Wednesday, 3rd July 2013

Tutorials and Workshops

Full-Day Tutorial
Implantable Medical Device Innovation: Certification and Safety Issues
8:30 - 17:30
1008 (10th Floor)
Registration Required

Organizer: Richard W Jones

Speakers:
1. Historical Review of IP-Protection: Trade-Secrets, Trademark, Copyright etc. - Basile Spyropoulos
2. Patentability Criteria, Priority, International Protection, Licensing, Royalties etc. - Basile Spyropoulos
3. Patent Classification Systems and Information Retrieval out of Patent Documents - Basile Spyropoulos
4. The Prediction Potential of IP-Documents - Basile Spyropoulos
5. Patent Mapping Indicating Technological and Capital-Investment Trends - Basile Spyropoulos
6. Identification of Ethical and Legal Aspects out of IP-Documents - Basile Spyropoulos

The use of human body implantable medical devices will revolutionise health care in the coming decades. Implantable devices have already evolved from artificial hips and knees to assistive devices that have built-in electronics such as artificial pacemakers and chronic pain treatment devices. Many manufacturers have remarked that medical device innovation is being stifled by certification procedures in both the U.S. and Europe particularly with regard to high risk, implantable medical devices. They argue that the effort required in carrying out the certification procedure, including the need for clinical trials, and the overall cost involved in becoming certified is counterproductive to implantable medical device innovation. A balance needs to be found to encourage innovation while at the same time protecting the public from possible harmful devices though recently the regulatory processes in both Europe and in the US have been challenged as to their ability to protect patients effectively from unreasonable risk and harm with regard to all classes of medical device. Given these recent challenges to the regulatory processes there definitely needs to be an increased awareness of the current certification procedures for medical devices, and the areas where the procedures, need to be improved to provide better protection to patients. This includes improved communication between the manufacturers, service provider (Healthcare organisation) and certifying body. This tutorial concentrates on the most innovative area of medical device development, namely active implantable medical devices (AIMD's). An overview of some developments is initially presented, with chronic conditions such as diabetes and pain and their treatment via AIMD's being prominent throughout the tutorial. The overall aim of the tutorial is to present the certification and safety procedures currently in place for these high risk Class III medical devices are reviewed, possible shortcomings to the current situation discussed and suggestions for improved certification procedures provided.

Half-Day Tutorial
Developing the Virtual Physiological Human: Tools, Techniques and Best Practices for Data Exchange, Storage and Publication
8:30 - 12:30
1102 (11th Floor)
Registration Required

Organizer: David Nickerson

Speakers:
1. The Physiome Model Repository- Poul Nielsen
2. OpenCOR- Peter Hunter
3. The MAP Client framework- Hugh Sorby

We will demonstrate tools, techniques and best practices that aid scientists in the development and application of computational models and simulation experiments in their work toward the creation of a virtual physiological human. The Physiome Model Repository (PMR) provides a framework for the storage, curation and exchange of data. By using standards suitable to their data, scientists maximise their ability to reuse existing knowledge and enable others to make use of their achievements in novel work. Annotations ensure scientists are able to find existing data and are also able to correctly interpret and apply the data in their own work. The tutorial will begin with a series of presentations introducing the central concepts of the PMR, the software

tools OpenCOR and MAP client, and some best practice guidelines which facilitate the finding, use, and sharing of data across the Physiome Project. OpenCOR (http://opencor.ws/) is a new editing, simulation and annotation tool for models encoded in the CellML format (http://cellml.org/). The Musculoskeletal Atlas Project (MAP) client is a software framework that integrates disparate software tools into a streamlined workflow of processing steps to achieve specific objectives. The initial focus of the MAP client is to segment and mesh medical imaging data to generate computational models of the musculoskeletal system. Following the introductory presentations, the speakers and other members of each of these projects will be available to help attendees work through prepared tutorials addressing various common scenarios that these tools are designed to achieve. These tutorials are designed to help demonstrate and promote practices which will aid attendees in their own work. Attendees are also encouraged to raise issues specifically related to their work with the tutors. Attendees should bring their own computers to participate in the hands-on section of the tutorial.

Half-Day Tutorial
Advanced Biological Signal Processing of Human Communications for Healthcare Engineering
8:30 - 12:30
1001 (10th Floor)
Registration Required

Organizers: Jian-Qin Liu
Shoji Makino

Speakers:
1. The Communications Infrastructure for Biomedical Engineering - Jian-Qin Liu, Shoji Makino
2. Signal Processing for Biomedical Engineering - Jian-Qin Liu, Shoji Makino
3. Brain-Machine Interfaces - Jian-Qin Liu, Shoji Makino

With the state-of-the-art of ICT (Information and Communication Technology), the tutorial is aimed at exploring the advanced signal processing technology for healthcare engineering. In the tutorial, the advanced ICT tools are presented to cover the field of signal processing for biomedical engineering from the aspects - molecule, image, speech, and neuron (brain) towards systematically understanding the principle of human communications. Mathematical and computational analysis of brain's functional connectivity and causality network is carried out to investigate the signaling mechanism of neurodegenerative diseases. The brain-machine interface enhanced by autonomous robotics and wireless sensor networks is also discussed as one of the most promising fields on the applications of biomedical engineering. The target audience of the tutorial is the whole community of the IEEE EMBS Society. Additionally, the related communities within the IEEE Signal Processing, Communications, CIS(Computational Intelligence), Control Systems, RAS(Robotics and Automation), and SMC (Systems, Man and Cybernetics) Societies are also oriented to by organizing the presentation for the tutorial.

Half-Day Tutorial
Statistical Modeling and Machine Learning in Medical Imaging
8:30 - 12:30
1003 (10th Floor)
Registration Required

Organizer: Kenji Suzuki

Speakers:
1. Overview of the Field of Statistical Modeling and Machine Learning in Medical Imaging - Kenji Suzuki
2. Applications to Reconstruction of Medical Images: Fundamentals of Statistical Image Reconstruction in X-ray CT, SPECT and PET - Hiroyuki Kudo
3. Applications to Super-Resolution of Medical Images: Fundamentals and Applications of Super-Resolution in Medical Imaging - Yen-Wei Chen
4. Applications to Computer-Aided Diagnosis of Medical Images: Pixel-based Machine Learning (PML) in Medical Image Processing and Computer-aided Diagnosis - Kenji Suzuki

Statistical modeling and machine learning play important roles in the medical imaging field, including image reconstruction, image processing and analysis, and computer-aided diagnosis and therapy. As medical imaging modalities are advanced, the amount of data from modalities increases dramatically. Such modalities include cone-beam CT, 3D ultrasound imaging, diffusion/functional/interventional MRI, and PET-CT/MRI. Consequently, algorithms/methods which can handle such a large amount of data are demanded. Furthermore, it is difficult to derive analytic solutions to represent lesions/anatomy because of large variations and complexity. Therefore, tasks in medical imaging require statistical representation of and/or learning from data.

Thus, statistical modeling and machine learning obtain enthusiastic attentions from the community. Statistical modeling is a modeling technique for representing data based on statistical methods such as Bayesian methods, Gibbs sampling, and principal/independent component analysis. On the other hand, machine learning is a technique aiming at acquiring functions/knowledge/tasks/models through "learning from examples/data," including neural networks, support vector machines, manifold learning, and dictionary learning.

This tutorial will provide the overview, fundamentals, and applications of statistical modeling and machine learning to three important areas: image reconstruction, super-resolution, and computer-aided diagnosis. We invite 3 experts in the areas as instructors in this tutorial. Dr. Kudo will talk about iterative (or statistical) reconstruction that is a mainstream research in the area, its basic principles, and advantages over analytical reconstruction. Dr. Chen will talk about super-resolution techniques that convert low-resolution images to high-resolution images by using machine learning, its theory, recent advances, and applications. Dr. Suzuki will talk about pixel-based machine learning that learns pixels/images directly, as opposed to extracted features from segmented lesions, its fundamentals, advances, and applications in computer-aided diagnosis.

Half-Day Tutorial
Industrial Property Rights and Biomedical Technology: An Introduction
13:30 - 17:30
1002 (10th Floor)
Registration Required

Organizer: Basile Spyropoulos

Speakers:

1. Historical Review of IP-Protection: Trade-Secrets, Trademark, Copyright etc. - Basile Spyropoulos
2. Patentability Criteria, Priority, International Protection, Licensing, Royalties etc. - Basile Spyropoulos
3. Patent Classification Systems and Information Retrieval out of Patent Documents - Basile Spyropoulos
4. The Prediction Potential of IP-Documents - Basile Spyropoulos
5. Patent Mapping Indicating Technological and Capital-Investment Trends - Basile Spyropoulos
6. Identification of Ethical and Legal Aspects out of IP-Documents - Basile Spyropoulos

Innovation has grown to become the keyword of the 21st Century competitiveness strategy, however, the increasing importance for Industrial Property (IP) Rights, and more specific for Patents, is often disregarded in academic Biomedical Informatics research. The knowledge and the technical information available in IP-documents are still underestimated, due to a lack of awareness and understanding of their function and advantages. IP-laws are concerned with the legal regulation of mental products, and they facilitate the cooperation of Industry and Academia, however, there is almost no training provided for Medicine, Engineering and Science graduate students. Since we already have the very positive experience of offering courses on Industrial Property Rights, for Biomedical Engineering under-graduate students and Medical Informatics post-graduate students in our Department, since 2003, a Tutorial is proposed, aiming the acquaintance of mainly young professionals, with the basics of IP- Rights, focused on Biomedical Informatics Research. The Tutorial will address relevant aspects of IP such as, the origin and the historical development of IP-protection, Trademark, Copyright, Patent International Protection, Licensing, Royalties, etc. Special care is taken in training on equipment and software classification, information retrieval out of patent documents and their use in research projects, by the employment of the Esp@cenet, the specialized Internet based search-engine of the European Patent Office and other similar services. The prediction potential of IP-Documents, concerning the development course of emerging technologies, is another important advantage that will be examined. This is obtained by evaluating relevant IP-Documents and combining premature hints, often embedded in patent applications, and aiming to extend the claimed legal and technical protection. Finally, the collective technological and capital-investment trends pinpointed, and the identification of Ethical and Legal aspects, out of properly assessed IP-Documents constitute another reliable "mapping" of the corresponding innovation-trail in almost all components of Biomedical Technology and Medical Informatics.

Half-Day Tutorial
Fuzzy Image Processing - Handling Vagueness and Uncertainty in Medical Image Analysis
13:30 - 17:30
1003 (10th Floor)
Registration Required

Organizer: Hamid R. Tizhoosh

Speaker: Fuzzy Image Processing - Handling vagueness and uncertainty in medical Image analysis - Hamid R. Tizhoosh

Medical images analysis has become a crucial component in modern medicine. Clinicians employ different image modalities, such as CT, MR and ultrasound images, for diagnostic, treatment planning and post-treatment monitoring of many diseases. The analysis of medical images involves many tasks such as enhancement, filtering, segmentation and registration of digital images. Due to the complexity of human anatomy, the limitations of imaging devices and other reasons, analyzing medical images is always accompanied with uncertainty and vagueness. Fuzzy image processing is a knowledge-based approach to image processing. In this tutorial, we start with a brief history of fuzzy techniques in digital image processing and provide basic definitions to perform fuzzy operations. We will briefly review the state of the art and examine fuzzy algorithms for different operations on medical images (filtering, enhancement, segmentation, registration, classification etc.). Using abdominal CT and pelvis MR images, we will, step by step, develop a complete processing chain to extract the prostate and bladder from these images. In each step we will demonstrate the benefit if using fuzzy image processing in managing uncertainty and vagueness.

Full-Day Workshop
Emerging Methods for Blood Pressure Measurements and Calibration
08:30 - 17:30
1202 (12th Floor)
Registration Required

Organizer: Van Moer Wendy

Speakers:

1. Blood Pressure Measurements: Past and Present: Introduction to Blood Pressure Measurements and Calibration Techniques - Wendy Van Moer
2. Innovative Blood Pressure Measurement and Calibration Techniques - Miodrag Bolic
3. International Standard for Blood Pressure Measurements/Calibration - Sergio Rapuano
4. Future Trends and Applications - Octavian Postolache
5. What does the Perfect Blood Pressure Meter Looks like: from a Clinician Point of View? - Shin-Ichi Ando

Worldwide, hypertension is the most important preventable risk factor for premature death since it increases the risk of heart disease strokes, and various cardiovascular diseases. Hence, the blood pressure is one of the most important vital signs to monitor. As a result, automatic blood pressure meters have become part of the family's medical chest and are available in almost any local grocery store. The automatic blood pressure meters are based on the oscillometric measurement principle. To ensure the correctness of these oscillometric meters, they should be calibrated by a physician to account for the individual patient. Indeed, parameters like arm fat, artery oxygenation, cholesterol levels etc. may have an important influence such that the blood pressure measured by means of the oscillometric meter and the sphygmomanometer used by physicians significantly deviate. At present, the only way to properly calibrate the oscillometric meter is by comparing it with the sphygmomanometer. However, this is both time-consuming and unfeasible since a skilled physician is required. This workshop will start with an overview of the classical blood pressure measurements and calibration techniques, so that even a non-specialist can take part and learn the basic blood pressure principles The main focus of the workshop will, however, be put on innovative blood pressure measurements and calibration techniques. World leading groups will show their state-of-the-art research developments in the domain of blood pressure measurements, such as alternative methods to the oscillometric blood pressure measurements and model-based calibration techniques. The workshop will end with a discussion forum which will allow the attendees to share their opinion and visions. This will lead to new insights and research directions in the evolving world of blood pressure measurements.

Full-Day Workshop
Computational Modeling of Regenerative Medicine and Cellular Pattern Formation
08:30 - 17:30
1201 (12th Floor)
Registration Required

Organizer: Jie Liang
Qing Nie
Lei Zhang

Speakers:
1. Spatio-Temporal Dynamics of Cell Population in Models of Stem Cell Lineage during Wound Healing - Youfang Cao
2. Key Roles of Reinitiation in Dynamical Behavior of Transcription Regulation - Luonan Chen
3. Cell Polarization in Budding Yeast - Ching-Shan Chou
4. TBA - Hisao Honda,
5. Self-Organized Hormone Transport Controls Leaf Polarity - Yuling Jiao
6. On Robustness of Morphogen Gradients - Jinzhi Lei
7. Mechanisms of Bristle Formation and Tissue Elongation - Hammad Naveed
8. Epigenetic Dynamics of Eukaryotic Cells - Masaki Sasai
9. Quantifying Waddington Landscape and Paths of Stem Cell Differentiation and Reprogramming - Jing Wang
10. Global Epigenetic State Network Governs Cellular Pluripotent Reprogramming and Transdifferentiation - Jianhua Xing

Understanding developmental patterning and control of stem cells and progenitor cells is one of the central problems in regenerative medicine. In this workshop, we discuss recent development in mathematical and computational modeling of developmental patterning and stem cells, with emphasis on understanding feedback loop controls, robustness, and spatial organization of stem cell driving growth developmental tissues. We will discuss stochastic effects important for the development and stem cells and progenitor cells. We will also discuss modeling techniques that track individual cells, allowing topological changes, rearrangement, growth, and apoptosis as well as computational frameworks based on discrete and continuum models of cell and tissue formation through partial differential equations.

Half-Day Workshop
IEEE11073 Personal Health Devices Educational Session
08:30 - 12:30
1002 (10th Floor)
Registration Required

Organizer: Malcolm Clarke

Speakers: TBA - Michael Kirwan

The session will present a tutorial on the IEEE 11073 Personal Health Device (PHD) standards. The session will cover the theory of the IEEE 11073-20601 base standard, the -104xx specializations and the current transport technologies (BT, BT LE, USB and ZigBee). The session will explain the domain information model, service model, and nomenclature and how these are used to model real devices. The session will cover practical examples of devices from the separate domains of telehealth, independent living, and health and fitness. The session will describe the advantages to research and industry applications.

Half-Day Workshop
g.tec ECoG Functional Brain Mapping
08:30 - 12:30
1004 (10th Floor)
Registration Required

Organizer: Robert Prueckl

Speakers:
1. Fundamentals - Robert Prueckl
2. Hardware - Robert Prueckl

3. Paradigms - Robert Prueckl
4. Signal Processing - Robert Prueckl
5. Mapping and Topographic Representation - Robert Prueckl
6. Validation - Robert Prueckl

This workshop highlights practical aspects of passive functional mapping using electro-corticographic (ECoG) signals. Functional mapping of eloquent cortex is important prior to invasive brain surgery. Many studies over the past decade have shown that ECoG activity in the high gamma band is a reliable indicator of local task-related cortical activity, and could thus complement existing methods for functional mapping, such as electrical cortical stimulation (ECS) mapping or functional magnetic resonance imaging (fMRI). Topics of the workshops are the (i) acquisition of ECoG in clinical environments, (ii) suitable electrodes, connectors, amplification technologies, (iii) experimental paradigms, (iv) real-time feature extraction, (v) real-time mapping using SIGFRIED technology, (vi) topographic arrangement and (vii) validation with electrical current stimulation.

Half-Day Workshop
Lessons Learned from Medical Systems Development
08:30 - 12:30
1005 (10th Floor)
Registration Required

Organizer: Dorin Panescu
Nick Chbat

Speakers:
1. Lessons Learned using the daVinci 3-D Robotic Vision: Augmenting the Surgeon's Senses - Catherine Mohr
2. Lessons Learned from the Development Therapies and Technologies based on Parasympathetic Nervous System Stimulation - Reese S. Terry, Jr
3. Lessons Learned from the Development of Liver Surgery Planning Systems - Andrea Schenk
4. Lessons Learned from Cardiopulmonary Decision Support Development - Nick Chbat
5. Lessons Learned from the Development of Wearable Cardiac Remote Monitors - Dorin Panescu

Half-Day Workshop
ISO 13606/openEHR
08:30-12:30
1007 (10th Floor)
Registration Required

Organizer: Shinji Kobayashi
Jussara Rotzch
Koray Atalag

Speakers:
1. Tutorial on Clinical Modeling and OpenEHR - Jussara Roetzsch
2. New Zealand Health IT Landscape and Approach to Interoperability - Koray Atalag
3. ISO 13606 Standard and its Implementation in Japan - Shinji Kobayashi

The communication, semantic interoperability and statistic analysis electronic health records (EHR) are increasingly important as functionality. Clinical information about individual person is inevitably collected across multiple care settings an within diverse heterogeneous EHR repositories. Integrating health information is a recognized health informatics challenge, and has been the subject of over 20 years of international research. ISO 13606 is one of the most remarkable standards to implement EHR(Electronic Health Records). This fiver part standard defines a generic information model for representing part all of individual EHR. This standard has been developed as European standard, and it is not familiar in Japan and Asian countries. However, this standards has been implemented by both commercial and voluntary base all over the world, because of its technical advantage. Brazil Ministry of Health committed to accept open EHR archetype as its architectural principles to be utilized in the Brazilian EHR project at 2012. New Zealand and Australia have been implemented EHR systems. In Japan, we launched domestic activity at 2007 and has researched the feasibility of open EHR specification and implementation to Japanese environment. In this tutorial session, we introduce the overview of this standard including the archetype concept and have a workshop to discuss EHR implementation with local arrangement.

Half-Day Workshop
All about the Pressure-volume Relationship of the Heart: What We Have Learned in the Last 100 Years? Where Are We Heading To?
08:30-12:30
1006 (10th Floor)
Registration Required

Organizer: Kenji Sunagawa

Speakers:
1. Historical Overview and Unique Characteristics of the Pressure-Volume Relationship - Kenji Sunagawa
2. Multiscale Simulation of PVR - Seiryo Sugiura
3. Basics Characteristics of the ESPVR: Application to Clinical Studies - Paul Steendijk
4. The ESPVR in the mouse: How to Measure it and What it Looks like - Dimitrios Georgakopoulos
5. Continuous Ees Tracking by Arterial Blood Pressure Waveform Analysis - Ramakrishna Mukkamala
6. The Clinical Usefulness of ESPVR in Predicting Hemodynamics through Ventricular-Arterial Coupling - Masaru Sugimachi
7. Pressure volume area and cardiac oxygen consumption - Yoichi Goto
8. Integration of ESPVR into the Guyton's circulatory equilibrium framework for the prediction of total hemodynamics - Kazunori Uemura

The pressure-volume relationship (PVR) of the left ventricle was first documented more than 100 years ago. In the late 60s and early 70s, a Japanese scientist, Dr. Hiroyuki Suga demonstrated in canine heart preparations that the end-systolic pressure-volume relationship (ESPVR) is linear and insensitive to changes in loading conditions. He also demonstrated that the slope of ESPVR (Ees) is a sensitive index of ventricular contractility. Ever since the early observations of unique characteristics of PVR, many groups in the world, in particularly, in the US, Europe and Japan, have extensively investigated, validated and applied the PVR to physiological and clinical studies. In this workshop, we would like to discuss historical aspects of PVR, basic characteristics of PVR including energetics, and molecular mechanisms that make the PVR load independent, yet sensitive to contractility. We would also like to discuss practical techniques to estimate PVR in patients and in animals. We also address the ventricular-arterial coupling that allows us to translate ventricular elastance into cardiac pump function and integrate into circulatory equilibrium. This WS is the most thorough review of latest knowledge of PVR. All lectures will be delivered by the first rated instructors who truly contributed and added lift to the PVR. In the era of molecular biology, the importance of organ level mechanics never gets less. Indeed, it is getting more important ever. I recommend that every student and scientist who is interested in cardiac mechanics should participate in the WS. We never disappoint you. All participants will get handouts of lectures.

Full-Day Workshop
2013 International Neurotechnology Consortium Workshop: NeuroDiagnostics, NeuroTherapeutics, Imaging and Grand Challenges
08:30-17:30
Conference Hall (12th Floor)
Registration Required

Organizer: Nitish V. Thakor

Speakers:
1. Welcome and Workshop Outline - Nitish Thakor
2. Lessons from Tests with Impaired Users - Jose del R. Millan,
3. Challenges and Progresses in Translational Neuroscience - Tzzy-Ping Jung,
4. Somatosensory Brain-Machine-Interfaces (BMIs) - Jose Principe,
5. Functional Neuroimaging - Bin He,
6. Brain-Machine-Body Interface (BMBI) for Natural Cognition – Chin-Teng Lin,
7. From Cognitive Sciences to Cognitive Engineering: New Tools and Biomarkers in Mind Reading Problems - Anastasios Bezerianos,
8. Continuous Detection of Mental Workload by using EEG Activity - Fabio Babiloni,
9. Signal Processing Techniques for EEG based Brain-Computer Interface - Cuntai Gua,
10. Flexible Electrode Array and Wireless Recording System using UWB -Takafumi Suzuki,
11. Advances in Neuromodulation - Pedro Irazoqui,
12. Implantable CMOS Imaging Devices -Jun Ohta,
13. Engineering Aspect of Retinal Prosthesis by Suprachoroidal Transretinal Stimulation -Yasuo Terasawa,
14. Interfacing with the Peripheral System -Dominique Durand,

15. Emerging Investigational Devices: Translating Neuroprosthetic Technology to People Living with Spinal Cord Injury -Justin C. Sanchez,
16. Young Investigator Awards

This full-day 2013 International Neurotechnology Consortium (INC) workshop, in concurrent with the 2013 IEEE EMBC conference in Osaka, Japan. This workshop will be devoted to bringing together the community of professionals to foster global NEUROTECHNOLOGY collaborations. Through INC, we propose the formation of partnerships among researchers, academic institutions and industrial partners to create a dialog and to foster collaborations that will accelerate neurotechnology development and industrial/clinical translation. The first INC was initiated in 2012 by Prof. Nitish V. Thakor (FIEEE) and Prof. Chin-Teng Lin at NCTU (FIEEE, Editor in Chief of IEEE Fuzzy system) concurrent with the 2012 IEEE BioCAS conference in Taiwan and attracted about 80 experts/professors/researchers. The goal for 2013 is to significantly expand the scope of the INC workshop to include many additional cutting edge topics:

- Neural interfaces, electrodes
- Neural circuits, devices
- Nerve and cortical prosthesis
- Implantable neurotechnologies
- Neuroimaging techniques
- Brain machine interfaces

The overall goal is for the experts in these fields to share their knowledge and to promote cross-fertilization of ideas, but especially foster international collaborations that will enable cutting edge Neurotechnology to be taken from engineering to experimentation and finally to the clinic.

Full-Day Workshop
Current Challenging Image Analysis and Information Processing in Life Sciences
09:00-16:30
1203 (12th Floor)
Registration Required

Organizer: Tuan D. Pham
Xiaoyi Jiang
Kazuhisa Ichikawa

Speakers:
1. Joint Registration of PET/MRI Data for Motion Correction of PET Data - M. Fieseler, F. Gigengack, X. Jiang, K. Schäfers
2. Deformable Part Models for Object Detection in Medical Images - K. Toennies
3. Semi-Automatic Segmentation and Classification of Pap Smear Cells - P.-C. Huang, K.-C. Lin, J.-Y. Lin, L.-E. Wang, Y.-F. Chen, J.Y. Chiang
4. An Automatic Segmentation and Classification Framework of Anti-nuclear Antibody Images - C.-C. Cheng; J.-S. Taur; T.-Y. Hsieh; Y.-F. Chen
5. Vessel Boundary Detection Using 3D Expansion of Dynamic Programming - D.-C. Cheng, S.-H. Liu
6. Signal Transduction in Real Intracellular Space - D. Ohshima, H. Sagara, T.D. Pham, K. Ichikawa
7. Mass Type-Specific Sparse Representation for Mass Classification in Computer-Aided Detection on Mammograms - S. H. Lee, D. H. Kim, Y. M. Ro
8. 3D Motion Image Reconstruction for Clinical Inspection of Tricuspid of Heart from 2D MRI Motion Images - R. Oka, K. Ota, S. Maeba
9. Lineage Data Analysis for the Inference of Regulatory Network for C.Elegans Embryonic Cell Cycle - X. Huang, H. Chim, L. Chen, L.L.H. Chan, Z. Zhao, H. Yan
10. A Brain MRI-based Hidden Markov Model for Dementia Recognition - Y. Chen, T.D. Pham
11. Segmentation of Endoplasmic Reticulum in Intracellular Space - N. Nguyen-Thanh, T.D. Pham, H. Sagara, K. Ichikawa

Rapid advances in imaging devices and biotechnology have greatly helped life-science researchers gain insights into studying complex disease process and progress. However, in order to enable the computerized analysis of novel high-content and high-throughput data, advanced image and signal analysis techniques for handling such state-of-the-art information are needed. For example, a new type of cancer research is to observe cancer-cell characteristics exhibited on its intracellular space captured by the advanced microscopy imaging technology to study how cell regulates its intracellular features to optimize their signaling pathways. Such advancement in microscopy imaging of the structure of cell organelles enables biomedical researchers to study cell morphology in great

detail to discover the pathogeneses of diseases by information obtained at molecular level. Therefore, automated segmentation/extraction of all organelles in a single cell for cancer modeling and simulation is a current challenge in computational systems biology. Another example is the challenge in the accurate 3D-image reconstruction of computed tomography (CT) scans of the abdominal aorta for computational modeling of fluid dynamics and the dynamic interaction of blood flow and the arterial wall which are important biomedical factors contributing to the pathogenesis of abdominal aortic aneurysms. In computational neuroscience, as another example, the same neuropathological burden that may cause different degrees of cognitive impairment with one person developing dementia such as Alzheimer's disease, while the next retains normal cognitive ability. Because brain structure is highly variable between individuals; therefore the quantification of brain structural complexity on magnetic resonance imaging (MRI) of individuals who were characterized as non-demented, mild to moderate Alzheimer's disease and non-demented is important for discovering imaging biomarkers for the early diagnosis and prediction of dementia. Such brain-MRI complexity analysis is a current trend in computational neuroscience. The proposed workshop will particularly calls for contributions from researchers working on biological imaging, medical imaging, biometric imaging, and health. Springer Communications in Computer and Information Science (CCIS) Series (http://www.springer.com/series/7899) has agreed to publish the proceedings of the proposed workshop.

Half-Day Workshop
Snapshot of EHR Implementation Around the World and the Future Direction of EHR in Japan
13:30-17:30
1006 (10th Floor)
Registration Required

Organizer: Hiroyuki Yoshihara

Speakers:
1. Overview of EHR Implementation Attempt around the World - Hiroyuki Yoshihara
2. Trend of EHR in North America - John Halamka
3. Towards a National EHR in New Zealand - Koray Atalag
4. Brazilian National EHR (RES-SUS) - Jussara Rötzsch
5. Role of EHR for Cohort Study: Nagahama Cohort Project - Takeo Nakayama
6. The Present and the Future of "Fujinokuni Virtual Mega-Hospital": N2N Medical Information Sharing System - Noriko Mori
7. Ongoing EHR and Statistic Analysis Platform development projects: Maiko net and CISA Project - Naoto Kume

Many attempts to implement EHR is undergoing around the world. The approach of EHR implementation varies around the world. In this workshop, we overview ongoing EHR projects around the world and typical Japanese projects. Additionally, we present a attempt to combine EHR and genomics research together as a touchstone of future direction, and discuss the future direction of EHR.

Half-Day Workshop
Systems Biology of Cellular Signaling
13:30-17:30
1102 (11th Floor)
Registration Required

Organizer: Shinya Kuroda

Speakers:
1. Entry into and Exit from the Cell Cycle are Stochastic Cell Fate Decisions Regulated by Cell Signaling - Tobias Meyer
2. Microfluidic Platforms for Spatiotemporally Resolved Experimentation - Teruo Fujii
3. Imaging and Control of Biological Functions Using Protein-Fragment Reconstitution Analyses - Takeaki Ozawa
4. System Identification of Cellular Information Processing - Shin Ishii
5. Information Coding of ERK Signaling Networks - Shinya Kuroda

Biological systems can process information and exert functions in the presence of inherent variability in expression levels and activity of molecules. Such variability generates diversity of biological functions including cell-fate decisions. In this symposium, inherent variability and information coding in biological systems will be discussed by having speakers from experimental and theoretical sides.

Half-Day Workshop
Whole-Body Computational Anatomy and its Application to Computer Aided Diagnosis and Therapy
13:30-17:30
1005 (10th Floor)
Registration Required

Organizer: Yoshinobu Sato

Speakers:
1. Whole-Body Anatomical Landmark Modeling - Yoshitaka Masutani
2. Whole-Body Organ Modeling - Hiroshi Fujita
3. Towards Complete Understanding of Whole-Body CT Images - Yoshinobu Sato
4. Multi-Scale Organ Modeling: from Macro to Micro - Noboru Niki
5. Computational Anatomy for Diagnostic and Therapeutic Assistance
6. Technical Development - Kensaku Mori
7. Clinical Perspectives - Makoto Hashizume
8. Computational Anatomy for Autopsy Imaging
9. Technical Development - Akinobu Shimizu
10. Clinical Perspectives - Shoji Kido

Computational Anatomy provides effective means to better understand anatomical variability, to support the diagnosis of disease, to simulate realistically intervention and so on. The depth and spectrum of technological topics in computational anatomy have expanded to encompass all aspects of intelligent segmentation and modeling of complex objects, understanding of 3D images, advanced pattern recognition, man-machine interface technologies, virtual reality technologies, and so on. However, its target has been focused primarily on the brain. Technologies of computational anatomy for the whole body including the chest and abdomen are still at a lower level compared with that for the brain. To close this gap, a research project on "Computational Anatomy for Computer-Aided Diagnosis and Therapy: Frontiers of Medical Image Sciences (Computational Anatomy in short)" has been organized in 2009. It is supported by the Grant-in-Aid for Scientific Research on Innovative Areas from the Ministry of Education, Culture, Sports, Science and Technology, Japan. This project aims to establish a new discipline which provides a mathematical framework to deal with human anatomy primarily focused on chest and abdominal areas based on medical images. The challenges consist of (1) development of theories for representation of anatomical models that cover inter-individual variability in shape and topology and its construction through statistical analysis of population data, (2) investigation of methodologies for precise and robust retrieval of anatomical information from medical images, virtually equivalent to real human body dissection, and (3) development of innovative technologies assisting medical diagnosis and interventions based on computational anatomy. The outcomes are expected to contribute to advanced medicine, basic biomedical research, medical education, and information science. In this workshop, the progress of the "Computational Anatomy" project is overviewed.

Half-Day Workshop
Innovation in Ultrasound Imaging
13:30-17:30
1007 (10th Floor)
Registration Required

Organizer: Kohji Masuda

Speakers:
1. Novel Imaging Technology by Fusion of Ultrasound and Optics - Tsuyoshi Shiina
2. High Frequency Ultrasound Imaging for Assessment of Biomechanics - Yoshifumi Saijo
3. Multiple Frequency Ultrasonic Imaging using Multi-Resonance Piezo-Electric Transducer - Iwaki Akiyama
4. Crystal Ball into Ultrasonic Imaging - William D. O'Brien, Jr.
5. Ultrasonic Imaging and Assessment Techniques of in-situ Tissue-Engineering Vasculature - Naotaka Nitta
6. High Frame Rate Echocardiography using Parallel Beamforming - Hideyuki Hasegawa
7. Real-Time High-Resolution Ultrasound Imaging for Human Carotid Artery using Adaptive Beamforming Technique - Hirofumi Taki

Recently main focus on ultrasound in medicine might be recognized to be shifted from diagnosis to treatment, because of the rapid development of therapeutic advance of ultrasound, e.g. HIFU (High intensity focused ultrasound). However, ultrasound treatment with high accuracy requires precise ultrasound imaging method, which is indispensable and unchangeable into other imaging modalities. Furthermore, new technologies for ul-

trasound imaging have a possibility to invite us to the world that we have never seen before. In this workshop, by inviting world-leading researchers, recent movement in this area is going to be elucidated, which includes techniques for elasticity measurement, high frequency imaging, multiple frequency imaging, novel beamforming and combinations with other modalities, not only to improve the quality of ultrasound diagnosis but also to enhance the possibility of preventive care.

Half-Day Workshop
g.tec BCI and Spike Workshop
13:30-17:30
1001 (10th Floor)
Registration Required

Organizer: Robert Prueckl

Speakers:
1. Fundamentals - Robert Prueckl
2. Invasive BCI's in Humans - Kyousuke Kamada
3. Motor Imaginery, P300, and SSVEP based BCI's - Andrzej Cichocki
4. Invasive BCI's in Animals - Junichi Ushiba

Brain-computer interfaces (BCI's) can be realized with EEG, ECoG, or spike activity recorded from the brain. A BCI translates brain waves into signals which can be interpreted by computers either to make statements about the brain itself, or to control an attached output device. BCI's have been developed during the last years mainly for people with severe disabilities to improve their quality of life. During the workshop we will introduce several approaches to EEG-based BCIs, as well as research that uses invasive electrophysiological data acquisition methods in animals as well as in humans. Examples are the usage of hippocampal place cells to reconstruct the position of an animal in space, the usage of the rat's cerebellum to investigate motor learning functions, or human functional brain mapping using ECoG.In each experimental setting different types of electrodes and amplifiers are used. The workshop will explain the necessary hardware and software components in order to run experiments like the mentioned successfully, using different biosignal modalities and recording settings. Real-time experiments using EEG data like motor imagery, P300 and steady state evoked potentials (SSVEP) for spelling and robot control during the workshop will show you the required components in action and provide detailed insight into the necessary steps to successfully perform BCI studies. This will speed up your own research.

Half-Day Workshop
Workshop on Large Data Gathering amd Bridges to Electronic Health Records
13:30-17:30
1004 (10th Floor)
Registration Required

Organizer: Nikolaos Maglaveras

Speakers:
1. Setting the Scene for the Bridging of Large Data Produced Medical Information and Knowledge with Medical Information Systems - Vassilis Koutkias, Nicos Maglaveras
2. Big Data in Leukemia Research and Treatment: the case of CLL in Translational and Personalized Health - Kostas Stamatopoulos
3. Pattern Recognition Based Data Reduction of Telemonitoring Streams for Efficient Storage in HER - Jorge Henriques
4. Large Data Gathering in Cardiovascular Diseases and their Added Value on Medical Information through the Medical Legacy Systems - Harald Reiter
5. Modeling Approaches Based on Large Data Gathering on Adherence and Complications: Communicating Schemas of the Semantics to the EHRs - Ioanna Chouvarda
6. Monitoring and Analysis of Patient Performances by Wearable Motion Sensors in Clinical and Rehabilitation Fields - Masaki Sekine

The technological breakthroughs related to telehealth monitoring through a wealth of micro-nano medical devices has led to an unprecedented large data gathering practice during the past few years. However, large data do not necessarily mean better semantics or better decision support systems or health management.

Thus, there are exciting challenges in managing the multi-sensorial and multi-parametric data, process and extract medically relevant semantics, tailor them into intelligent medical decision support modules, help reconfigure clinical care plans and interventions , produce personalized models of time evolution of critical vital

signs and parameters correlated with treatment plans (e.g. medication) and possible complications as well as the appearance of co-morbidities and thus provide the health care providers a global and reliable view of the patient's status through the medical legacy systems such as the Electronic Health Records (EHRs).

Interoperability, standardization, knowledge management and engineering, seamless interfacing and training/education constitute more horizontal non-the-less much needed added value activities.

In this workshop the current state-of-the-art in the area of bridging large data with medical legacy systems such as EHRs shall be addressed. Experience from a number of European Union and Japan initiatives in this area, with applications ranging from wellbeing data to major chronic diseases and co-morbidities shall be presented.

PowerPoint/Poster Clinic: Effective Presentation Design and Delivery
09:00-12:00
1010 (10th Floor)
Open to all registered conference attendees

Are you nervous about your upcoming PowerPoint/Poster presentation, but have time for some last minute words of wisdom? For many of us, oral communication is the key for sharing ideas and research; however, both PowerPoint and Poster presentations offer visual tools which can make our talks infinitely more accessible, uncomplicated and effective. You will also receive some all-round pointers on the "do's" and "don'ts" of preparing and delivering an effective and even captivating presentation. Spaces are limited.

Technical Writing and Manuscript Preparation
13:00-16:00
1010 (10th Floor)
Open to all registered conference attendees

From start to finish, the entire writing process of an academic publication will be covered in this session. The talks will first provide an overview of the structure of a scientific article, and will outline methods for improving your writing skills. A review of the editorial process will follow, whereby the salient "do's" and "don'ts" will be discussed. The overall aim of this session is to help you improve your technical writing, explain the science/engineering you are working on, and inevitably, get your work published.

EMBS Region 10 Chapter Chair's Meeting
15:00-17:00
10-2 (10th floor)
Open to all EMBC13 participants who are interested in EMBS membership and chapter activities.

Introduction to IEEE EMBS (Bruce Wheeler)
How to run a chapter (Shaun Cloherty)
Open forum on EMBS membership and chapter activities (All participants)
Proposal of new EMBS chapter (Potential chapter chairs)

Thursday, 4th July 2013

General Program

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
08:00 - 09:30
Open to all registered conference attendees

Student Paper Competition Session I
Room 805 (8th Floor)
08:00 – 09:30
Open to all registered conference attendees

Finalists of the Student Paper Competition present their papers in three special sessions. First, second and third place winners will be selected and receive monetary awards. The award ceremony will take place at 10:45am before the Plenary session on Friday in the Large Hall (5th Floor).

Theme Keynote Lecture
New Generation of Personal Health Systems Enabling Quality Health Data and Information Gathering and Use
08:00 - 09:30
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Nicos Maglaveras, Aristotle University - Certh, Greece

Exhibits
Visit the exhibits located on the 3rd Floor, Event Hall
09:00 - 17:00
Open to all registered conference attendees

Poster Session and Coffee Break
Located on the 3rd Floor, Event Hall
09:30 - 11:00
Open to all registered conference attendees

EMBC'13 Opening Remarks & Welcome
11:00 - 11:30
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Bruce Wheeler-2013 EMBS President

Keynote Lecture
Connecting Providers, Payers and Patients
11:00 - 12:00
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: John Halamka- Harvard Medical School

Lunch with Leaders SOLD OUT
12:30 – 13:30
Cube Cinq (5th Floor)
Registration required

Organizer: Lisa Lazareck- Welcome Trust
Subhamoy Mandal- Technische Universitat

Hungry for a chat? All EMBS students are invited to register to one (of three) free lunches at the EMBC'13. Approximately ten students are seated per table where leaders of the biomedical engineering community are waiting to engage in informal conversation over a delicious and complimentary lunch. This is a rare and invaluable opportunity for you, as a student, to talk to a world leader, get some advice and network in your field. Registration in advance is required, as spaces are limited. Students may only attend one out of the three Lunch with Leaders. The list of Leaders in attendance is subject to change due to scheduling conflicts with the Conference.

Special Session: Hypertension: Pathophysiology and Therapy
Room 1102 (11th Floor)
13:30-15:00
Open to all registered conference attendees

Organizer Takuya Kishi (Kyushu Univ.)

Abstract Hypertension is a major risk for cardiovascular diseases, such as ischemic heart disease, heart failure, and/or arrhythmia. Previous many clinical and basic research studies have revealed various factors to induce hypertension, and we have already had many pharmacological depressor agents. Furthermore, recently, several device therapies for hypertension have come to be available. However, the precise mechanisms in the pathophysiology of hypertension are remained not to been fully determined. Now, we must review and discuss again about the hypertension.

Talks
1. Management of Hypertension in New Era of Renal Denervation - Kazuomi Kario (Jichi Medical Univ.)
2. Blood Pressure Variability in Hypertension - Kazuo Eguchi (Jichi Medical Univ.)
3. Abnormal Sympathoexcitation in Hypertension - Takuya Kishi (Kyushu Univ.)
4. Renin-Angiotensin System in Hypertension - Ryuichi Morishita (Osaka Univ.)

Special Session: A Decade of Progress in Basic Research in Pulmonary Hypertension
Room 1203 (12th Floor)
13:30-15:00
Open to all registered conference attendees

Organizers Keiko Takihara (Osaka Univ.), Kohtaro Abe (Kyushu Univ.)

Abstract Pulmonary arterial hypertension (PAH) leads to right heart failure and death. This disease is characterized by progressive narrowing of small pulmonary arteries and arterioles and a sustained increase in pulmonary vascular resistance. Despite recent advances in treatment, severe pulmonary hypertension is still fatal. A better understanding of the pathophysiological, genetic and molecular mechanisms in the development of PAH is urgently needed. In this session, we would like to discuss recent basic topics for the experimental studies for PAH.

Talks
1. A Pathophysiology of Pulmonary Arterial Hypertension - Kohtaro Abe (Kyushu Univ.)
2. Gene Mutations in Pulmonary Arterial Hypertension - Tsuyoshi Ogo (National Cerebral and Cardiovascular Center)
3. A Molecular Mechanisms for the Development of PAH - Aiko Ogawa (National Hospital Organization Okayama Medical Center)

Special Session: Biomedical Innovations and Applied Business Network
Room 1101 (11th Floor)
13:30-18:00
Open to all registered conference attendees

Organizer Yukihisa Namiki (World Intellectual Property Holdings Inc.)

Abstract This session is uniquely organized for participants to develop networks with biomedical related specialists and companies. Tours of Japanese local biomedical companies, small talks and dinner gathering with the speakers will be available. Your registration from the website of this session (http://www.biomedicalip.com) is necessary for participating in the tours and the dinners. Contact at info@biomedicalip.com.

Talks TBD

Student Paper Competition Session II
Room 805 (8th Floor)
13:30-15:00
Open to all registered conference attendees

Finalists of the Student Paper Competition present their papers in three special sessions. First, second and third place winners will be selected and receive monetary awards. The award ceremony will take place at 10:45am before the Plenary session on Friday in the Large Hall (5th Floor).

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
13:30-15:00
Open to all registered conference attendees

Theme Keynote Lecture
Manipulative Neuroscience Realized as Decoded Neurofeedback
13:30-15:00
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Mitsuo Kawato ATR, Japan

Poster Session and Coffee Break
Located on the 3rd Floor, Event Hall
15:00-16:30
Open to all registered conference attendees

Special Session: Pathophysiology and Treatment of Abnormal Respiratory Regulation of Patients with Cardiovascular Disease
Small Hall (5th Floor)
16:30-18:00
Open to all registered conference attendees

Organizers Ryuji Nohara (Kitano Hospital), Taiki Higo (Kyushu Univ.)

Abstract Recently, it has come to be well known that disturbance of respiratory regulation during exercise, and also in sedative condition or during sleep in patients with cardiovascular disease. It is not only the result of hemodynamic abnormality due to cardiovascular disease, but also the risk of worsening prognosis. In this special session, we are going to have 2 lectures by specialists in Japan. Dr. Itoh will give a lecture on the usefulness of measurements of oxygen uptake during exercise in understanding of hemodynamic abnormalities in patients with cardiovascular disease, and Dr. Asanoi will over view the pathophysiology and treatment of respiratory instability in patients with chronic heart failure. He will suggest that the treatment of respiratory abnormality will improve the prognosis of patients with cardiovascular disease.

Talks

1. Oxygen Uptake Dynamics Tells the Abnormality of Cardiovascular System during Exercise - Haruki Itoh (Sakakibara Heart Institute Hospital and Clinics)
1. Pathophysiology and Treatment of Respiratory Instability in Patients with Chronic Heart Failure - Hidetsugu Asanoi (Imizu City Hospital)

*This session is supported by Bayer Yakuhin, Ltd.

Student Paper Competition Session III
Room 805 (8th Floor)
16:30-18:00
Open to all registered conference attendees

Finalists of the Student Paper Competition present their papers in three special sessions. First, second and third place winners will be selected and receive monetary awards. The award ceremony will take place at 10:45am before the Plenary session on Friday in the Large Hall (5th Floor).

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
16:30-18:00
Open to all registered conference attendees

Theme Keynote Lecture
Relevant technology for the future of surgery ? how should we pick our winners?
16:30-18:00
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Catherine Mohr, Intuitive Surgical

Student Chapter/Club Development-Meet and Become Leaders
Conference Hall (12th Floor)
18:00 – 19:30
Open to all registered conference attendees

The goal here is to share examples of how Student Chapters and Clubs have been developed in different places around the world, and to provide immediate answers to novice questions from people who have actually done the work very recently. Experienced Chapter Leaders will act as panellists for a Q&A session, including last year's Best Chapter/Club Award Winners, recent Winners, and a Student Chapter Faculty Adviser. All levels of interest are welcome for avid volunteers; i.e., you don't have to want to change the world – just a small piece of it!

Attendee & Student Welcome Reception
19:30 - 21:30
Rihga Royal Hotel- Kourin room (3rd Floor) and Sanraku room (2nd Floor)
Registration required - Guests of students may purchase tickets.

This year's EMBS conference will hold one reception where students and attendees come together for this great networking opportunity. The reception will include open bar and heavy Hor' D Oeuvres.

Friday, 5th July 2013

General Program

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
08:00 - 09:30
Open to all registered conference attendees

Theme Keynote Lecture
Modeling Heart Function and Dysfunction
08:00-09:30
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Natalia Trayanova- Johns Hopkins University

Special Session: A Decade of Progress in Diagnostic Assessments and Treatments for Pulmonary Hypertension
Room 1007 (10th Floor)
08:00-09:30
Open to all registered conference attendees

Organizer Noriaki Emoto (Kobe Phamaceutical Univ.)

Abstract Severe idiopathic and thromboembolic pulmonary hypertension are still fetal disease, characterized by high pulmonary arterial pressure and subsequent right heart failure. To cure the patients with pulmonary hypertension, early diagnosis and treatments are needed. Recently, a progress of diagnostic technologies and various drug agents has dramatically improved survival in the patients with idiopathic pulmonary arterial hypertension. Furthermore, the balloon pulmonary angioplasty has improved symptoms in the patients with inoperable chronic thromboembolic pulmonary hypertension. In this session, we would like to discuss diagnostic assessments and treatments for pulmonary hypertension.

Talks

1. How to Diagnose Pulmonary Hypertension and Right Heart Failure - Kaoru Dohi (Mie Univ)
2. Treatments for Idiopathic Pulmonary Arterial Hypertension - Yuichi Tamura (Keio Univ.)
3. Balloon Pulmonary Angioplasty Procedure for Chronic Thromboembolic Pulmonary Hypertension - Aiko Ogawa (National Hospital Organization Okayama Medical Center)

Exhibits
Visit the exhibits located on the 3rd Floor, Event Hall
09:00 - 17:00
Open to all registered conference attendees

Undergraduate Research/Design Poster Session
Located on the 3rd Floor, Event Hall D
09:30-11:00
Open to all registered conference attendees

This is the first of an ongoing series of forums within the annual Engineering in Medicine and Biology Conference in which undergraduate bioengineering research and/or design work can be presented within a friendly and supportive environment. If you are an undergraduate student, this session provides you with the unique opportunity to showcase a research or design project you have worked on to leaders in the BME field, and to network with graduate students and potential faculty mentors. First (corresponding) authors must be registered in an undergraduate program in bioengineering or other engineering field in the academic year immediately prior to, or during, EMBC'13

Poster Session and Coffee Break
Located on the 3rd Floor, Event Hall
09:30 - 11:00
Open to all registered conference attendees

Keynote Lecture
Recent Progress in iPS Cell Research Towards Regenerative Medicine
11:00-12:00
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Shinya Yamanaka, Center for iPS Cell Research and Application, Kyoto University

Meet the Editors of EMBS Publications
Conference Hall (12th Floor)
15:00-16:00
Open to all registered conference attendees

The "Meet the Editors" session will follow the "Technical Writing and Manuscript Preparation session" where each EiC will shortly present their journal and what they are looking for an a manuscript submission. This will be followed by interactive Q&A where participants have an opportunity to learn about the IEEE EMBS Journal and Magazine publications.

Lunch with Leaders SOLD OUT
12:30 – 13:30
Cube Cinq (5th Floor)
Registration required

Organizer: Lisa Lazareck- Welcome Trust
Subhamoy Mandal- Technische Universitat

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Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
13:30-15:00
Open to all registered conference attendees

Theme Keynote Lecture
Engineering Memories: A Cognitive Neural Prosthesis for Restoring and Enhancing Memory Function
13:30-15:00
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Theodore W. Berger, University of Southern California

Special Session: Advances for Diabetes in Japan: Flying to Biomedical Engineering from Physiology
Room 806 (8th Floor)
13:30-15:00
Open to all registered conference attendees

Organizer Noriaki Emoto (Kobe Phamaceutical Univ.)

Abstract Diabetes mellitus is associated with a reduced life expectancy, and previous many clinical and basic research studies have revealed various underlying causes in the pathophysiology in diabetes mellitus. We have already had many approaches and effective therapies for hyperglycemia and its complications. However, unfortunately, the improvement in outcomes for individual patients with diabetes mellitus has not resulted in similar improvements from the public health perspectives. The worldwide prevalence of diabetes mellitus has continued to increase dramatically. In this special session, we will review and discuss again about diabetes mellitus.

Talks
1. The Diabetes Pandemic: an Introduction - Kunihisa Kobayashi (Fukuoka Univ. Chikushi Hospital)
2. Inter-Organ Metabolic Communication in Glucose and Energy Homeostasis - Hideki Katagiri (Tohoku Univ.)
3. Mitochondrial Dynamics in Energy Homeostasis - Masatoshi Nomura (Kyushu Univ.)
4. Diagnosis for Diabetes Complication in New Era - Toyoshi Inoguchi (Kyushu Univ.)
5. Smartphone-Based Self-Management for Diabetes - Hideo Fujita (Univ. of Tokyo).

Special Session: Basic Understanding of Heart Failure, Present and the Future
Room 1005 (10th Floor)
13:30-15:00
Open to all registered conference attendees

Organizers Tomomi Ide (Kyushu Univ.), Daniel Raess (Abiomed, Inc.)

Abstract Heart failure: prevalence, basic pathophysiology, and current therapeutics, including left ventricular assist system (LVAS).

Talks
1. Pathophysiological Basis of Heart Failure: Lessons from Mice and Patients - Hiroyuki Tsutsui (Hokkaido Univ.)
2. Optimal Medical Treatment of Chronic Heart Failure: Current Understandings and Future Prospects - Tohru Masuyama (Hyogo College of Medicine)
3. Japanese Trial and Post-Market Clinical Results of EVAHEART LVAS - Kenji Yamazaki (Tokyo Women's Medical Univ.)

Poster Session and Coffee Break
Located on the 3rd Floor, Event Hall
15:00-16:30
Open to all registered conference attendees

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
16:30-18:00
Open to all registered conference attendees

Theme Keynote Lecture
Grand Challenges in Cardiovascular Health Informatics
16:30-18:00
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Yuan-Ting Zhang, Chinese University of Hong Kong

Saturday, 6th July 2013

General Program

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
08:00-09:30
Open to all registered conference attendees

Theme Keynote Lecture
Integrated Bio-Nano-CMOS-Sensors for Remote Monitoring of Human Metabolism toward Applications in Personalized Medicine
08:00-09:30
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Sandro Carrara, Ecole Polytechnique Federale de Lausanne

Exhibits
Visit the exhibits located on the 3rd Floor, Event Hall
09:00 - 17:00
Open to all registered conference attendees

Poster Session and Coffee Break
Located on the 3rd Floor, Event Hall
09:30-11:00
Open to all registered conference attendees

EMBS Awards Ceremony
10:45-11:15
Large Hall (5th Floor)
Open to all registered conference attendees

Keynote Lecture
IT Convergence & Healthcare
11:15-12:15
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Yoonchae Cheong, Senior Vice President, Samsung Electronics Co. Ltd.

Lunch with Leaders
12:30 – 13:30
Cube Cinq (5th Floor)
Registration required

Organizer: Lisa Lazareck- Welcome Trust
Subhamoy Mandal- Technische Universitat

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WIE Lunch and Minisymposium
Women in Biomedical Engineering and Health Informatics: A Lifetime Journey Integrating Diversity
12:00 – 14:00
801-802 (8th Floor)
Registration required

The career choice of biomedical engineering and/or health informatics does not exist within a vacuum but rather must work in harmony with other aspects of our lives. Just as our careers are not static our lives outside of our careers are also not static. We have the potential to become partners, mothers, fathers, careers for our parents, grandparents for example and all of these roles mean that our work/life dynamic is constantly changing. A valuable session for anyone whether student or not, interested in learning more about Biomedical Engineering and Health Informatics as a career choice for women and men over a lifetime. Prominent women within the domains Biomedical Engineering and Health Informatics will present their real life case studies of living the journey through changing times in both career and family. Utilize the fantastic networking opportunity that will conclude this session to build and establish new professional networks with other women and men interested in your fields of expertise. Bring your contact details and be ready to make new contacts that are relevant for you

Did you know that joining IEEE Women In Engineering (WIE) is free for Students, Graduate Student Members and Life Members? (Dues are otherwise US$25 annually).

Registration in advance is required for the luncheon, as spaces are limited. Both men and women are encouraged to attend, and this event is open to non-students. Lastly, attendance for the full two-hours is required, as the talks and food service intertwine.

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
13:30-15:00
Open to all registered conference attendees

Theme Keynote Lecture
An overview of VPH/Physiome activities: A (bio) engineering opportunity
13:30-15:00
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Peter Hunter, Bioengineering Institute, University of Auckland

Poster Session and Coffee Break
Located on the 3rd Floor, Event Hall
15:00-16:00
Open to all registered conference attendees

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
16:30-18:00
Open to all registered conference attendees

Theme Keynote Lecture
Signal Processing Guided by Physiology: Making the Most of Cardio-Respiratory Signals
16:30-18:00
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Pablo Laguna, University of Zaragoza

Career Advice: Short-Term, Long-Term and Everything In-Between
801-802 (8th Floor)
18:00-19:30
Open to all registered conference attendees

Are you wondering what to do next in your career? We have assembled a panel of diverse and prestigious speakers to provide their insight on the job market today – with representation from academia, the private sector, government and regulators/funders. The discussion will be moderated and the session will focus on pragmatic advice for today, intermingled with future trends and tips for the future.

GOLD & Student Networking Reception
19:30 - 21:30
Grande Toque (12th Floor)

IEEE and EMBS want our young engineers to meet each other! Therefore, for the seventh year, we are hosting the IEEE EMBS-GOLD & Student Networking Reception. GOLD, or Graduates Of the Last Decade, is an IEEE entity whose programs work at providing benefits for young IEEE members after their 'Student Member' status has expired. If you are an IEEE Member who graduated with your first professional degree within the last ten years, including all graduate student members, you are automatically part of IEEE GOLD. Around the world, there are over 47,000 GOLD members and 100 GOLD Affinity Groups. The continuing goal of GOLD is to find out what students need from their Society at this particular stage of their careers and how their Society can in turn offer additional value of membership. If you are indeed GOLD, you are cordially invited to network with your peers, some of whom are working in industry, at the Reception's informal and brilliantly fun environment. Registration in advance is required, as spaces are limited. There is a small fee for attendance, but food and drink are provided.

Sunday, 7th July 2013

General Program

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
08:00-09:30
Open to all registered conference attendees

Theme Keynote Lecture
Therapeutic and Diagnostic Decision Support from 3D Medical Data based on Computational Anatomy
08:00-09:30
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Yoshinobu Sato, Osaka University

Coffee Break
Located on the TBD
09:30-10:00
Open to all registered conference attendees

Keynote Lecture
Systems Biology and Systems Biomedicine: Integrating Systems Sciences and Biomedical Sciences
09:45-10:45
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Hiroaki Kitano, Okinawa Institute of Science & Technology Graduate University

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
11:00-12:30
Open to all registered conference attendees

Theme Keynote Lecture
Point-of-Care Healthcare Technologies (POCHT): A Paradigm Shift in Affordable Quality Global Healthcare
11:00-12:30
Large Hall (5th Floor)
Open to all registered conference attendees

Speaker: Atam Dhawan- New Jersey Institute of Technology

Oral Sessions
Rooms on the 5th, 8th, 10th, 11th & 12th Floors
13:30-15:00
Open to all registered conference attendees