Director of the Unit of Medical Technology and Intelligent Information Systems. He is an Affiliated Member of the Foundation for Research and Technology Hellas, Institute of Molecular Biology and Biotechnology, Dept. of Biomedical Research. He has coordinated and participated in several R&D funded projects. He is the author or coauthor of more than 220 papers in scientific journals, 380 papers in peer-reviewed conference proceedings, and more than 45 chapters in books. He is the editor or co-editor of 18 books. He is a senior member of IEEE, member of IEEE Technical Committee of information Technology in Healthcare, Chairman of the IEEE EMBS Greek Chapter,Associate Editor in the journals *IEEE Journal of Biomedical Health Informatics* and *Computers in Biology and Medicine* and Receiving Editor in the *Biomedical Signal Processing and Control Journal*. He was the founder of the Science and Technology Park in Ioannina, Greece.

His research interests include multiscale modeling of human tissues and organs, processing of heterogeneous medical and genetic data for diagnosis and prognosis, intelligent systems for patient monitoring and treatment, wearable monitoring platforms and bioinformatics.

Invited Keynote Speaker IV

Qiushi Ren

Department Chair COE Endowed Chair Professor
Chang-Jiang Distinguished Professor
Fellows of SPIE, AIMBE
Department of Biomedical Engineering
College of Engineering
Peking University

Prof. Qiushi Ren graduated from Hua-zhong University of Science and Technology, Wuhan, China with Bachelor degree in Optical Engineering in June, 1984. From September, 1985 to December, 1990, he studied at the Department of Electrical Engineering majoring Solid State Electronics and received Master Degree in March, 1987, and Ph. D. Degree in December, 1990, respectively.

After he received his Ph.D. degree, Dr. Qiushi Ren joined the faculty of Department of Biomedical Engineering as an assistant professor at University of Miami, Miami, Florida in 1991, where he was working on innovative laser therapies for medical application. In 1995, he joined the faculty of the Department of Ophthalmology, University of California, Irvine, where he was working on excimer laser refractive surgery and new laser therapies in ophthalmology. In July, 2002, Dr. Ren joined the faculty of the Department of Biomedical Engineering at Shanghai Jiao Tong University as a Full-Professor and served as the director of the Institute for Laser Medicine and Bio-Photonics. In May, 2009, Dr. Ren joined College of Engineering at Peking University as COE Endowed Chair Professor and the Chairman of the Department of Biomedical Engineering at Peking University. One of Professor Ren's research interests is in the area of multi-modality molecular imaging and novel molecular imaging probe developments. Under Prof. Ren's leadership, his team developed an integrated PET, CT, SPECT and FMT quad-modality imaging system for small animals. This imaging system provided a versatile research platform for biomedical research and new drug development, and received $9 million research funding under Major Scientific Instrument Development Program from the Ministry of Science and Technology of China. Using this newly developed system with multi-modal molecular probes, Prof. Ren and his team is currently studying the biological behavior of different sub-types of the same cancer cell for personalized cancer diagnosis and treatment.

Because of his accomplishments, Prof. Ren received National Distinguished Young Scholar Award from the Natural Science Foundation of China in January, 2006, Distinguished Chang-Jiang Scholar Professorship from the Chinese Ministry of Education in March, 2007. In 2012, he became the Fellow in the American Institute for Medical and Biological Engineering's (AIMBE) College of Fellows.

Invited Keynote Speaker V

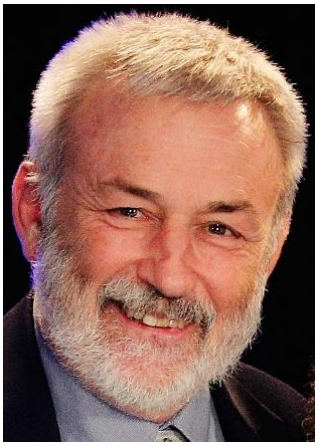
Kang-Ping Lin

Dept. of Electrical Engineering,
Chung-Yuan Christian University,
Taoyuan, Taiwan

Professor Kang-Ping Lin is Distinguished Professor for Electrical Engineering, and the Director of Technology Translation Center for Medical Devices at Chung-Yuan Christian University, Taiwan. He received his BS and MS degrees in Biomedical Engineering and Applied Physics from the Chung-Yuan Christian University, Taiwan in 1982 and 1984, respectively. In 1994, he earned his Ph.D. degree in Biomedical Physics, School of Medicine UCLA. He served as Director of Medical Device Technology Division of the Biomedical Engineering Center in Industrial Technology Research Institute in Taiwan (2000~2004). He was the president of Taiwanese Society of Biomedical Engineering (2007~2010), the Editor-in-Chief of the Journal of Medical & Biological Engineering (1999~2007), and several roles in IFMBE including the Chair of Publication Committee and Publicity Committee, the Co-Chair of Asia Pacific Working Group, and the Editor of IFMBE Newsletter (2009~2015). He has been elected to be the Secretary General of IFMBE (2015~2018).

His research interests include handheld medical devices, physiological signal processing, and medical image processing. His current research topics include capillary blood velocity measurement, microcirculation images, and hemodynamic data analysis. In the field of medical devices, he has also focused on integration of industry, academia and medicine oriented towards being homecare, small, simple and low-energy consumption.

Invited Keynote Speaker VI



Bruce Wheeler

Past President,
IEEE Engineering in Medicine and Biology Society
Adjunct Professor of Bioengineering,
University of California at San Diego

Bruce Wheeler recently joined the University of California at San Diego as an Adjunct Professor of Bioengineering with duties principally aimed at supporting the new Systems Bioengineering major at UCSD. He had served for 7 years at the University of Florida, including service as Acting Chair of the Biomedical Engineering Department and co-author of the successful proposal for the BMS BME program. Previously he served for 28 years at the University of Illinois, including as Associate Head of the Electrical and Computer Engineering Department, Chair of the Neuroscience Program and Founding Head of the Department of Bioengineering. He has also served President of the IEEE Engineering in Medicine and Biology Society, the world's largest, oldest, and most global bioengineering society, and Editor in Chief of the IEEE Transactions on Biomedical Engineering, one of the most influential general biomedical engineering journals.

Common in all these positions has been his concern for the preparation of students for careers in the expanding field of biomedical engineering. This has led him to advocate for biomedical and health informatics and for point-of-care-technologies as rapidly emerging fields that offer challenges and opportunities for the next generation of engineers who wish to dedicate their careers to improving healthcare, even to a global scale. Accordingly he has promoted these topics in EMBS conferences and publications.

Prof. Wheeler's research interests lie in the application of electrical engineering methodologies to basic neuroscience, most notably "brain on chip" technology, with considerable national funding. He is a Fellow of the IEEE, BMES, AAAS, IAMBE, AIMBE and BMES. He is likely the only person to start two undergraduate BME degree programs.

Invited Keynote Speaker VII

Xianfang YUE

Marie Curie Fellow (University of Birmingham)
Associate professor in Mechanical Engineering (University of Science and Technology Beijing, China)

Xianfang YUE is an International Incoming Fellowship of People Marie Curie Actions & Honorary Lecturer in Bio-medical Engineering, School of Mechanical Engineering at the University of Birmingham, and an Associate professor in Mechanical Engineering, University of Science and Technology Beijing, China.

Xianfang has published over 30 peer-reviewed journal papers and a book in Chinese and two books chapters in the field of Bio-medical and Mechanical Engineering, mainly on the human skull modeling, sensing of medical devices and energy conservation. She has obtained 3 national patents of invention, and owned one item of the second Award of the Provincial science and technology progress. She has received major grants from the European Commission, the National Natural Science Fund, the Ministry of Science and Technology, the National Development and Reform Commission and the medical device.

Research:
Bio-medical Engineering, Tissue modelling and Biomedical Sensing, Mechanical Properties of natural tissues, Energy conservation.

Invited Keynote Speaker VIII

Shankar Krishnan

Department Chair, Dept. of BME & H.C. Lord Chair Professor
Biomedical Engineering, Wentworth Institute of technology

Shankar Krishnan received his Ph.D. degree from the University of Rhode Island with research work done at Rhode Island Hospital. He is the founding director of the biomedical engineering department and an endowed chair professor at Wentworth Institute in Boston. Previously, he was an assistant director at Massachusetts General Hospital and a teaching affiliate of Harvard Medical School in Boston. He has also held faculty appointments in Illinois, Miami, Singapore and Boston. At NTU in Singapore, he was the founding director of the BME Research Center and the founding head of the Bioengineering division. He also worked in R&D at Coulter Electronics in Miami and in hospital design and operations management at Bechtel for healthcare megaprojects.

He has been a consultant to few medical companies, software firms and hospitals. He has served in the National Medical Research Council in Singapore. His research interests are biomedical signals and image processing, telemedicine, health informatics, medical robotics and BME education. He has been developing novel models in BME curricula design, labs, co-ops and internships. He keeps active memberships in AAMI, ASEE, BMES, IEEE-BMES and IFMBE.

He was a member of a team which received the CIMIT Kennedy Innovation Award. He is a Fellow of AIMBE, and President-Elect of IFMBE for the term 2015 to 2018.

Invited Keynote Speaker IX

May D. Wang

Kavli Fellow, Georgia Research Alliance Distinguished Cancer Scholar, Fellow of AIMBE
Associate Professor, The Wallace H. Coulter Joint Dept. of Biomedical Engineering
Georgia Institute of Technology and Emory University

Dr. May Dongmei Wang is an Associate Professor in the Joint Department of Biomedical Engineering of Georgia Tech and Emory and School of Electrical and Computer Engineering of Georgia Tech, a Kavli Fellow, a Georgia Research Alliance Distinguished Cancer Scholar, and a Fellow of The American Institute for Biological and Medical Engineering (AIMBE). Professor Wang serves as Co-Director of Biomedical Informatics Program of Georgia Tech in Atlanta Clinical and Translational Science Institute, Co-Director of Georgia-Tech Center of Bio-Imaging Mass Spectrometry, and Biocomputing and Bioinformatics Core Director in Emory-Georgia-Tech Cancer Nanotechnology Center. She is also with Emory Winship Institute, Georgia Tech IBB and and IPaT.

Prof. Wang's research focuses on Biomedical Big Data Analytics. More specifically, she works on Biomedical and Health Informatics (BHI) for Personalized and Predictive Health, including high throughput NGS and -omic data mining to identify clinical biomarkers, bionanoinformatics, pathological imaging informatics to assist clinical diagnosis, critical and chronic care health informatics for evidence-based decision making, and predictive systems modeling to improve health outcome. She has published over 190 peer-reviewed articles and is the corresponding/co-corresponding author for articles published in Journal of American Medical Informatics Association (JAMIA), Journal of Biomedical and Health Informatics (JBHI), IEEE/ACM Transactions on Computational Biology and Bioinformatics (TCBB), Briefings in Bioinformatics, BMC Bioinformatics, Journal of Pathology Informatics, Proceedings of The IEEE, IEEE Transactions on Information Technology in Biomedicine (TITB), Proceedings of National Academy of Sciences (PNAS), Annual Review of Medicine, Nature Protocols, Circulation Genetics, Nanomedicine, BMC Medical Imaging, Annals of BME (ABME), and Trends in Biotechnology etc. She has led RNA-data analysis investigation within FDA-led Sequencing Consortium (SEQC) of MAQC-III. Dr. Wang received PhDEE and MS (CS, EE, Applied Math) from Georgia Institute of Technology (Atlanta, GA) and BSEng. from Tsinghua University (Beijing China). Currently, Prof. Wang serves as the Senior Editor for IEEE Journal of Biomedical and Health Informatics (J-BHI), an Associate Editor for IEEE Transactions on Biomedical Engineering (TBME), and an Emerging Area Editor for Proceedings of National Academy of Science (PNAS).

Invited Keynote Speaker X

James Goh Cho Hong

Professor and Head
Department of Biomedical Engineering
National University of Singapore, Singapore
Professor
Department of Orthopaedic Surgery
Yong Loo Lin School of Medicine
National University of Singapore

Prof James GOH obtained his BSc (1st Class Honours) in Mechanical Engineering (1978) and PhD in Bioengineering in 1982 from the University of Strathclyde, Glasgow, UK. He is currently Professor and Head, Department of Biomedical Engineering, Faculty of Engineering, NUS and holds a joint appointment, as the Research Professor in the Department of Orthopaedic Surgery, Yong Loo Lin School of Medicine, NUS.

He is also Director, Centre for Healthcare Innovation and Medical Engineering (CHIME). Prof Goh is on a number of national as well as international committees. He chairs the Science and Technology Advisory Board of the Singapore Sports Institute. He is the President of the Biomedical Engineering Society (Singapore) and the President of the International Federation of Medical and Biological Engineering. Prof Goh has been actively involved in organizing international conferences and had served on numerous International Scientific Committees. He chaired the 6th World Congress of Biomechanics, (2010), TERMIS-AP (2011) and 15th ICBME (2013).

Prof Goh has an active research interest in musculoskeletal research and advances in biomedical engineering. He has given numerous invited talks at international and regional conferences. He has published well over 130 international peer review journal papers, more than 500 conference papers and 12 book chapters.

FINAL PROGRAM

October 9th

Afternoon Session (13:00-19:05) Room: < Grand World Ballroom, 2/F >

Code	Time	Session Name/Speaker	
Op	13:00-13:15	**Opening Session** Conference Co-Chair: Ratko Magjarevic Opening speeches: James Goh (President of IFMBE) Andrew Laine (President of IEEE-EMBS)	
Pl1	13:15-13:45	Keynote Speaker 1: **Andrew Laine** (Columbia University) ***"Quantitative Imaging Informatics In Cost Effective Pet Imaging And Classification Of Lung Disease"*** Chairs: Ratko Magjarevic, Qiushi Ren	
Pl2	13:45-14:15	Keynote Speaker 2: **Marc Nyssen** (Free University Brussels) *"**Notable e-health developments**"* Chair: Shankar Krishnan	
FrAf1	14:15-15:15	Oral Presentation: *Unobtrusive and Wearable Blood Pressure Measurement* Chair: Lei Wang	
FrAf2	15:15-16:15	Oral Presentation: *Medical Imaging and Image Processing* Chair: Ye Li	Poster Session I Chair: Marc Nyssen
CB1	16:15-16:45	Coffee Break	
FrAf3	16:45-17:45	Oral Presentation: *Distributed Health Information Systems* Chair: Ratko Magjarevic	
Pl3	17:45-18:15	Keynote Speaker 3: **Dimitris Fotiadis** (University of Ioannina) *"**Atherosclerotic Plaque Detection in Coronary Arteries using Hybrid Imaging**"* Chairs: Liang Song, Kang-Ping Lin	
Pl4	18:15-18:45	Keynote Speaker 4: **Qiushi Ren** (Peking University) *"**Telemedicine-Enabled Ophthalmic Diagnostic Imaging System**"* Chairs: Marc Nyssen, Andrew Laine	
PA	18:45-19:05	A Panel Discussion on Health Informatics in China Chairs: Qiushi Ren, Ye Li Panelists: Lei Wang, Guanglin Li, Xianfang Yue	
W	20:00-22:00	Conference Dinner	

<table>
<tr><th colspan="4">October 10th
Full day Session(09:00-19:00) Room: < Grand World Ballroom, 2/F ></th></tr>
<tr><th>Code</th><th>Time</th><th colspan="2">Session Name/Speaker</th></tr>
<tr><td>Pl5</td><td>9:00-9:30</td><td colspan="2">Keynote Speaker 5: Kang-Ping Lin (Chung-Yuan Christian University, Taiwan)
“Heart, Heart Rate, and Heart Rate Variability with Applications of Controlled Breath”
Chair: Guanglin Li</td></tr>
<tr><td>Pl6</td><td>9:30-10:00</td><td colspan="2">Keynote Speaker 6: Bruce Wheeler (University of California at San Diego)
“Visions and American Perspectives in Health Informatics“
Chairs: Andrew Laine, Shankar Krishnan</td></tr>
<tr><td>SaMo1</td><td>10:00-11:00</td><td colspan="2">Oral Presentation:
Signal Processing and Physiological Systems

Chair: Guanglin Li
Co-Chair: R. Couceiro</td></tr>
<tr><td>CB3</td><td>11:00-11:30</td><td>Coffee Break</td><td rowspan="2">Poster Session II

Chair: Liang Song</td></tr>
<tr><td>SaMo2</td><td>11:30-12:30</td><td>Oral Presentation:
Pattern Recognition and Physiological Systems

Chair: Shankar Krishnan
Co-chair: Sara Zulj</td></tr>
<tr><td>L2</td><td>12:30-14:00</td><td colspan="2">Conference Lunch</td></tr>
<tr><td>Pl7</td><td>14:00-14:30</td><td colspan="2">Keynote Speaker 7: Xianfang Yue (University of Birmingham)
“Is Human Cranial Cavity Deformed with the Changing ICP?”
Chairs: Lei Wang, Dimitris Fotiadis</td></tr>
<tr><td>Pl8</td><td>14:30-15:00</td><td colspan="2">Keynote Speaker 8: Shankar Krishnan (Wentworth Institute of technology)
“An Overview of Big Data and Healthcare Analytics”
Chairs: James Goh, May D. Wang</td></tr>
<tr><td>SaAf1</td><td>15:00-16:00</td><td>Oral Presentation:
Information Acquisition and Transmission

Chair: Marc Nyssen</td><td rowspan="2">Poster Session III

Chair: Ye Li</td></tr>
<tr><td>CB4</td><td>16:00-16:30</td><td>Coffee Break</td></tr>
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SaAf2	16:30-17:30	Oral Presentation: *Cardiovascular Health Informatics* Chair: Ratko Magjarevic Co-chair: Lei Wang
Pl9	17:30-18:00	Keynote Speaker 9: **May D. Wang** (Georgia Institute of Technology and Emory University) *"**Biomedical Big Data Analytics for Patient-Centric Precision Health**"* Chairs: Qiushi Ren, Ye Li
Pl10	18:00-18:30	Closing Speech Keynote Speaker 10: **James Goh** (National University of Singapore) "***Wearable Technologies for Tele-Rehabilitation"*** Chairs: Ratko Magjarevic, Shankar Krishnan
Cl	18:30-19:00	Closing Session: Conference Chairs: Y.T. Zhang, Paulo Carvalho

ORAL PRESENTATION SCHEDULE

Oct 9th FrAf1 14:15-15:15 Room: < Grand World Ballroom, 2/F >
Oral Presentation: Unobtrusive and Wearable Blood Pressure Measurement
Chair: Lei Wang (HICAS at SIAT, China)

Time/ Paper ID	First Author	Presentation Title
14:15-14:30 ID:10026	Rong-Chao Peng	***Estimating Blood Pressure with a Smartphone*** Cardiovascular disease like hypertension is one of the top killers of human's life. As the smartphone is becoming ubiquitous in the world, its application in medicine may provide an easy and low-cost approach for early detection of cardiovascular disease. Lamonaca et al applied artificial neural network to evaluate blood pressure from the pulse wave signal acquired by the camera of the smartphone. Chandrasekaran et al proposed two vascular transit time methods to cufflessly estimate blood pressure with smartphones. In this study, we proposed a novel method to estimate continuous blood pressure from heart sound signals acquired by the built-in microphone of the smartphone.
14:30-14:45 ID:10038	Wan-Hua Lin	***Comparison of the Correlation of Different Pulse Transit Time Parameters to Blood Pressure*** Estimation of blood pressure (BP) based on pulse transit time (PTT) is of great interest since it can estimate BP continuously and cufflessly. In previous studies, different character points were available in ECG and in photoplethysmogram (PPG) for calculating PTT. The present study aimed at comparing the correlation of BP to different PTT parameters calculated using different character points of ECG and PPG. PTT parameters were calculated as the time interval from R peak, Q valley, or S valley of ECG to the peak or valley of the first derivative of the PPG. Correlations of beat-to-beat BP to the different beat-to-beat PTT parameters were calculated for the selected 13 datasets with a total of 3910 heart beats data. The results showed that the PTT as the time interval from Q valley of the ECG to the peak of the first derivative of the PPG gave the best parameter which correlates with both the systolic blood pressure (SBP, r=-0.62±0.14) and the diastolic blood pressure (DBP, r=-0.45±0.18). Therefore, this method ofdetermining PTT would be useful to improve the accuracy ofestimating BP continuously and cufflessly.
14:45-15:00 ID:10042	Jing Liu	***Correlation Analysis of the Time Difference Between Multi-Wavelength PPG*** This work developed a four-channel photoplethysmogram (PPG) acquisition system to collect the multi-wavelength PPG signals of red, yellow, green and blue light at the fingertip simultaneously. Eight subjects participated including 4 females took part in the experiment, and the multi-wavelength PPG signals from their fingertip were recorded. Since different PPG signal carries the blood pulsation information in different depth of the tissue, the time difference between multi-wavelengths was examined to investigate their relationships. The result shows the three time difference between yellow PPG and other PPGs (red PPG, green PPG and blue PPG) are highly correlated with each other (|r|> 0.7).
15:00-15:15 ID:10045	Wenxuan Dai	***An Investigation of Time Difference between Epidermal Pressure Pulse and PPG Signal*** This work investigates the time difference between epidermal pressure pulse and PPG signal over the radial artery. 8 healthy subjects including 4 females participated in the experiment with their PPG signals and epidermal pressure pulses recorded at wrist simultaneously by a multi-modal pulse sensing patch. The arrival times of two signals are marked by three different characteristic points. The result shows that there is a significant delay between the peaks of epidermal pressure pulse and PPG signal.

Oct 9th FrAf2 15:15-16:15 Room: < Grand World Ballroom, 2/F >
Oral Presentation: Medical Imaging and Image Processing
Chair: Ye Li (HICAS at SIAT, China)

Time/ Paper ID	First Author	Presentation Title
15:15-15:30 ID: 16	Daniel Y. Kim	***Intra-Operative Tumor Tracking Using Optical Flow and Fluorescent*** ImagingImage-guided surgery (IGS) can assist surgeons by modeling and visualizing objects of interest (tumors, nerves, etc.) that may be obstructed or difficult to recognize during surgery. Models based on pre-operative images are often not applicable during surgery because of motion and deformation. Therefore, real-time updates to IGS models are required. We propose an automated intra-operative tumor tracking system in which the initial tumor location is predicted using near infrared (NIR) fluorescence with indocyanine green (ICG), and the tumor is tracked using the Lucas-Kanade (LK) algorithm, a multi-resolution coarse-to-fine optical flow method. We simulate various conditions of intra-operative tumor movement, including movement speed and variations in image brightness.
15:30-15:45 ID: 10046	Shih-Yen Lin	***Automatic Co-Registration of MEG-MRI Data using Multiple RGB-D Cameras*** Integration of functional and structural modalities is essential to functional brain mapping. This paper presents an automatic co-registration system for aligning the coordinate systems between magnetoencephalography/electroencephalography (MEG/EEG) and magnetic resonance image (MRI) using multiple off-the-shelf RGBD cameras. The system was constructed by using multiple Kinects for Windows V2, which were calibrated for the integration of the captured data of subjects' heads from multiple views. The integrated point clouds of the head surface captured by Kinects played an intermediate role between MEG/EEG and MRI. MEG/EEG-to-Kinect coregistration was conducted by using 3D locations of three anatomical landmarks, whereas Kinect-to-MRI co-registration was performed by using Gaussian mixture model to align facial part of points automatically segmented from both Kinect data and MRI. Combination of these two co-registration results yields the MEG/EEG-to-MRI transformation. Our evaluation results showed that the proposed system can achieve coordinate system alignment with high accuracy.
15:45-16:00 ID:10022	Jingqin Chen	***Indocyanine Green Loaded, PEGylated, Reduced Graphene Oxide as A Highly Efficient Passive Targeting Contrast Agent for Photoacoustic/Fluorescence Dual-Modality Tumor Imaging*** Multi-modality imaging based on multifunctional nanocomposites holds great promise to fundamentally augment the capability of biomedical imaging, for both the diagnosis and therapy of cancer. Herein, we synthesized indocyanine green (ICG) loaded, PEGylated, reduced nano-graphene oxide (rNGO-PEG/ICG), which provide excellent fluorescence imaging capability and greatly enhanced optical absorption for photoacoustic imaging
16:00-16:15 ID: 10024	Mucong Li	***A novel compact linear-array based photoacoustic handheld probe towards clinical translation for sentinel lymph node mapping*** In this study, we developed a handheld ultrasound linear array based real-time photoacousitc tomography system. Compared with previously reported systems, our system is more compact and clinically friendly, and the excitation laser energy is more efficiently utilized. A novel optical-acoustic co-axial probe design (Figure 1) was proposed in our system to offer the system a high signal-to-noise ratio as well as deep imaging capability, under relatively low laser energy excitation. GPU computation was also applied in the system to accelerate the imaging reconstruction speed, guaranteeing a real-time frame rate display. The system was validated in both in vitro and in vivo studies, by imaging silver needles in intra-lipid containing agar phantom as well as a rat sentinel lymph node (Figure 2) under the skin surface in vivo, respectively.

Oct 9th FrAf3 16:45-17:45 Room: < Grand World Ballroom, 2/F >
Oral Presentation: Distributed Health Information System
Chair: Ratko Magjarević (University of Zagreb, Croatia)

Time/ Paper ID	First Author	Presentation Title
16:45-17:00 ID: 3	Marc Nyssen	***Implementation of an electronic prescription system for ambulatory care*** After a two-year pilot, including the ICT (Information and Communication Technology) developments and small scale tests, theRecip-e project for ambulatory electronic prescriptions is currently in national roll-out phase. Along with the operational secure data-flow, an important number of parameters are captured and taken along; these parameters are processed and archived, enabling us to make a first evaluation regarding the approach taken in Belgium, both from a technical point of view and from a methodologic point of view, regarding the technical developments and the involvement of all stakeholders.
17:00-17:15 ID: 5	Dimitrios Gatsios	***Mhealth platform for Parkinson's disease management*** Parkinson's is a complicated, chronic disease that most people live with for many years/decades. For this reason, a multidisciplinary disease management, involving several professions working together (neurologists, physiotherapists, speech and language therapists, occupational therapists, dieticians), is important to ensure that the patient retains his/her independence and continues to enjoy the best quality of life possible. To address these needs we describe an mhealth ecosystem for Parkinson's disease (PD) management facilitating the collaboration of experts and empowering thepatients to self-manage their condition.
17:15-17:30 ID: 10048	Sara Zulj	***Pilot Project: ICT System for Better Management and Self--Management of Diabetes*** Diabetes is one of the leading health problems in the world and its treatment typically requires a lot of interactions between healthcare professionals and patients. Patients are advised to self-monitor their blood glucose in order to achieve a specific level of glycemic control, to prevent hypoglycemia and to help healthcare professionals to adjust their treatment. In order to help patients and healthcare professionals provide better self-management and management of diabetes, we have developed new system. The system comprises a device for connecting and communicating withglucose meters, data management software for data acquisition and visualization, and database. The system is endorsed through the pilot project by Croatian Health Insurance Fund and Croatian Ministry of Health. We present some features of the collected data from the first one hundred patients.
17:30-17:45 ID: 7	René Baranyi	***Design of a Serious Game to Increase Physical Activity by Adding Direct Benefits to the Game for Conducting Sport Activities*** "Dosisfacitvenenum," or "the dose makes the poison," as first expressed by Paracelsus, is a universally valid statement. Thus, being a little bit of a sedentary person makes a whole lot of difference when this behavior turns into a lifestyle. If combined with additional poor habits like imbalanced food intake, little physical activity becomes a number one risk factor in developing chronic diseases later on. What is lacking are motivational concepts and tools that pick up "active" as well as"less active couch potatoes" with the purpose to prevent serious health consequences by making sport activities more attractive, interactive, fun and engaging. Thus, lowering the barrier of overcoming one's weaker self is pivotal. In this paper, we propose a novel concept and Android-based prototype of a serious game called Lazarus, which aims to prevent chronic disease by using motivational boosts to enhance physical exercise. 117 people helped gathering basic information for the game and another 10 people evaluated the concept adhering to a User Centered Design. The application takes advantage of an approach to reward physical real-life activity (doing sports) with virtual in-game benefits.

Oct 10th SaMo1 10:00-11:00 Room: < Grand World Ballroom, 2/F >
Oral Presentation: Signal Processing and Physiological Systems
Chair: Guanglin Li (HICAS at SIAT, China)
Co-Chair: R. Couceiro (University of Coimbra,Portugal)

Time/ Paper ID	First Author	Presentation Title
10:00-10:15 ID: 15	Gert Mertes	***Detection of chewing motion using a glasses mounted accelerometer towards monitoring of food intake events in the elderly*** A novel way to detect food intake events using a wearable accelerometer is presented in this paper. The accelerometer is mounted on wearable glasses and used to capture the movements of the head. During meals, a person's chewing motion is clearly visible in the time domain of the captured accelerometer signal. Features are extracted from this signal and a forward feature selection algorithm is used to determine the optimal set of features. Support Vector Machine and Random Forest classifiers are then used to automatically classify between epochs of chewing and non-chewing. Data was collected from 5 volunteers. The Support Vector Machine approach with linear kernel performs best with a detection accuracy of 73.98% ± 3.99.
10:15-10:30 ID: 21	Eiji Kondo	***Synchronization Analysis of EEG using the Hilbert Huang Coherence*** The short periods of synchronization of different brain regions in particular frequency ranges during cognitive activities is reported. In this study, the Hilbert Huang Coherence(HHC) for analyzing the degree of synchronization by using a Hilbert Huang transform with high temporal frequency resolution is proposed. The authors intended to verify the availability of the HHC. According to computer simulation, it was found that temporal frequency resolution of HHC is higher than that of traditional coherence analysis for non-stationary signals. Furthermore, the HHC was applied to EEG during closed eyes rest. As results of them, the change of coherence in α band was obtained higher temporal frequency resolution than that of traditional coherence analysis.
10:30-10:45 ID: 1	Tomislav Pozaic	***Inter-limb coordination assessment and fall risk in ADL*** Fall risk assessment research has largely been focused on individual biomechanical measures or assessment in clinical setting. The goal of the study was to evaluate the fall risk from the inertial sensor data from activities of daily living (ADL) based on the inter-limb coordination assessment. Eight older adults with higher risk of falling and eight adults with no risk of falling were monitored for one week with hip and wrist sensor node. A one-way analysis of variance and 95% confidence interval were applied to investigate associations between extracted temporal inter-limb coordination measures for these two groups. Results have shown significantly higher asymmetry in lower limbs and between contralateral arm and leg for subjects with higher risk of falling, allowing us to reliably distinguish these two groups.
10:45-11:00 ID:10047	Yi Han	***Comparison of Heart Rate Variability and Pulse Rate Variability of Respiratory control*** This paper presents a study based on the characteristics of the respiratory sinus arrhythmia (RSA), the heart rate and tide volume of breath and the variabilities from PPG and ECG which were measured by PSG simultaneously. Furthermore, according to the measurement of PTT based on PPG and ECG signals, the characteristics of peripheral arteries were evaluated. From the results, it was found that the significance ($p < 0.05$) was shown between HRV and PRV when normal young groupswere controlled at different tide volume of breath; No significance was shown on the PRV obtained from four limbs. In summary, the PRV and HRV showed different characteristics at different breath controls. There were no differences among each PRV when PPG signals obtained at four differences among each PRV when PPG signals obtained at four limbs.

Oct 10th SaMo2 11:30-12:30 Room: < Grand World Ballroom, 2/F >
Oral Presentation: Pattern Recognition and Physiological Systems
Chair: Shankar Krishnan (Wentworth Institute of Technology, USA)
Co-chair: Sara Zulj (University of Zagreb, Croatia)

Time/ Paper ID	First Author	Presentation Title
11:30-11:45 ID:10035	Oluwarotimi Williams Samuel	***A Hybrid Non-Invasive Method for the Classification of Amputee's Hand and Wrist Movements*** The quest to develop dexterous artificial arm which supports multiple degrees of freedom for amputees has attracted a lot of study interest in the last few decades. The outcome of some of the studies had identified surface Electromyography (EMG) as the most commonly used biological signal in predicting the motion intention of an amputee. Different EMG based control methods for multifunctional prosthesis have been proposed and investigated in a number of previous studies. However, no any multifunctional prostheses are clinically available yet. One of the possible reasons would be that the residual muscles after amputations might not produce sufficient EMG signals formovement classifications. In this study, we proposed to use electroencephalography (EEG) signals recorded from the scalp of an amputee as additional signals for motion identifications. The performance of a hybrid scheme based on the combination of EMG and EEG signals in identifying different hand and wrist movements was evaluated in one transhumeral amputee. Our pilot results showed that the proposed hybrid method increased the classification accuracy in identifying differenthand and wrist movements of the amputee. This suggests that the proposed method may have potential to improve the control of multifunctional prostheses.
11:45-12:00 ID:10032	Jingbo Ma	***A Study of Alzheimer's Disease Based on DTI Gaussian Mixture Analysis*** MRI has been the main assistant tool for the diagnosis of most cerebral disease. However, early clinical diagnosis of Alzheimer's disease (AD) is still a challenge because of the lack of visible lesions in AD patients' brain Magnet Resonance Images, even if the dementia has been developed. Current diagnosis is still based on the observation of clinical symptoms from the family members and the MMSE score test from the doctors. An effective quantitative analysis method is required which could provide reference for the clinical diagnosis of AD.
12:00-12:15 ID:13	Eleni I. Georga	***The Diabino System: Temporal Pattern Mining from Diabetes Healthcare and Daily Self-Monitoring Data*** In this study, we present an intelligent clinical diabetes management system to support the processes of follow up and treatment of diabetic patients. In addition, temporal pattern mining is proposed as a tool for explaining and predicting the long-term course of the disease. In particular, a fast time-interval pattern mining algorithm is utilized for knowledge discovery from a multivariate dataset concerning not only long-term clinical diabetes data but also daily selfmonitoring data.
12:15-12:30 ID:10033	Haitao Yang	***SVM-based Approach for Human Daily Motion Recognition*** The application of human motion analysis and recognition is very extensive, involving national defense, medical, film production and many other areas. The traditional study of human motion is achieved by the video or image sequence analysis, however, it usually has a problem that the vulnerable interfering background noise may cause the body contour segmentation inaccurate results [1]. With the development of MEMS, the sensors become smaller, cheaper and cheaper. Considering the portability, accuracy and real-time, we study on design of human motion recognition system based on inertial sensors. In this study, SVM-based approach for human daily motion recognition shows a better generalization properties than previous studies, which are based on the principle of structural risk minimization-have major advantages, such as a convex objective function with efficient training algorithms and good generalization properties.

Oct 10th SaAf1 15:00-16:00 Room: < Grand World Ballroom, 2/F >
Oral Presentation: Information Acquisition and Transmission
Chair: Marc Nyssen (Free University Brussels, Belgium)

Time/ Paper ID	First Author	Presentation Title
15:00-15:15 ID:24	Bouchta Hajjine	***Development of an Electronic Patch for Falls Detection and Elderly Tracking*** Considering the aging population all over the world, that leads to an increasing rate of Alzheimer's troubles. Patients suffer of problems like restless sleep which causes falls. This new field of research is known as Human Health Monitoring. Those systems are able to give us in real time information about a fragile part of our people. This paper presents the design of an electronic patch for the monitoring of elderly suffering from Alzheimer disease. This device ensures falls detection and geolocation in the case of fugues via GPS with the integration of wireless charging function. Different antennas were simulated and fabricated simultaneously with the patch PCB to reduce the total cost and present quite good simulated and measured performances.
15:15-15:30 ID:10018	Rui Xu	***An Approach for Body Motion Registration Using Flexible Piezoelectret Sensors*** Body motion registration can be applied to control computer interfaces or real devices, and forcemyography (FMG) is a promising modality to register real-time body motions. In this work, an approach for FMG recording was developed by using flexible piezoelectret sensors, and different lower-limb motions of three able-bodied subjects were captured. The experimental results demonstrated that the piezoelectret sensors were a suitable approach for FMG recording, and the five-channel data were possible to register the motions of leg raising, knee flexion, and knee extension. An average motion classification accuracy of 92.1% was achieved, which would be useful for the FMG-based device control in future work.
15:30-15:45 ID: 8	Jia-heng Li	***An Adaptive Compression Algorithm for Wireless Sensor Network Based on Piecewise Linear Regression*** The wireless sensor network (WSN) has limited bandwidth, low power consumption, and may have redundantly collected data. The effective compression of data to reduce the energy consumption in transmission is of great importance. To this end, we proposed a new data-compression algorithm for WSN. The key idea of the algorithm is based on an adaptive threshold and piecewise linear fitting. The adaptive threshold is automatically adjusted by error after the fitting model was applied to the rationality of the adjusted model; subsequently linear fitting is used to determine the reasonable range of subsection based on the detection of continuous unfitting points. From the simulation results, the algorithm is realized in low time complex but with a good data compression effect, and then has a potential practicability.
15:45-16:00 ID:10028	Fangmin Sun	***Power aware topology management and congestion control mechanism in high medical QoS WHMNs*** Wireless health monitoring networks (WHMNs) usually characterized by limited bandwidth resource and large amount of data, so to improve the network throughput of the wireless health monitoring network is a key challenge. Besides, as the data transmitted in the WHMNs are about the health or even the life of the people being monitored, so the real-time ability of the network should be ensured. In this paper, an adaptive transmission power based congestion control (Acc) mechanism was designed to achieve high throughput and real-time for a three-tier semi-self-organizing health monitoring network. The router nodes adjust their wireless transmission power according to the current network topology state and the communication state of the network adaptively to balance network load and reduce network congestion. The congestion control methods proposed in this paper have the characteristics of low power consumption and low communication overhead. Experiments have shown that the WHMN with the proposed Acc mechanism performs better than the WHMNs without the Acc in end-to-end delay and network throughput.

Oct 10th SaAf2 16:30-17:30 Room: < Grand World Ballroom, 2/F >
Oral Presentation: Cardiovascular Health Informatics
Chair: Ratko Magjarevic (University of Zagreb, Croatia)
Co-chair: Lei Wang (HICAS at SIAT, China)

Time/ Paper ID	First Author	Presentation Title
16:30-16:45 ID:10036	Wenjun.Su	***The Research and FPGA Implementation of ECG Signal Preprocessing*** In this paper, we studied ECG signal preprocessing and implemented it into a Field Programmable Gate Array (FPGA). The processing includes band pass filter, pseudo differential identification and mathematical morphology transform.
16:45-17:00 ID:14	Xingbin Qin	***Adaptive Latent Space Domain Transfer for Atrial Fibrillation Detection*** Atrial fibrillation(AF) is characterised by disorganised atrial electrical activity and contraction. The complications of atrial fibrillation is varied, so it shows several modalities in the Electrocardiogram(ECG). According to our statistics, the beat features and duration time of AF are different from person to person. The distribution of available annotated source ECG date is not as the target. Due to the rapid development of portable monitor, the ECG data explodes. The existing algorithms for the detection of AF perform well only in the training database. Training a general used model requires a great deal of labeled data for every user, this is a huge amount of work that is almost impossible. In order to make full use of the limited labeled ECG data and training a generalmodel, we propose an adaptive latent space domain transfer method for the detection of AF. The model learned from the source data is automatically adapted with little annotated or none in the target data. The MIT-BIH Atrial Fibrillation Database is regard as standard reference for classifier. Thenwe carry the experimental verification on the MIT-BIH Normal Sinus Rhythm Database and the Long-Term AF Database. The transfer method shows better performance than directly applied. It does make sense for detection and analysis of clinical dynamic electrocardiogram and individual ECG monitoring.
17:00-17:15 ID:19	An Luo	***Measuring Physiological Stress Using Heart-Related Measures*** Stress is an emergency response of our organism. Although stress may be necessary in case of life threatening situations, most of the stress experienced by modern day human is misplaced, and spur from evolutionary pressure that is not relevant in our societies. Finding ways to monitor, control, and reduce stress has become critical for the well-being of human societies. For the purpose of developing real time applications to assess and reduce stress for the general public using portable devices, we designed an experiment to trigger stress in laboratory conditions. Our results show that we successfully induced stress and that heart-related measures such as heart rate, heart rate variability and spectral estimation based on heart beats were reliable indicators of stress.
17:15-17:30 ID:10049	R. Couceiro	***Detection of Atrial Fibrillation using 12-lead ECG for Mobile Applications*** In this paper we present a new algorithm for detection of AF based on the assessment of the three main physiological characteristics of AF: 1) the irregularity of the heart rate; 2) the absence of the P-wave and 3) the presence of fibrillatory waves. Several features were extracted from the analysis of 12-lead electrocardiogram (ECG) signals, the best features were selected and support vector classification model was adopted to discriminate AF and non-AF episodes. Our results show that the inclusion of features from the analysis of the recovered atrial activity was able to increase the performance of the algorithm: Sensitivity of 88.5 % and specificity of 92.9%. In the WELCOME project it is being designed a novel light vest with an integrated sensor system that collects several signals, including 12-lead ECG signals. The proposed algorithm is currently integrated in the WELCOME feature extraction module, which is responsible for receiving raw signals, extract high-level features, such as the occurrence of AF episodes, and provide them to the clinical decision process.

POSTER PRESENTATION SCHEDULE

October 9th Poster Session I 15:15-16:45 Room: < Outside Grand World Ballroom, 2/F > Chair: Marc Nyssen (Free University Brussels, Belgium)

Paper ID	First Author	Presentation Title
10050	A. Leal	***A multi-feature approach for noise detection in Lung Sounds*** During the acquisition of lung sounds, several sources of noise can interfere with the recordings. Therefore, the detection of noise present in lung sounds plays an important role in the correct diagnosis of several pulmonary disorders such as in chronic obstructive pulmonary diseases. Denoising tools reported so far focus mainly in the detection of abnormal lung sounds from the background noise (usually vesicular background) or even just in the discrimination of normal from abnormal lung sounds. Algorithms for heart sound cancellation have also been proposed. However, it can be noticed that there is a lack of signal processing methods to efficiently detected and/or remove artifacts introduced in the acquisition environment or produced by the subject (e.g., speech). The present study focuses in the analysis of lungs sounds recorded in two different populations containing events of cough, speech and other artifacts from the surrounding environment. Feature extraction and binary classification were performed achieving, on average, values of a sensitivity and specificity ranging from 76% to 97% for the classification of cough, speech and other artifacts and from 83% to 90% for the specific detection of cough events. The detection of artifacts achieved sensitivity and specificity values of 84% and 61%, respectively for one population and 88% and 52% for another population.
2	Shah Mukim Uddin	***Optimization of the Amplicons Detection System of Loop-mediated Isothermal Amplification on Microfluidic Compact Disk*** Salmonellosis caused by the bacteria in the genus Salmonella remains the most important foodborne disease in both developing and developed countries. Since several decades various microbial detection and quantification methods have been developed. One of recently developed gene amplification method is loop-mediated isothermal amplification (LAMP) which has been developed on tube-based platform. To facilitate the detection of pathogenic diseases in remote areas, a microfluidic platform has been developed called lab-on-a-CD. This paper presents an improved endpoint detection system for LAMP on Lab-on-a-CD platform. A set of ultraviolet (UV) emitter and color sensor have been used in this detection system to detect the emission level of LAMP amplicons. A LAMP assay has been performed with Salmonella bacteria DNA and calibrated the duty cycle of UV emitter to optimize the amplicons detection system.

4	Panagiotis K. Siogkas	***Quantitative Coronary Analysis using 3D Coronary Reconstruction Based on Two Biplane Angiographic Images: a Validation Study*** The mortality rate due to Cardiovascular Diseases is constantly gaining ground worldwide. Therefore, the early detection of coronary hemodynamic abnormalities is a non-trivial matter in today's clinical practice. The assessment of coronary lesions is made using either invasive imaging techniques or by measuring the Fractional Flow Reserve value which also requires the use of a dedicated pressure wire. In this work, we present our newly developed novel 3-Dimensional Quantitative Coronary Analysis reconstruction method and its' validation by comparing it to an already validated commercial 3D-QCA software. We used the volumes of the 7 3D reconstructed arterial segments as well as the virtual Functional Assessment Index values as validation metrics to compare the two methods. The obtained results show a very high correlation between the two methods presenting very high r^2 values (0.98 and 0.99) and a very strong agreement between them.
9	Alberto Palacios Pawlovsky	***Improving the Accuracy of the kNN Method when Using an Even Number k of Neighbors*** The kNN (k Nearest Neighbors) method is a classification method that could show low accuracy figures for even values of k. This paper details one method to improve the accuracy of the kNN method for those cases. It also shows one method that could improve the accuracy of it for biased classification sets and for odd values of k.
11	Jacob Krive	***Effectiveness of Evidence-Based Venous Thromboembolism Electronic Order Sets Measured by Health Outcomes*** In this retrospective causal comparative study, we analyzed 5 years of electronic medical records (EMR) data at two large teaching hospitals to determine effectiveness of evidence-based VTE prophylaxis physician order entry systems (CPOE) order sets, measured by acute VTE diagnosis, length of stay (LOS), and comorbidities outcomes. Results indicate lower VTE rate among non-surgical patients, while surgical patients did not benefit. Placing VTE orders via sets was not effective in influencing LOS and comorbidities outcomes. The study highlights the role of medical informatics in improving patient outcomes through reduction of variability in patient care practice.
10052	Xiaorong Ding	***An Attempt to Define the Pulse Transit Time*** Pulse transit time (PTT) is promising for various clinical applications. This paper attempts to discuss different terminologies used for PTT and reveals the research discontinuity among different groups, with the aim to describe the definition of PTT and propose solutions to clarify the usage of PTT.

October 10th Poster Session II 11:00-12:30 Room: < Outside Grand World Ballroom, 2/F> Chair: Liang Song (HICAS at SIAT, China)		
Paper ID	**First Author**	**Presentation Title**
20	Sayedeh Razieh Abdollahi Demneh	***Associating protein interactions with disease comorbidity to prioritize colorectal cancer genes*** Identification of disease causing genes is one of the most important topics in human health that affects disease therapy and understanding disease mechanism. Genome-wide association studies focus on chromosomal locus which contains many suspected disease genes. Gene prioritization methods identify the most probable unknown disease genes due to this locus. In this study a network-based approach is proposed to prioritize colorectal cancer genes. Different methods involved in this approach are random walk with restart, network propagation and shortest path algorithms, which are separately applied on protein-protein interaction network to prioritize genes. Then these methods are combined in different ways to find the best combination of them for identifying disease genes. Finally by looking through comorbid diseases to colorectal cancer and extracting their causing genes, the proposed approach is reconsidered. The method is validated by cross-validation analysis and its results are compared with other prioritization methods. This comparison shows the better performance of this new approach.
23	Tomislav Pribanić	***On Fabrication of a Shoe Insole: 3D Scanning using a Smartphone*** The generation of 3D models from still images has been a long term goal in computer vision. Acquiring high quality 3D mod-els is no longer restricted to processing on desktop computers and high end laptops. Modern and powerful smartphones open up the possibilities designing new methods for 3D reconstruc-tion. The scope of this work is the development of the proto-type system on a smartphone for the efficient active stereo 3D reconstruction. Acquired 3D results are apparently no differ-ent from 3D results using a standard structured light scanner. Extending smartphone's functionality towards an active stereo 3D scanning device is interesting both for the medical applica-tions and for the industrial (economic) exploitation as well. Namely, combining 3D reconstruction capabilities with the present smartphone features sets the foundations for numer-ous other functionalities.
10017	Hui Xie	***Spatial Interactions of Electrically Evoked Potentials in visual cortex induced by multi-retinal electrical stimulation in rats*** Retinal prostheses are designed to electrically stimulate retinal neurons to generate artificial vision in patients with degenerative diseases such as retinitis pigmentosa (RP) or age-related macular degeneration (AMD). Considering hundreds of microelectrodes may be applied in the future retinal prosthesis to provide enough spatial information for precise perception, it is crucial to investigate the spatial properties of the visual cortex in response to retinal electric stimulation via *in vivo* studies, especially in multi-stimulating manner by adjacent electrodes. In this study, we use retinal multi-stimulating electrodes to stimulate retinal ganglion cells (RGCs) and record electrically evoked potentials (EEPs) in contralateral visual cortex by a 32-channel Utah array. The threshold of eliciting current for EEPs was determined with 20% of the maximum response in visual cortex. The spatial map with 32 grids for single retinal stimulation was obtained firstly, which showed the different spatial distribution to different retinal stimulation. Then the combination of two stimulation from two adjacent retinal stimulating electrode was applied to figure out the spatial responses of visual cortex.

10039	Xiao-Mao Fan	***Relative Analysis between Curative Effect Evaluation and Electroencephalograph of Stroke Patient in Convalescence*** Assessment of stroke mainly depends on clinical symptoms, however, it can only detect static reaction of brain function. Electroencephalograph (EEG) with no-invasive and dynamic is an important means to monitor electrophysiological pathological states of the cerebral cortex. To get insights into the correlation between factors of EEG and factor of curative effect evaluation, 84 stroke patients in convalescence less than 6 months were recruited. All of them received twice 19 leads EEG examinations of patients in hospital before and after the discharge as well as scale of evaluation criteria for strokes of Traditional Chinese Medicine (TCM). Pearson's correlation analysis method was used for EEG data on 114 factors, which 23 were found to be relative with curative effect evaluation factor(p value < 0.05).
10029	Chenfei Ye	***DTI Quantitative Analysis on Microstructural Abnormality in Post Stroke Depression*** Post stroke depression (PSD) is a frequent problem in stroke rehabilitation. Previous neuroimaging studies have implicated the link between particular white matter microstructures and pathophysiology of depression [1]. However, these studies reported no clear association between the lesion location and stroke-induced deterioration, and are often restricted to particular diffusion tensor imaging (DTI) image contrast like fractional anisotropy (FA) changes, lacking of multiple comparisons. In order to explore the effect of microstructural abnormalities in white matter to PSD comprehensively, we proposed a quantitative method with multiple DTI coefficient comparisons. Our result shows certain parameter changes in microstructures affected by infarct lesions are associated with depression.
10030	Yang Chen	***Marrow Fat Effect on Trabecular Biomechanics in Different BV/TV Subjects – A Simulation Study*** Osteoporosis is a metabolism disease characteristic with a loss of bone mass and a reduction of bone strength, patients suffering osteoporosis will have an increased probability of bone fracture [1]. BV/TV is a main factor for bone strength evaluation. Trabecular structures and bone marrow are the main components of cancellous bone, it has been reported that bone marrow may affect cancellous bone biomechanics, especially for marrow fat, which may enhance trabecular strength, but the difference of this effect in different BV/TV groups remains unknown yet. In this study, in order to investigate the difference of marrow fat effect in different BV/TV people, three different groups finite element (FE) models were established based on three different BV/TV subjects, simulation compressive test were preformed on these models. The simulation results indicate that marrow fat may have larger contribution in low BMD people.
10023	Riqiang Lin	***Photoacoustic/ultrasonic dual-modality endoscopy in vivo*** In our study, a miniaturized, simple and full field-of-view photoacoustic/ultrasonic endoscopy system was developed. A flexible coil was used to transmit the rotational torque from the rotary stage, which enables a 360o field-of-view imaging in vivo, for the first time to our knowledge. The developed imaging catheter was fully encapsulated by a single-use protective polyamide tube. A B-scan rate up to 5 Hz (200 A-lines/B-scan) was achieved. Three-dimentional photoacoustic and ultrasound images of the rectum from a SD rat were acquired in vivo. The significantly improved imaging field-of-view, together with the flexible, simple and encapsulated catheter design, suggests that this PAE system can be of great interest for clinical translation for a variety of endoscopic applications, such as the urogenital, colorectal and gastrointestinal tract imaging.

October 10th Poster Session III 15:00-16:30 Room: < Outside Grand World Ballroom, 2/F > Chair: Ye Li (HICAS at SIAT, China)		
Paper ID	**First Author**	**Presentation Title**
10040	Yu-Jie Yang	***Big Data Analysis of Hypertension Complications Bases on Shenzhen Medical Information Management Platform*** In recent years, the prevalence of hypertension in China increases continuously, and hypertension has become the first risk factor of the total death of Chinese population. At the same time, with the progression of hypertension condition, it may induces stroke, coronary heart disease, kidney failure and other severe complications, endangering the safety of life and property seriously. However, in China, hypertension patients have "three low" - low awareness rate, low treatment rate and low control rate, thus analyzing the significant risk factors and pathogenesis has certain clinical significance for prevention and treatment of complications of hypertension. In this paper, we screen approximately 2.2 million copies of hypertensive patients from medical information management platform, analyzing the risk factors by General Linear Model, selecting the factors of high significance for statistical analysis.
10041	Fen Miao	***Vital Signs Analysis for Oceanauts in Deep Sea Submerged Environment: a case study*** The oceanauts often suffer a lot from psychological dysfunction in the narrow and complicated deep sea environment. This paper aims to analyze the vital signs for oceanauts in submergence work with one case as an example. Four vital signs including heart rate, blood pressure, SDNN and LF/HF derived from ECG and blood pressure signals were analyzed to demonstrate the physiological status in submergence work.
10043	Jie Zhang	***Epidermal Bioelectronics toward Oximetry and Health Care Applications*** Cardiovascular diseases are among the most dangerous illnesses to human being, especially to the aged people. Therefore precaution and surveillance of cardiovascular diseases, empowered by prompt diagnosis and treatment of abnormal physiological conditions, have become growingly important and are expected to play essential roles in people's daily life. In this work, we developed low power photoplethysmogram (PPG) sensing system containing a flexible inorganic LED device and a high-sensitivity, ultra-thin phototransistor to monitor physiological parameters such as heart rate variability and oxygen saturation. The ultra-thin flexible LED and phototransistor overcome the roughness of human skin and allow conformal contact between the devices and the skin surface to realize high signal-to-noise ratio and resistance to motion artifact. The fabrication protocol of the LED and phototransistors will be described, followed by a detailed characterization on the device performance.
10027	Dan Wu	***Is Beat-to-Beat Blood Pressure Variability in Frequency Domain Associated with the Occurrence of Carotid Plaques?*** More evidences indicate that the increased blood pressure variability (BPV) has some relations with arteriosclerosis and development of plaques, also it will lead to the cardiovascular disease [1]. Blood pressure variability is usually assessed in the time domain. Standard deviation (SD), coefficient of variability (CV), average real variability (ARV) are the most used BPV indices. However, the prognostic significance of the BPV indices in frequency domain was less reported. Therefore, in this study, we will investigate whether beat-to-beat BPV in frequency domain can evaluate the occurrence of carotid plaques in the early stage.

10034	Xiaojing Gong, Yan Li	***High-speed intravascular spectroscopic photoacoustic imaging at two spectral bands*** In this study, a catheter of 0.9 mm in diameter with a novel quasi-focusing light illumination scheme is designed and developed， smaller than the critical size of 1 mm required for clinical translation. With this design, the laser fluence in the targeted imaging region was increased, which produced detectable signals with laser energy as low as ~ 30μJ/pulse. As a result, a 1-kHz-repetition-rate, ns-pulsed optical parametric oscillator (OPO) laser was able to be utilized to achieve high-speed IVPA imaging, working at both the 1.2μm and 1.7μm spectral bands for lipid detection. Specifically, a B-scan acquisition rate of 5 Hz was achieved, ~100-fold faster than conventional IVPA systems operating at the similar tunable range. With the system, multi-wavelength (five wavelengths) spectroscopic IVPA imaging of both a lipid-mimicking phantom
10031	Hengtong Li	***An New Atlas Pre-selection Approach for Multi-atlas Based Brain Segmentation*** The demographic-based multi-atlas propagation indicates that top-ranked atlas selection with mutual information (MI) similarity can result in a better segmentation performance compared to that from a random set of atlases [1]. For the purpose of speeding up this process, we propose a fast method for the atlas pre-selection in multi-atlas based segmentation. This study is based on the multiple granularity analysis, where Lite-M1 pipeline has been developed. In this pipeline, the lateral ventricle (LV) of target image is primarily labeled before the multi-atlas based segmentation. By adopting the same pipeline for segmentation, results based on the proposed pre-selection method were compared to that using MI similarity and 4 labels, which contain cerebral cortex, white matter, gray matter and lateral ventricle. This study shows that the proposed method can reduce heavy computational burden in atlas pre-selection process, while remains high accurate multi-atlas based brain segmentation.
10051	Yuhe Wang	***Reconstruction and in silico Simulation towards electricigens metabolic network of electronic mediator*** Microorganisms have drawn our attention for its distinguished capacity of electron transportation. Recently microbial fuel cells (MFC) have emerged as a novel biochemical catalytic device, the electron transfer mechanisms are of our primary concern to improve the efficiency of extracellular electron transfer (EET). Here we reconstruct the genome-scale metabolic network of Shewanella oneidensis MR-1 by merlin. Based on text mining, we focus on the electronic mediators, then we complete the reconstruction of the metabolic sub-network. We have identified the key reactions of EET process combined with the utilization of COBRA Toolbox, the simulated gene and reaction knockouts provided guidance to the strain genetic modification to a certain level.

Conference Venue

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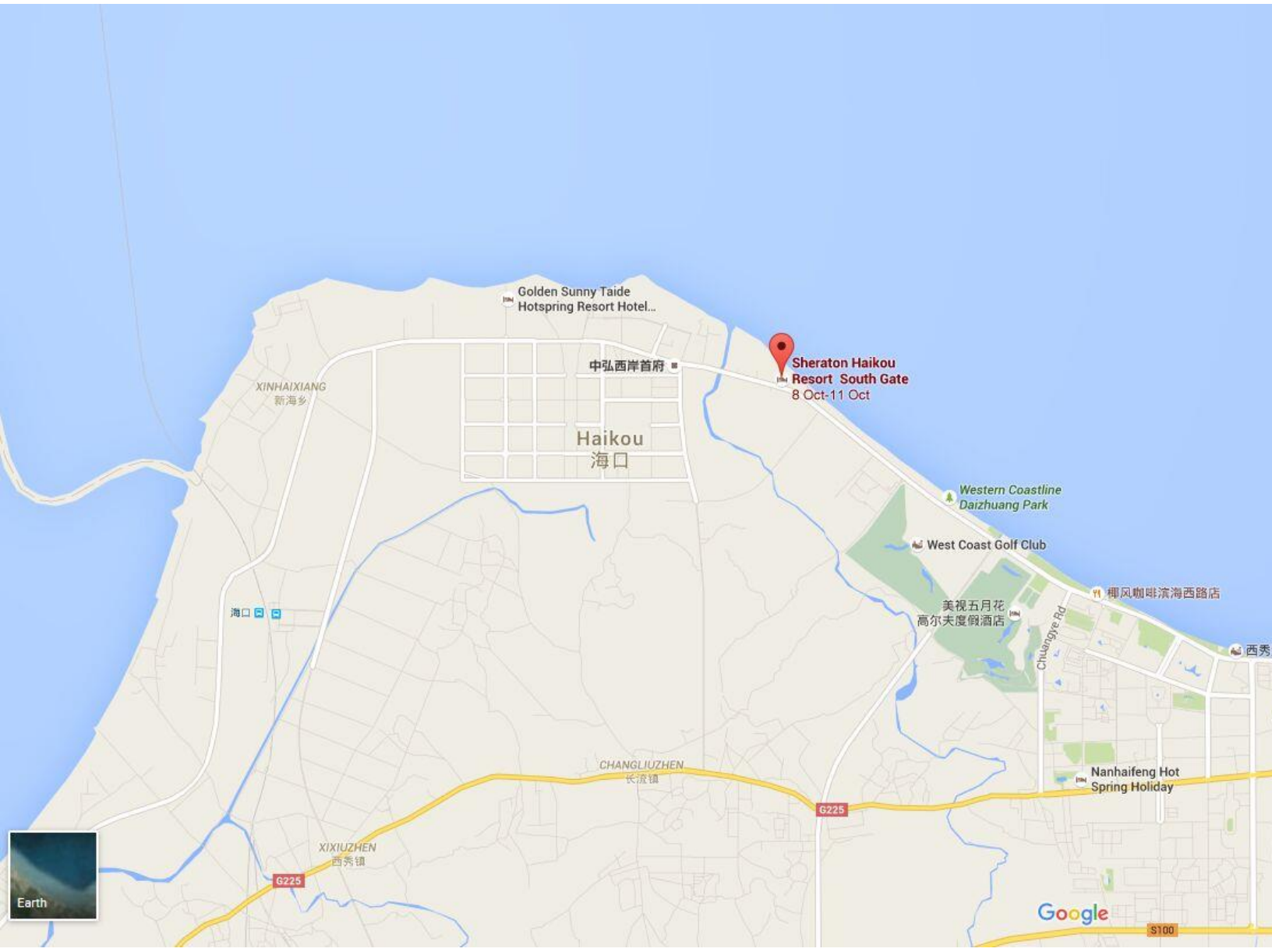

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