2018 CBEES-BBS OKINAWA, JAPAN CONFERENCE ABSTRACT

2018 5th International Conference on Biomedical and Bioinformatics Engineering (ICBBE 2018)

November 12-14, 2018

Okinawa Institute of Science and Technology Graduate University, Japan

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Poster Session

Introduction

Welcome to 2018 5th International Conference on Biomedical and Bioinformatics Engineering (ICBBE 2018) which is sponsored by Hong Kong Chemical, Biological & Environmental Engineering Society (CBEES), Biology and Bioinformatics (BBS) and co-sponsored by Okinawa International University, Japan. The objective of 2018 5th International Conference on Biomedical and Bioinformatics Engineering (ICBBE 2018) is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Biomedical and Bioinformatics Engineering.

Papers will be published in one of the following conference proceedings or journals:

International Conference Proceedings by ACM (ISBN: 978-1-4503-6561-1), which will be archived in the ACM Digital Library, indexed by Ei Compendex and Scopus, and submitted to be reviewed by Thomson Reuters Conference Proceedings Citation Index (ISI Web of Science).

International Journal of Bioscience, Biochemistry and Bioinformatics (IJBBB, ISSN: 2010-3638), and will be included in the Engineering & Technology Digital Library, and indexed by WorldCat, Google Scholar, Cross ref, ProQuest.

Conference website and email: http://www.icbbe.com/; icbbe@cbees.net

Presentation Instruction

Instruction for Oral Presentation

Devices Provided by the Conference Organizer:

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)
Digital Projectors and Screen
Laser Stick

Materials Provided by the Presenters:

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)

Duration of each Presentation (Tentatively):

Regular Oral Presentation: about **12** Minutes of Presentation and **3** Minutes of Question and Answer
Invited Speech: about **15** Minutes of Presentation and **5** Minute of Question and Answer
Keynote Speech: about **40** Minutes of Presentation and **5** Minutes of Question and Answer

Instruction for Poster Presentation

Materials Provided by the Conference Organizer:

The place to put poster

Materials Provided by the Presenters:

Home-made Posters
Maximum poster size is A1
Load Capacity: Holds up to 0.5 kg
The duration of each poster is 5 minutes of brief introduction.

Best Presentation Award

One Best Oral or Poster Presentation will be selected from each presentation session, and the Certificate for Best Oral or Poster Presentation will be awarded at the end of each session on November 12 and 13, 2018.

Keynote Speaker Introduction

Keynote Speaker I

Prof. Jose Nacher
Toho University, Japan

Prof. Jose Nacher received his Ph.D. in Theoretical Physics from Valencia University. From 2003-2007 he was a postdoctoral research fellow at the Bioinformatics Center, Institute for Chemical Research (ICR), Kyoto University. He was awarded with a JSPS Research Fellowship at the ICR, Kyoto University (2005-2007). From 2007-2012, he was a Lecturer and an Associate Professor at the Department of Complex and Intelligent Systems, Future University, concurrently with a visiting Associate Professor appointment at the Bioinformatics Center, ICR, Kyoto University (2011-2102) and Future University (2012-2013), respectively. From 2012, he was an Associate Professor at the Department of Information Science, Toho University. Since 2016, he is a Professor at the Department of Information Science, Faculty of Science, Toho University. He is a reviewer of more than 30 international journals in his field, serves as an Editorial Review Board of the International Journal of Knowledge Discovery in Bioinformatics (IJKDB) since 2009, as an Editorial Board of the Computational Biology Journal since 2012 and as an Editorial Board Member of Scientific Reports NPG since 2015. Prof. Nacher Lab's bioinformatics research interests include the development and application of novel mathematical methods and algorithms in systems biology and complex biological networks.

Topic: "*Controllability and Data Mining Integrating Transcriptome Data and Biological Networks*"

***Abstract*—**Recent studies have integrated various types of 'omics' data from metabolic pathways and protein interaction networks to gene expression profiles. However, integration of biological network structures with gene expression profiles have been less investigated from a controllability perspective. Here, we show some theoretical and data-driven based results on this approach. On the other hand, deep learning techniques are widely used in various fields. Here, we will also discuss our recent research progress on biological sequence analysis as well as in the integration of biological networks with gene expression data using deep learning approaches.

Keynote Speaker II

Prof. Kiyoshi Hoshino
University of Tsukuba, Japan

Prof. Kiyoshi Hoshino received two doctor's degrees; one in Medical Science in 1993, and the other in Engineering in 1996, from the University of Tokyo respectively. From 1993 to 1995, he was an assistant professor at Tokyo Medical and Dental University School of Medicine. From 1995 to 2002, he was an associate professor at University of the Ryukyus. From 2002, he was an associate professor at the Biological Cybernetics Lab of University of Tsukuba. He is now a professor. From 1998 to 2001, he was jointly appointed as a senior researcher of the PRESTO "Information and Human Activity" project of the Japan Science and Technology Agency (JST). From 2002 to 2005, he was a project leader of a SORST project of JST. He served as a member of the "cultivation of human resources in the information science field" WG, Special Coordination Funds for the Promotion of Science and Technology, MEXT, a member of "Committee for Comport 3D Fundamental Technology Promotion", JEITA, and the chairman of the 43rd Annual Meeting of Japanese Society of Biofeedback Research.

Topic: "*Estimation of the Line-of-Sight and Rotational Eye Movement by Tracking of Blood Vessel Images on the Eyeball Sclera*"

***Abstract*—**First, the measurement of the line-of-sight is expected to be effective in screening schizophrenia and dementia, as well as identifying patients with sick-house syndromes and drug addicts. Second, the biometry of the eye rotational movement, where the eyeball rotates around the z axis, is expected to be useful in detecting and quantifying visually-induced motion sickness, 3D sickness, car sickness, dizziness, discomfort, or sudden development of poor physical condition. And third, the gaze and the rotational eye movement influence each other, for instance, in the condition with the head or the body trunk tilted, as seen in playing sports, or where gravitational acceleration may affect the human visual system, as seen in car driving.

This talk therefore focuses on a new method for estimating both the line-of-sight and the rotational eye movement day and night with a high degree of accuracy without imposing a psychological burden on a device-wearer, regardless of brightness of image contents. To meet these expectations, tracing the images of the characteristic template blood vessels is used to measure the user's eye movements. The system can select the most appropriate template image with a characteristic shape according to brightness gradient direction of the edges on the eyeball sclera.

Keynote Speaker III

Assoc. Prof. Junichi Hoshino
University of Tsukuba, Japan

Dr. Junichi Hoshino received Ph.D in Information Engineering from Waseda University, Japan in 1999, and Ph.D in Design Study from University of Tsukuba, Japan in 2012. He is currently an associate professor at University of Tsukuba. He founded Entertainment Computing Lab in 2002, and published over 200 academic papers on entertainment computing, digital storytelling, media art, and game technologies. He is currently a vice chair of IFIP TC14 Entertainment Computing, and a chair of WG14.4 Entertainment Games.

Topic: "*Entertainment and Bioinformatics Engineering*"

***Abstract*—**Entertainment is important for empowering our lives, and also one of the driving force of economical growth. Creating entertaining experiences is also important for many product and service design. However, entertainment have complex multimodal and temporal structure, and difficult to analyze. In this talk, I would like to share entertainment technologies using bioinformatics engineering such as biometric game controller, biofeedback, and analysis of user behaviors. Future international collaboration between entertainment computing and bioinformatics engineering field will be also discussed.

Keynote Speaker IV

Prof. Qingli Li
East China Normal University, China

Prof. Qingli Li received the B.S. and M.S. degrees in computer science and engineering from Shandong University, Jinan, China, in 2000 and 2003, respectively, and the Ph.D. degree in pattern recognition and intelligent system from Shanghai Jiaotong University, Shanghai, China, in 2006. From 2012 to 2013, he was a visiting scholar at Medical Center, Columbia University, New York, USA. He is currently with the Key Laboratory of Polor Materials and Devices, East China Normal University, Shanghai, China. He is the author or coauthor of more than 50 papers published in various international journals and conference proceedings and a Principle Investigator (PI) for the National Natural Science Foundation of China (NSFC) projects. His research interests in biomedical engineering include molecular imaging, biomedical optics, and pattern recognition.

Topic: "*Spectral Imaging and its Biomedical Applications*"

***Abstract*—**Spectral imaging is a technology that integrates conventional imaging and spectroscopy to get both spatial and spectral information from an object. Although this technology was originally developed for remote sensing, it has been extended to the biomedical engineering field as a powerful analytical tool for biological and biomedical research. This presentation introduces the basics of spectral imaging, imaging methods, current equipment, and recent advances in biomedical applications. The performance and analytical capabilities of spectral imaging systems for biological and biomedical imaging are discussed. In particular, the current achievements and limitations of this technology in biomedical engineering are presented. The benefits and development trends of biomedical spectral imaging are highlighted to provide an insight into the current technological advances and its potential for biomedical research.

Keynote Speaker V

Prof. Yen-Wei Chen
Ritsumeikan University, Japan

Prof. Yen-Wei Chen received his B.E. degree in 1985 from Kobe University, Kobe, Japan. He received his M.E. degree in 1987 and his D.E. degree in 1990, both from Osaka University, Osaka, Japan. From 1991 to 1994, he was a research fellow at the Institute of Laser Technology, Osaka, Japan. From October 1994 to March 2004, he was an associate Professor and a professor in the Department of Electrical and Electronic Engineering, University of the Ryukyus, Okinawa, Japan. He is currently a professor at the college of Information Science and Engineering, Ritsumeikan University, Kyoto, Japan. He was a visiting professor at Oxford University, Oxford, UK in 2003 and at Pennsylvania State University, Pennsylvania, USA in 2010. He is also a chair professor at College of Computer Science and Technology, Zhejiang University, Hangzhou, China. He is associate Editors for the International Journal of Image and Graphics (IJIG), and the International Journal of Knowledge-based and Intelligent Engineering Systems. His research focuses on computer vision, medical image analysis and machine learning. He has published more than 300 research papers in these fields. He received various awards, such as Best Paper Award of ICPR2012, Paper Award of Meical Imaging Technology (Journal).

Topic: "*Digital Atlas, Artificial Intelligence and Virtual Reality in Medical Applications*"

***Abstract*—**Atlas of human anatomy is an important teaching tool in the medical community. In the recent years, digital atlases of human anatomy have become popular and hot topics in medical image analysis research field. The basic idea of the digital atlas is to capture the organ variability of its position, shape and voxel intensity (texture) from a training set (either different individuals (inter-patient variability) or the same individual (intra-patient variability)). On the other hand, artificial intelligence (AI) and virtual reality (VR) play important roles in medicine and healthcare. In our Lab (Intelligent Image Processing Lab), we constructed computational abdominal atlas and developed advanced computer-aided detection/diagnosis (CAD) and surgery support systems by combining the atlases with AI and VR. In this keynote, I will talk about current progress and futures of computational anatomy, AI and VR in medical applications.

Keynote Speaker VI

Assoc. Prof. Kuo-Yuan Hwa
National Taipei University of Technology, Taiwan

Dr. Kuo-Yuan Hwa is an associate professor and the director of the Center for Biomedical Industries at the National Taipei University of Technology. Dr. Hwagraduated and received her PhD from the School of Medicine, the Johns Hopkins University. She is the president of the Medical Association for Indigenous Peoples of Taiwan (MAIPT). Dr. Hwa's scientific interests are: 1) nanotechnology and biosensor, 2) new drug discovery for human diseases by proteomics and genomics approaches and 3) glycobiology, especially on enzymes kinetics. She has published 85 conference and journal articles and 10 patents. She has served in many national and international committees. Dr. Hwa has been invited as a speaker for many academic research institutes and universities in China, Korea, Japan and USA. She has been invited as a reviewer, a judge and an editor for international meetings and journals. In addition, one of her currently works is on developing culturally inclusive health science educational program, with both indigenous and western science knowledge for indigenous children.

Topic: "*How to Build an in silico Platform from Bench to Bed Side in the Era of Precision Medicine*"

***Abstract*—**Precision medicine is a medical service model based on individual customization data such as genomics information, cellular molecular data and health record including disease records. Amongst all the human health care, precision medicine is most applicable to cancer prevention and treatment. Cancer is one of the dreadful diseases taking many lives worldwide. It is now clear that cancer is caused by a series of DNA mutations. Many cancer-related genes such as proto-oncogenes have been identified and mapped. Moreover, the formation of cancer is due to genomic mutations, often single nucleotide variant. Spontaneous or environmentally induced mutation occurs in a single cell, which then undergoes multiple cell divisions to form a tumour. Hence establishing cancer-related DNA variants database are important. Although there are many cancer-related DNA database, in this paper we have designed a workflow for establishing a precision medicine database system which consists of up breasted information of genes and DNA variants responsible for causing cancer. We have collected data from different databases and applied computational approach for the elicitation of beneficial outcomes from the large data sets. It will provide assistance to many researchers and clinicians in identifying different DNA variants linked with cancer and can provide the possible personalized healthcare treatment for various cancers.

Keynote Speaker VII

Assoc. Prof. Zhifu Sun
Mayo Clinic, USA

Dr. Zhifu Sun received his medical and pathology training in China and medical informatics training in U.S.A. He practiced surgical pathology for quite some years before switching his focus to genetics, genomics and bioinformatics fields. For the past 15 years he has worked on genetic and molecular epidemiology of lung cancer and applications of bioinformatics and data sciences to medical research and precision medicine, particularly in cancer molecular marker identification, outcome prediction and epigenomics. His recent focus expands to large and heterogeneous data integration, utilization of medical record and image data for personalized medicine. Currently, he is a Consultant and Associate Professor in the Department of Health Science Research and the Associate Director of Bioinformatics Core at Mayo Clinic, Rochester, Minnesota. He has over 110 peer-reviewed publications, with many in high impact journals such as Lancet Oncology, JCO, Cancer Research, Arch Intern Med, Ann Oncol, Bioinformatics and Genomics.

Topic: "*Mine Big Methylome Data for Cancer Early Diagnosis and Drug Response Signatures*"

***Abstract*—**TCGA and CCLE have generated huge amount of genomics data including genome-wide DNA methylation (methylome) for thousands of primary tumors and cancer cell lines, which provide a unique opportunity for biomarker discovery. Each cancer has its own DNA methylation change hallmark and all cancers also share a common signature. These cancer specific and universal cancer markers can be used for early cancer detection by non-invasive method such as liquid biopsy. Moreover, de-methylating agents used in clinic for cancer treatment target methylome but only a fraction of patients benefit from the therapy. Identification of these patients would facilitate precision medicine. However, mining these big genomic data for the most useful information is a daunting challenge and novel and powerful approaches are needed. In this talk I will share our experience using machine learning methodology in this expedition. By analyzing 32 tumor types, we found a few hundred CpG sites that can be used for universal cancer detection with high accuracy (0.988). These universal markers can also accurately identify different tumor subtypes or origin (accuracy 0.91). DNA methylation profiles are strongly correlated with 2 de-methylation agents but not the other 2 which shed light on their different mechanisms of actions and potencies. A set of markers are identified to predict response with high accuracy.

Invited Speaker I

Assoc. Prof. Yan Guo
University of New Mexico, USA

Dr. Yan Guo is an Associate Professor at the Department of Internal Medicine, Division of Molecular Medicine, University of New Mexico. He is also serving as the director of Bioinformatics Shared Resources for the New Mexico Comprehensive Cancer Center. Before joining the University of New Mexico, Dr. Guo served as the Technical Director of Bioinformatics Core for Vanderbilt University for six years. Dr. Guo has substantial experience with NIH funded projects and has served as bioinformatician on over 30 NIH funded grants including SPORE in breast, lung and GI cancers. Dr. Guo's research has been focused on the development of bioinformatics methodology and analysis for genomic studies and has published more than 110 manuscripts in the related fields. Dr. Guo' s latest researches heavily involve applying machine learning, deep learning techniques in biomedical research.

Topic: "*The Applications of Machine Learning in Biomedical Researches*"

***Abstract*—**The concept of machine learning has existed for decades. With the blooming of high throughput genomic technology, machine learning methods have been frequently applied to high throughput genomic data to assist biological researches. Using this opportunity, several concrete examples of machine learning applications in big genomic data will be shown and discussed in depth. These examples include an application of machine learning techniques to identify metabolomics biomarkers for early-stage chronical kidney diseases; how deep learning methods such as convolution neural networks can be used for phenotype classification; and using deep learning method to construct a genome-wide RNA editing prediction model.

Invited Speaker II

Dr. Rajeev Kanth
Savonia University of Applied Sciences, Finland

Dr. Rajeev Kanth was born in Rajbiraj, Nepal, on July 29, 1971. He received Doctor of Science (D.Sc.) in Information and Communication Technology from University of Turku, Finland, in 2013. He is currently working as a Senior Lecturer at the Savonia University of Applied Sciences, Finland where he is focusing on teaching and research on Industrial Internet of Things (IIoT). Previously, he has worked at the Indian Space Research Organization (ISRO), Ahmedabad India, Royal Institute of the Technology (KTH), Stockholm, Sweden and the University of Turku (UTU), Finland, where he has been a Researcher, Post-doctoral Researcher, and the Senior Researcher respectively. His current research interests include image and video analysis, Internet of Things, Big Data Analytics, and the Artificial Intelligence. He has published more than 45 scientific articles in peer-reviewed conference proceedings and refereed journals in the field of computer science and communication technology. He is also a recipient of a certification from Stanford Centre for Professional Development, Stanford University and has presented keynote talks, invited lectures and his research work in more than 25 countries across the world. He has been a member of IEEE communication society, IEEE cloud computing community, IEEE Earth Observation Community, and green ICT community.

Topic: "*Image Analysis and Development of Graphical User Interface for Pole Vault Action*"

***Abstract*—**In recent years, motion estimation analysis has become one of the vital research areas in sport and has attracted the interest of many researchers toward events such as swimming, pole vaulting, and hurdling. In this paper, we present a novel method for determining the step length, speed, and the feet-contact-time on the running track of a pole vault athlete using a mono-camera arrangement. The step length and step frequency are essential descriptors of the approach run in pole vaulting. The approach along a linear trajectory is familiar to many throwing and jumping events. The measurement setting and image processing, as well as the step registration stages such as the block matching and optimal flow algorithm are presented and compared to alternative methods. The validation of the step size and step frequency accuracy is provided, using manually digitized step sizes as the baseline. The proposed methodology is efficient and straightforward, providing immediate feedback to the athlete and coaches. We were also successful in building a basic graphical user interface (GUI) to illustrate pole-vaulting actions during a performance. This research

could be used as an initial step for developing a fully interactive platform that is capable of yielding supportive instructions to the athletes and the coaches on a real-time basis for self-assessment and further improvement.

Brief Schedule for Conference

<table>
<tr><td rowspan="2">Day 1</td><td colspan="3">November 12, 2018 (Monday)
Venue: Lobby of Meeting Room 1
Arrival Registration 10:00-17:50</td></tr>
<tr><td colspan="3">Afternoon Conference

Venue: Meeting Room 1
13:30-13:35 Opening Remarks (Prof. Kiyoshi Hoshino)
13:35-14:20 Keynote Speech I (Prof. Jose Nacher)
14:20-15:05 Keynote Speech II (Prof. Kiyoshi Hoshino)
15:05-15:50 Keynote Speech III (Assoc. Prof. Junichi Hoshino)
15:50-16:20 Coffee Break & Group Photo

Session 1: 16:20-17:50
Venue: Meeting Room 1
Topic: “Image Recognition and Detection”--6 presentations</td></tr>
<tr><td rowspan="6">Day 2</td><td colspan="3">November 13, 2018 (Tuesday) 09:00-18:00</td></tr>
<tr><td colspan="3">Morning Conference (Meeting Room 1)

09:00-09:05 Opening Remarks (Prof. Kiyoshi Hoshino)
09:05-09:50 Keynote Speech IV (Prof. Qingli Li)
09:50-10:35 Keynote Speech V (Prof. Yen-Wei Chen)
10:35-11:00 Coffee Break & Group Photo
11:00-11:45 Keynote Speech VI (Assoc. Prof. Kuo-Yuan Hwa)
11:45-12:30 Keynote Speech VII (Assoc. Prof. Zhifu Sun)</td></tr>
<tr><td colspan="3">Lunch: 12:30-13:40 (Lobby of Meeting Room 1)</td></tr>
<tr><td colspan="3">Afternoon Conference

13:40-14:00 Invited Speech I (Assoc. Prof. Yan Guo)
14:00-14:20 Invited Speech II (Dr. Rajeev Kanth)</td></tr>
<tr><td>Session 2: 14:20-15:50
Venue: Meeting Room 1
Topic: “Image Analysis and Method”

6 presentations</td><td>Session 3: 14:20-15:50
Venue: Meeting Room 2
Topic: “Information Medicine and Technology”
6 presentations</td><td>Session 4: 14:20-15:50
Venue: Meeting Room 3
Topic: “Biomaterials and Drug Development”

6 presentations</td></tr>
<tr><td colspan="3">Coffee Break: 15:50-16:10</td></tr>
</table>

	Session 5: 16:10-17:40 Venue: Meeting Room 1 Topic: "Image Processing and Application" 6 presentations	**Session 6**: 16:10-17:55 Venue: Meeting Room 2 Topic: "Biomedical Engineering" 7 presentations	**Session 7:** 16:10-17:40 Venue: Meeting Room 3 Topic: "Molecular Biology" 6 presentations
	Poster Session: 17:40-18:00		
	18:00-20:00 Dinner (Lobby of Meeting Room 1)		
Day 3	**9:00-17:40 Academic Tour**		

Tips: Please arrive at the Conference Room 10 minutes before the session begins to upload PPT into the laptop.

Detailed Schedule for Conference

November 12, 2018 (Monday)

Venue: Lobby of Meeting Room 1

10:00-17:50	**Arrival and Registration**

Venue: Meeting Room 1

13:30-13:35		**Opening Remarks** Prof. Kiyoshi Hoshino University of Tsukuba, Japan
13:35-14:20		**Keynote Speech I** Prof. Jose Nacher Toho University, Japan Topic: "*Controllability and Data Mining Integrating Transcriptome Data and Biological Networks*"
14:20-15:05		**Keynote Speech II** Prof. Kiyoshi Hoshino University of Tsukuba, Japan Topic: "*Estimation of the Line-of-Sight and Rotational Eye Movement by Tracking of Blood Vessel Images on the Eyeball Sclera*"
15:05-15:50		**Keynote Speech III** Assoc. Prof. Junichi Hoshino University of Tsukuba, Japan Topic: "*Entertainment and Bioinformatics Engineering*"
15:50-16:20	**Coffee Break & Group Photo**	
14:20-17:50	**Session 1, Meeting Room 1** Topic: "Image Recognition and Detection"	

November 13, 2018 (Tuesday)

Venue: Conference Center

Morning Conference Venue: Meeting Room 1		
09:00-09:05		**Opening Remarks** Prof. Kiyoshi Hoshino University of Tsukuba, Japan
09:05-09:50		**Keynote Speech IV** Prof. Qingli Li East China Normal University, China Topic: "*Spectral Imaging and its Biomedical Applications*"
09:50-10:35		**Keynote Speech V** Prof. Yen-Wei Chen Ritsumeikan University, Japan Topic: "*Digital Atlas, Artificial Intelligence and Virtual Reality in Medical Applications*"
10:35-11:00		**Coffee Break & Group Photo**
11:00-11:45		**Keynote Speech VI** Assoc. Prof. Kuo-Yuan Hwa National Taipei University of Technology, Taiwan Topic: "*How to Build an in silico Platform from Bench to Bed Side in the Era of Precision Medicine*"
11:45-12:30		**Keynote Speech VII** Assoc. Prof. Zhifu Sun Mayo Clinic, USA Topic: "*Mine Big Methylome Data for Cancer Early Diagnosis and Drug Response Signatures*"
12:30-13:40		**Lunch (Lobby of Meeting Room 1)**
13:40-14:00		**Invited Speech I** Assoc. Prof. Yan Guo University of New Mexico, USA Topic: "*The Applications of Machine Learning in Biomedical Researches*"
14:00-14:20		**Invited Speech I** Dr. Rajeev Kanth Savonia University of Applied Sciences, Finland Topic: "*Image Analysis and Development of Graphical User Interface for Pole Vault Action*"

Afternoon Conference			
14:20-15:50	**Session 2:** 14:20-15:50 **Meeting Room 1** Topic: "Image Analysis and Method" 6 presentations	**Session 3:** 14:20-15:50 **Meeting Room 2** Topic: "Information Medicine and Technology" 6 presentations	**Session 4:** 14:20-15:50 **Meeting Room 3** Topic: "Biomaterials and Drug Development" 6 presentations
15:50-16:10	**Coffee Break**		
16:10-17:55	**Session 5**: 16:10-17:40 **Meeting Room 1** Topic: "Image Processing and Application" 6 presentations	**Session 6**: 16:10-17:55 **Meeting Room 2** Topic: "Biomedical Engineering" 7 presentations	**Session 7:** 16:10-17:40 **Meeting Room 3** Topic: "Molecular Biology" 6 presentations
18:00-20:00	**Dinner (Lobby of Meeting Room 1)**		

Note: (1) The registration can also be done at any time during the conference.
(2) The organizer doesn't provide accommodation, and we suggest you make an early reservation.
(3) One Best Oral or Poster Presentation will be selected from each oral presentation session, and the Certificate for Presentation will be awarded at the end of each session on November 12 and 13, 2018.

Let's move to the session!

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, November 12, 2018 (Monday)

Time: 16:20-17:50

Venue: Meeting Room 1

Session 1: Topic: "Image Recognition and Detection"

Session Chair: Prof. Jiing-Yih Lai

A2013 Session 1 Presentation 1 (16:20-16:35)	Improving Accuracy for Authenticity Inspection of Brand Items Using Logo Region Detection Processing **Ryo Inoue**, Tomio Goto and Satoshi Hirano Nagoya Institute of Technology, Japan *Abstract*—In recent years, manufacturing technology of counterfeit brand products has advanced, and it is becoming very difficult for humans to distinguish many counterfeit products. In this paper, we propose an inspection system using two image matching methods to realize authenticity inspection of logo parts of brand items by recognize those images. In the first experiment, we compare the similarity evaluation performance by NCC (Normalized Cross-Correlation) and POC (phase-only correlation) using images of actual brand products. In the next experiment, we propose logo region detection processing using edge images as preprocessing of image matching with the aim of improving inspection accuracy of images containing many background components. Experimental results show that it is possible to separate genuine and fake more accurately by evaluating similarity by POC. Moreover, we confirmed that by adding the logo region detection processing, the background component of the image was reduced and highly accurate inspection was possible.
A2015 Session 1 Presentation 2 (16:35-16:50)	Overlapped Fingerprint Separation Based on Deep Learning Chi-Hsiao Yih, Jui-Lung Hung, Jin-An Wu and **Li-Ming Chen** Tamkang University, Taiwan *Abstract*—Biometrics and artificial intelligence play the important roles of recent technology. In biometrics, fingerprint is one of the most widely used identification methods. However, most of this kind applications only focus on single fingerprint processing but lack discussion of recognition of overlapped fingerprint due to its complexity. In fact,

	overlapped fingerprints are much more common on the criminal spot and nowadays we still rely on the inefficient manual operation to separate those overlapped fingerprints. So, we purpose our automatic, accurate, and even more efficient method using convolutional neural network to deal with the overlapped fingerprints problem. In experimental result, not only the single and multi-fingerprint latent test has 92.39% and 97.1% average accurate rate respectively, but we also got 92.19% and 95.84% correct rate respectively in the overlapped and non-overlapped range detection tests. The result shows that we could actually assist the fingerprint separation work automatically and efficiently with our own method.
A2016 Session 1 Presentation 3 (16:50-17:05)	A System for Disguised Face Recognition with Convolution Neural Networks Kuo-Ming Hung, Jin-An Wu, Chia-Hung Wen and **Li-Ming Chen** Tamkang University, Taiwan *Abstract*—Face recognition technology has been quite advanced in recent years and has been applied to various daily necessities and applications. However, people may make a false positive feature of the masked camouflage face because of makeup or wearing different equipment. In this paper, a two-stage disguise face recognition method based on CNN is proposed for the disguised face wearing equipment. In the first stage, we train a network that identifies the type of equipment and extracts the remaining faces that are not disguised. In the second stage of identification, the extracted remaining faces use the identified network for identity identification. The experimental results show that the proposed method has reached an average of 97.6% accuracy in the first stage of equipment type recognition. In the second stage of disguise face identification, 72.4% identification rate was obtained. The proposed method in this paper has reached the identification rate of the disguise identification research in recent years. The results of the above two stages show that the proposed method can effectively identify the type of disguise worn when people wear disguise. Then, the facial information of the disguise is removed to achieve a certain identity recognition effect.
A2017 Session 1 Presentation 4 (17:05-17:20)	Performance Improvement of Face Image Super-Resolution Processing by High-Precision Skin Color Detection **Keigo Kano**, Tomio Goto and Satoshi Hirano Nagoya Institute of Technology, Japan *Abstract*—In recent years, opportunities to deal with digital images on the Internet have increased due to the information society, there is a great demand for techniques such as super-resolution processing to make images more beautiful. When super-resolution processing is performed on natural images such as scenery, edges are emphasized to obtain clear

	images. However, when super-resolution processing is applied to a facial image, the wrinkle and stains of the skin as well as the emphasis of hair and eyes are emphasized, so super-resolution processing on the skin part is not suitable. Therefore, in the previous study, we proposed a method to perform facial correction using non-linear filter on skin part, and tried to solve this problem. This method is composed of super-resolution processing and facial correction processing, and it was possible to realize a super-resolution processing with a sharp sense for facial images. However, we also confirmed that there was a problem that the image quality deteriorated according to the skin color detection accuracy at the time of image synthesis of each processed image. Therefore, in this paper, we study the skin color detection method and try to improve the image quality.
A2021 Session 1 Presentation 5 (17:20-17:35)	An Improved Kinect-Based Real-Time Gesture Recognition Using Deep Convolutional Neural Networks for Touchless Visualization of Hepatic Anatomical Models in Surgery **Jiaqing Liu**, Kotaro Furusawa, Tomoko Tateyama, Yutaro Iwamoto and Yen-wei Chen Ritsumeikan University, Japan *Abstract*—Visualization of three-dimensional (3D) medical images is an important tool in surgery, particularly during the operation. However, it is often challenging to review a 3D anatomic model while maintaining a sterile field in the operating room. Thus, there is a great interest in touchless interaction using hand gestures to reduce the risk of infection during surgery. In this paper, we propose an improved real-time gesture-recognition method based on deep convolutional neural networks that works with a Microsoft Kinect device. A new multi-view RGB-D dataset consisting of 25 hand gestures was constructed for deep learning. The nine gestures that were associated with the high recognition accuracies were selected for the touchless visualization system. A deep network architecture, AlexNet, was used for the hand gesture recognition. The recognition accuracy was about 96.5%, which was much higher than that in our previous systems. We further demonstrated that this technique facilitates touchless real-time visualization of hepatic anatomical models during surgery. This system is expected to ultimately lead to better patient outcomes by enhancing the ability to visualize medical images in 3D during surgery.
	Handheld Food Localization and Food Recognition Using Convolutional Neural Network **Duan-Yu Chen** and Hao-Syuan Wang Yuan Ze University, Taiwan

A2026 Session 1 Presentation 6 (17:35-17:50)	*Abstract*—In modern society, calories and carbohydrate intake leads to the obesities and diabetes sharply increases. For this reason, food recognition and its application attracted more and more attention. However, a variety of problem such as deformation and color difference cause the difficulty in this task. Especially, localization problem of food item is the most difficult, because the background always colorful and messy. In view of this, optical flow algorithm, which commonly used for foreground separation, is employed in this paper. Based on the speed information, hand-held objects can be isolated from background according to the estimated optical flows. Then, gradient and RGB color value of each pixel in an image are used for recognition. With the advantage of convolutional neural network, high stability and high tolerance, we finally get the remarkable precision in the experiment results, which show the feasibility of our proposed approach for real-world environments.

Session 2

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, November 13, 2018 (Tuesday)

Time: 14:20-15:50

Venue: Meeting Room 1

Session 2: Topic: "Image Analysis and Method"

Session Chair: Prof. Yen-Wei Chen

A2007 Session 2 Presentation 1 (14:20-14:35)	A Study of Conversion of Graphical Symbols for Psychological Cognition Huang Yu-Che, **Hsiao Ko-Jou** and Chen Yan-Jie Chaoyang University of Technology, Taiwan *Abstract*—The transformation of graphics comes from the recognition of symbolic semantics, related cognition will affect human cognition, different countries, cultures, years, age, gender, etc. For the people will have different cognitive differences. How to provide better images to satisfy users, making it easier to learn and cognize, and reduce factors such as misjudgment or misunderstanding, will come to be an important issue. Whether in normal healthy users or in dementia due to advanced age, the relationship between image and cognition must be taken seriously. This study will make a change design for image and symbol semantics to study the responses and cognition of different subjects and provide a reference for future rehabilitation learning or cognitive learning.
A2012 Session 2 Presentation 2 (14:35-14:50)	Noise Removal Method for Moving Images Using 3-D and Time-Domain Total Variation Regularization Decomposition **Tsubasa Munezawa** and Tomio Goto Nagoya Institute of Technology, Japan *Abstract*—In recent years, in order to display high vision broadcast the next generation displays, super resolution techniques for improving image resolution are demanded. In addition, with the spread of digital cameras and smartphones, people have more opportunities to handle camera images. In particular, images of surveillance cameras are required to obtain high-definition output by removing noise. In this paper, in order to avoid the adverse effect of image quality deterioration when emphasizing noise mixed image which is a problem of super resolution

	processing, we examine a noise removal method before super resolution processing. In our proposed method, Total Variation regularization, which is decomposed into structure and texture components, is extended in direction of time axis. As a result, moving images can be decomposed into structure moving images and texture moving images. In theory, it is thought that noise components with large value of Total Variation should shift to texture components. Furthermore, we aim for separation of texture components and noise, and aim for acquisition of high-definition moving images. We verify the performance of our proposed method by comparing it with the BM3D method, which is regarded as the highest performance for moving image noise removal processing.
A2023 Session 2 Presentation 3 (14:50-15:05)	Classification of Focal Liver Lesions Using Deep Learning with Fine-Tuning **Weibin Wang**, Yutaro Iwamoto, Xianhua Han, Yen-Wei Chen, Qingqing Chen, Dong Liang, Lanfen Lin, Hongjie Hu and Qiaowei Zhang Ritsumeikan University, Japan *Abstract*—Liver cancer is one of the leading causes of death worldwide. Computer-aided diagnoses play an important role in liver lesion diagnoses (classification). Recently, several deep-learning-based computer-aided diagnosis systems have been proposed for the classification of liver lesions. The effectiveness of these systems has been demonstrated; however, the main challenge in deep-learning-based medical image classification is the lack of annotated training samples. In this paper, we demonstrate that transfer learning and fine-tuning can significantly improve the accuracy of liver lesion classification, especially for small training samples. We used the residual convolutional neural network (ResNet), which is a state-of-the-art network, as our baseline network for focal liver lesion classification using multi-phase CT images. Fine-tuning significantly improved the classification accuracy from 83.7% to 91.2%. This classification accuracy (91.2%) is higher than that of state-of-the-art methods.
A2024 Session 2 Presentation 4 (15:05-15:20)	Automatic Liver Segmentation Using U-Net with Wasserstein GANs **Yuki Enokiya**, Yutaro Iwamoto, Yen-Wei Chen and Xian-Hua Han Ritsumeikan University, Japan *Abstract*—Automatic liver segmentation in CT images is an important step for computer-aided diagnosis and computer-aided hepatic surgery. Recently, though numerous methods based on deep learning such as U-Net have been proposed for automatic liver segmentation, it is still a challenging topic because of its low contrast and variations of liver shape. Additionally, limited training data for deep learning is another challenging problem. In this paper, we propose an automatic liver segmentation using U-Net with a Wasserstein Generative Adversarial

	Network (GAN). The Wasserstein GAN was used to improve U-Net's training, especially training with a small data set. We demonstrated that liver segmentation accuracy (Dice value) with 33 and 392 training data sets was improved from 88% to 92% and from 92% to 93%, respectively.
A2028 Session 2 Presentation 5 (15:20-15:35)	A Pre-Liminary Analysis of Three-Dimensional Morphological Change for Facial Swelling Using Kinect **Tomoko Tateyama**, Akifumi Ohno and Shimpei Matsumoto Hiroshima Institute of Technology, Japan *Abstract*—The post-surgical follow-up observation of facial swelling change is mainly subjective assessment by the doctor, therefore clinical field hopes to establish its numerical assessment of the facial changed. In this study, we focus to develop Computer Aided Diagnosis system for assessment to three-dimensional facial swelling morphological change after orthognathic surgery. Laser-scanner is effective device and used generally for measuring facial shape features, however the device is so expensive that is necessary to adopt general-purposed devices in order to reduced cost. Although Kinect is one of the general-purpose devices that can acquire three-dimensional face shape information, verification that its accuracy is effective for the measurement of facial swelling is not sufficient. In this study, we verify the effectiveness of the evaluation of the morphological change from the face shape obtained using Kinect. First, we propose an alignment method at some points including the forehead part for the face shape of all samples and evaluate whether accurate analysis for facial morphological change is possible.
A2009 Session 2 Presentation 6 (15:35-15:50)	Improvement of Robustness In Blind Image Restoration Method Using Failing Detection Process **Takahiro Nagata**, Tomio Goto, Satoshi Motohashi, Haifeng Chen and Reo Aoki Nagoya Institute of technology, Japan *Abstract*—Blind image restoration, which restores a clear image from a single blurry image, is a difficult process of estimating two unknowns: a point-spread function (PSF) and an ideal image. In this paper, we propose a novel blind deconvolution method to alternately estimate a PSF and its latent image. We apply a gradient reliability map that enables edge selection appropriate for PSF estimation and an energy function that enables estimation of convergence states. This method improves restoration performance by eliminating noise adversely affecting estimation. Additionally, a restoration failure detection process is added by using an evaluation function. Experimental results show that the robustness of the proposed method is improved and high quality images are obtained.

Session 3

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, November 13, 2018 (Tuesday)

Time: 14:20-15:50

Venue: Meeting Room 2

Session 3: Topic: "Information Medicine and Technology"

Session Chair: Assoc. Prof. Yan Guo

A0009 Session 3 Presentation 1 (14:20-14:35)	Experimental Result Extraction from Research Paper Related to Health Effects of Electromagnetic Fields Sang-Woo Lee, Jung-Hyok Kwon and **Eui-Jik Kim** Hallym University, South Korea *Abstract*—This paper presents a method for extracting experimental results from the research paper related to the health effects of electromagnetic fields (EMF), which aims to automatically and accurately extract the sentences containing the experimental results from the conclusion. For this, the proposed method consists of EMF lexicon creation and sentence extraction. In the former, an EMF lexicon is created via the topic modeling with various the research papers. The EMF lexicon is a dictionary containing the words related to the psychological effects of EMF (e.g., depression, panic disorder, stress, etc.), biological effects of EMF (e.g., cell, protein, tumor, etc.), and environmental factors (e.g., exposure time, frequency, signal strength, etc.). In the latter, the sentences related to the experimental results are extracted from conclusion using the created EMF lexicon and TextRank. Specifically, each sentence in the conclusion is compared with each other, and the number of words that are commonly included in both sentences and EMF lexicon is counted. Then, the counted value is multiplied by each score in the similarity matrix constructed by TextRank. The results of experimental implementation showed that the proposed method more accurately extracts the experimental results from research paper than the existing extraction methods.
	Correlation Analysis of the Relationship Between Mitral Valve Prolapse and Panic Disorder **Yi-Horng Lai**, Feng-Feng Huang and Piao-Yi Chiou Oriental Institute of Technology, Taiwan

A0013 Session 3 Presentation 2 (14:35-14:50)	*Abstract*—Mitral valve prolapse is the most common heart disease, and panic disorder is a common chronic mental illness. The symptoms of panic disorder are similar with those of mitral valve prolapse, and therefore misdiagnoses often occur. The purpose of this study is to explore the relationship between mitral valve prolapse and panic disorder with the data from Taiwan's National Health Insurance Research Database (NHIRD). There were 15,350 patients of mitral valve prolapse, and 587,735 patients without mitral valve prolapse in this study between 1998 and 2010. Cox-proportional model was used to analyze the association between mitral valve prolapse and panic disorder. This study found that patients with mitral valve prolapse were 1.92 times more likely to have panic disorder than patients without it. Therefore, patients with mitral valve prolapse have a higher risk of panic disorder. As for gender difference, male patients were 0.6183 times more likely to have panic disorder than female patients. It is also found that every one year increase in age increases the risk of illness by 1.0159 times. It is hoped that through the results of this study, patients with mitral valve prolapse will have better care, proper relief, and better quality of life.
A0029 Session 3 Presentation 3 (14:50-15:05)	The Study of Protective Effects of Low-Level Light and Donepezil Against B-Amyloid-Induced Cytotoxicity in SH-SY5Y Cells **Siriluk Thammasart**, Kwanchanok Viravaidya-Pasuwat and Anak Khantachawana King Mongkut's University of Technology Thonburi, Thailand Abstract—The main purpose of this study was to evaluate whether donepezil and Low-Level Light Therapy (LLLT) shown to play neuroprotective effects by stimulating mitochondrial activity in the amyloid-beta 1-42 (Aβ1-42) -induced neuronal toxicity model of Alzheimer's Disease (AD). This result indicates that the Aβ1-42 accumulation in neuronal cells is related to the mitochondrial dysfunction and induced-neuronal cell death. While donepezil and Low-Level Light Therapy (LLLT; 660 nm, 5mW/cm2, 3J/ cm2) can reverse this situation. Donepezil is therapeutic acetylcholinesterase inhibitor currently being used for the treatment of AD. SH-SY5Y cells were pre-treated by donepezil at a concentration of 1 μM showed a maximum of neuronal viability compared to control cells. However, at higher concentrations, the neuronal viability was diminished. LLLT is a noninvasive therapy which showed significant increasing of neuronal viability and afforded protection against Aβ1-42-induced toxicity. In addition, the combination treatment between 1 μM of donepezil pre-treatment and LLLT in SH-SY5Y cells induced by Aβ1-42 toxicity had increased cell viability. In aggregate, these results demonstrate that LLLT has probably contributed to alternative treatment in

	neurodegenerative disease.
A0030 Session 3 Presentation 4 (15:05-15:20)	Tankendo Motion Estimation System with Robustness Against Differences in Color and Size Between Users' Clothes Using 4-Color Markers with Elastic Belts **Maki Nakamura** and Kiyoshi Hoshino Ibaraki Prefectural University of Health Sciences, Japan *Abstract*—To allow an individual to immediately try to train thrusting and striking motions motions of Tankendo on his / her own on the spot without changing clothes whenever necessary, we suggests a system, which is capable of capturing and analyzing the postures of thrusting and striking motions of Tankendo in a sagittal plane using up to 4-color markers and a single camera, even though there are differences in color and size between users' clothes and something is placed in the background. First, focusing on the colors of the background and users' clothes in a relatively wide area on a captured image, the system has integrated the procedure that different colors are allocated to the color markers of users, who may approach each other through a thrusting / striking motion, while the same color is allocated to the color markers of users, between whom the distance does not change. Moreover, some color marker may be difficult to visually observe when the user moves and overlaps with something with a relatively wide area in the background. To address this problem, a color different from that of the background is allocated to the color marker in question. This makes it easy to set the thresholds for extracting the markers in image processing even though the hue across the captured image reduces. Second, to prevent the color markers from getting out of original positions due to loosened clothes, the elastic belts with color markers fixed on are attached to e user's body. The result of our system evaluation demonstrated that up to 4-color markers might prevent similar color markers from approaching or occluding each other when the users move, regardless of the mode of thrusting / striking, simply by attaching the color markers to the users' bodies in the suggested procedure, even if the color of the clothes or something in the background would change. Moreover, when the color markers were attached to the user's bodies following the procedure doe attaching he markers specified in the system, the articular angle estimation could be achieved with relatively satisfactorily accuracy.
	Brain Activity While Waiting to Steer a Car: An fMRI Study **Yoshihisa Okamoto**, Takafumi Sasaoka, Toshihiro Yoshida, Kazuhiro Takemura, Zu Soh, Takahide Nouzawa, Shigeto Yamawaki and Toshio Tsuji Mazda Motor Corporation, Japan

A0041 Session 3 Presentation 5 (15:20-15:35)	*Abstract*—In this paper, we report a novel approach to automobile development based on the understanding of the brain mechanism. We aim to realize fun to drive applying the neuroscientific findings of affective states. There are few studies about it, therefore using newly developed experimental unit, we are examining participants' brain activity affected by the load of steering operation task in the MRI scanner. We focused on the brain activity while waiting to steer, assuming that it reflects participants' affective state in preparation of the upcoming steering task. We observed activations in the anterior cingulate and insular cortices comprising the salience network, which is one of the intrinsic brain networks and involved in preparation for an upcoming task. Intriguingly, when waiting for the steering task having larger reaction force, the anterior cingulate cortex, known to be related to anxiety, was more active. Moreover, waiting for the condition in which the steering had to be operated with only the non-dominant arm, the amygdala, known to be associated with negative emotion, was significantly activated. Thus, our results newly show that the steering reaction force and the hand used for steering operation may influence brain activity while waiting for the upcoming steering task.
A2027 Session 3 Presentation 6 (15:35-15:50)	A Model for Sibilant Distortion Detection in Children **Ivo Anjos**, Margarida Grilo, Mariana Ascensão, Isabel Guimarães, João Magalhães, Sofia Cavaco Universidade NOVA de Lisboa, Portugal *Abstract*—The distortion of sibilant sounds is a common type of speech sound disorder in European Portuguese speaking children. Speech and language pathologists (SLP) use different types of speech production tasks to assess these distortions. One of these tasks consists of the sustained production of isolated sibilants. Using these sound productions, SLPs usually rely on auditory perceptual evaluation to assess the sibilant distortions. Here we propose to use an isolated sibilant machine learning model to help SLPs assessing these distortions. Our model uses Mel frequency cepstral coefficients of the isolated sibilant phones and it was trained with data from 145 children. The analysis of the false negatives detected by the model can give insight into whether the child has a sibilant production distortion. We were able to confirm that there exist some relation between the model classification results and the distortion assessment of professional SLPs. Approximately 66% of the distortion cases identified by the model are confirmed by an SLP as having some sort of distortion or are perceived as being the production of a different sound.

Session 4

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, November 13, 2018 (Tuesday)

Time: 14:20-15:50

Venue: Meeting Room 3

Session 4: Topic: "Biomaterials and Drug Development"

Session Chair: Assoc. Prof. Kuo-Yuan Hwa

A0025 Session 4 Presentation 1 (14:20-14:35)	Enhanced Osteoblastic Differentiation Using Graphene Oxide Coating on Anodized Titanium **Pichayada Techaniyom** and Sirinrath Sirivisoot King Mongkut's University of Technology Thonburi, Thailand *Abstract*—The aim of this study is to improve bone ingrowth and efficiency of orthopedic implants using anodized titanium and graphene oxide coating. Calcium mineralization from MC3T3-E1 pre-osteoblasts (bone-forming cells) on a modified surface of titanium by anodization and electrodeposition of graphene oxide was investigated. Not only graphene oxide coating improves biocompatibility and corrosion resistance, but also anodization of titanium eliminates residuals and reduces the releasing of metal ions. The effects of both surface modifications to calcium deposition and osteopontin expression by osteoblasts were evaluated in this study. Calcium deposited during osteoblast differentiation were observed with alizarin red S (ARS) staining after MC3T3-E1 cells were cultured on polystyrene (PS), graphene oxide coating on polystyrene (GO), anodized titanium (ATi), and graphene oxide coating on anodized titanium (ATiGO) for 14 and 21 days. The concentration of ARS dye was significantly increased when cells were cultured for 21 days onto ATiGO when compared with ATi. Moreover, osteopontin expression was detected with an indirect immunofluorescence staining using flow cytometer after MC3T3-E1 cells were cultured on the samples for 14 days. A relative fluorescence intensity (RFI) of osteopontin in MC3T3-E1 cells on ATiGO was significantly more than that on PS and GO. The results in this study showed that ATiGO increased calcium deposition by and osteopontin expression in osteoblasts, indicating bone formation on the samples.
	Comparison of EPS Extraction Efficiences from Spirogyra Fluviatilis by

A0047 Session 4 Presentation 2 (14:35-14:50)	Chemical and Physical Extraction Methods **Shui-Ping Chang**, Hwey-Lin Sheu and Yi-Chao Lee Kun Shan University, Taiwan *Abstract*—The algal extracellular polymeric sustances (EPS) have been studied as natural resources for a number of applications. For a macroalgae Spirogyra fluviatilis, the aboundant extracellular matrix on the surface of algae cell. EPS has a gel-like structure that could fractioned into loosely bound EPS (LB-EPS) and tightly bound EPS (TB-EPS). The contents and extraction rate of EPS were compared two chemical (formaldehyde-NaOH and NH4OH) and two physical (ultrasonication and heating) extraction methods. The analysis demonstrated that extraction rates of EPS followed heating (7.94 mg g-1 fresh algae) > ultrasonication (5.02 mg g-1 fresh algae) > formaldehyde-NaOH (3.12 mg g-1 fresh algae) > NH4OH (2.01 mg g-1 fresh algae). The protein to polysaccharides ratio (P/S) in EPS is between 0.23 to 0.35 by chemical methods and between 0.27 to 0.37 by physical methods. The P/S ratio is LB-EPS is higher than TB-EPS. The results indicated that the EPS could be efficiently extracted by the heating method, the influence of P/S ratios were obvious different.
A0050 Session 4 Presentation 3 (14:50-15:05)	Effect of Water Activity on Glass Transition Temperature and Physical Properties of Fried Durian Slice Sawanit Aichayawanich and **Thanya Parametthanuwat** King Mongkut's University of Technology North Bangkok, Thailand *Abstract*—This research aimed to study glass transition temperature (T_g) and the physical properties of fried durian slice at various water activity. To adjust the water activity in fried durian slice, the samples were placed in boxes containing a saturated salt solution while the water activity in the fried durian slice ranged from 0.207 to 0.796. Then, the glass transition temperature, color, and sensory evaluation score of the samples were evaluated. The correlation between phase and cripness of the samples were investigated. The experimental results showed that the glass transition temperature of fried durian slice decreased with a higher water activity. Glass transition temperature and the water activity were significantly related with the crispness and color value of the fried durian slice. The cripness of durian slice had high correlation with its cripness. The sensory evaluation score of fried durian slice depends on water activity. All sensory evaluation of fried durian slice at a water activity higher than 0.542 were not acceptable.
	Pharmacokinetics Analysis of Controlled Insulin Delivery from Biodegradable Polymer Matrix **Ruojia Li**

A1006 Session 4 Presentation 4 (15:05-15:20)	Chongqing Foreign Language School, China *Abstract*—Diabetes is a group of metabolic disorders in which there are high blood sugar levels over a prolonged period. As of 2015, an estimated 415 million people had diabetes worldwide. Insulin is the most effective and safe medicines needed to stable the blood sugar level and so treat diabetes. Current insulin administration requires daily subcutaneous injection, which is not a favorable choice of patients and physicians. Biodegradable polymer delivery systems have been developed and demonstrate enormous potentials for therapeutics, including those within insulin. However, there is no well-developed pharmacokinetic model to analyze and predict the insulin release from polymer delivery system. In this presented work, we have developed a pharmacokinetic compartment model to describe insulin delivery from polymer matrix. PLGA degradation model was incorporated into the compartment model, which enables quantitative comparison between PLGA insulin controlled release and conventional insulin injection. Further, this model revealed that PLGA chemical properties significantly influence the insulin controlled release in pharmacokinetics. This novel model overcomes drawbacks of the conventional compartment models developed so far and provides insight into insulin controlled drug delivery system designing for more patient-friendly and personal diabetic treatment.
A1009 Session 4 Presentation 5 (15:20-15:35)	Characterization of Neurotrophin in Sea Cucumber, *Holothuria Scabra*, and the Possible Role in Neural of Mesenchymal Stem Cell **Buranee Lekskul**, Tipok Vivattanasarn, Jutarat Saengsuwan, Supawadee Duangprom and Napamanee Kornthong Thammasat University, Thailand *Abstract*—Neurotrophin (NT) is a group of growth factor involved in the protection of neural damage from degeneration. As such, its exogenous source is believed to be beneficial for neurodegenerative diseases such as Dementia. In this study, we attempted to characterize NT in sea cucumber, *Holothuria scabra,* which has the ability to regenerate following evisceration. *H. scabra* RNA was isolated to find the gene for NT. Nucleotides of *Hsca*-NT partial sequence consisted of 399 base pairs and encoded a deduced 112 amino acids. It was then shown to match with the referenced NT protein known from other species of sea cucumber. Using real time PCR, it was demonstrated that NT was upregulated following evisceration. Furthermore, we also explored the effect of crude extract protein from *H. scabra* on the neural differentiation of mesenchymal stem cells (MSCs) taken from human placenta. Results demonstrated that the crude extract protein was successful in promoting neural differentiation of MSCs. These results

	suggested that *H. scabra* could be a potential source for exogenous NT. Further development and research into this NT extract could yield an effective mean to enhance and support the current treatment of neurodegenerative diseases.
A2004 Session 4 Presentation 6 (15:35-15:50)	Momentous Innovations in the Prospective Method of Drug Development **S. Jafar Ali Ibrahim** and M. Thangamani Anna University, India *Abstract*—The innovative work (Research and development) pipeline is a huge cost for pharmaceutical Organizations. In spite of the requirement for more advancement, Research and development profitability has vegetated or decayed over various years.1-3 More present, the industry has not exhaustively evaluated the effect of new developments in pharmaceutical improvement and market get to particularly as far as basic achievement measurements, for example, clinical preliminary productivity, the probability of medication dispatch and patient access. To invigorate activity on this diagnostic issue, we accumulated and translated hard confirmation on the effect of chosen developments estimated against particular achievement measurements. The general objective of the investigation is to invigorate expansive dialog on how the business can utilize inventive methodologies in medicate advancement and market access to enhance proficiency, revive profitability and revitalize supportability. It is unmistakable in openly evaluating the effect of the most encouraging advancements in sedate improvement on preliminary productivity and accomplishment in dispatch and getting model endorsement around the world. We recommend that it makes convincing, information-driven case for expediting the selection of new market get to forms for drugs. In particular, it demonstrates that the four developments assessed— adaptive trial designs, patient-centric trials, precision medicine trials and real-world data trials reliably convey in contrast to industry achievement touchstone.

15:50-16:10	**Coffee Break**

Session 5

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Afternoon, November 13, 2018 (Tuesday)

Time: 16:10-17:40

Venue: Meeting Room 1

Session 5: Topic: "Image Processing and Application"

Session Chair: Dr. Rajeev Kanth

A2008 Session 5 Presentation 1 (16:10-16:25)	Research on Traditional Auspicious Images and Cognition Huang Yu-Che, **Chen Yan-Jie** and Hsiao Ko-Jou Chaoyang University of Technology, Taiwan *Abstract*—Most studies have shown that when memories are declining year by year, images of past past memories, or images that patients often encounter in the past, are often one of the clinical methods to slow down memory decline, but according to people. The growth process and social changes, many past images will have varying degrees of change and evolution, how to identify and correlate some of the patterns in the past, is the core spirit of this research, this study will be from semiotics Under the theoretical basis, it is hoped that it can provide a basis for future image psychocognitive research or rehabilitation medicine for different cognition studies on the auspicious patterns often seen in the Chinese nation during festivals.
A2020 Session 5 Presentation 2 (16:25-16:40)	All-in-Focus Image Generation Using Improved Blind Image Deconvolution Technique **Sota Kawakami** and Hiroyuki Kudo University of Tsukuba, Japan *Abstract*—The purpose of this paper is two-fold. First, we propose two new blind image deconvolution (BID) methods by improving Ahmed's BID method [1] in 2014 that is based on techniques of low-rank matrix recovery. The first method is introducing the total variation regularization term into Ahmed's BID method for the single-input-single-output (SISO) imaging model. The second method is extending Ahmed's BID method to the single-input-multiple-output (SIMO) imaging model. The practical iterative algorithm is developed to solve the formulated BID problem in each case when we take so-called iterative singular value thresholding algorithm. In the next part, we apply the new algorithm for the SIMO case, which is more stable than the

	SISO case, to the problem in generating all-in-focus images. We often have such a kind of problem when we take multiple images with different focal lengths for a 3-D scene holding varying depth. We demonstrate performances of the proposed methods through simulation studies as well as real data experiments.
A2029 Session 5 Presentation 3 (16:40-16:55)	Two-Dimensional Phase Unwrapping with Continuous Submodular Minimization H. Kudo, **Songzhe Lian** and K. Wada University of Tsukuba, Japan *Abstract*—The phase unwrapping is recovering true phase from its 2π modulo observations which are related to some discrete optimization problems. The challenge is to exactly solve the discrete optimization problem arising from noisy data. In this paper, we propose a new continuous minimization method for phase unwrapping. Using the Lovász extension we transform the discrete problem to equivalent continuous problem. In contrast to conventional continuous minimization methods, our method can solve this discrete optimal problem exactly. In addition, one regularization term is added to the energy function to deal with noisy images. By using L^1 norm for both data term and regularization term our method performs well for discontinuous images. Moreover, its implementation is very simple. A set of experiment results illustrates the effectiveness of the proposed method.
A3001 Session 5 Presentation 4 (16:55-17:10)	Comparison Between Image Processing Methods for Detecting Object Like Circle **Faris Adnan Padhilah** and Wahidin Wahab Universitas Indonesia, Indonesia *Abstract*—This paper discuss a method of circle detection using HSV method, Circle Hough Transform (CHT) method and combination of HSV and CHT method. Then discusses the advantages and disadvantages of the color detection method, CHT method and the combination of both, which include the speed of the data process, the reliability of the algorithm, the limitations and so on. The object used in the experiments is a table tennis ball placed on different area. The HSV method is a selection of object using color filtering. The CHT method is a shape detection method for circle object. The combination method perform CHT method to detect an object based on color filtering in HSV color space. Result show that the combination method of HSV and CHT method gave a better result than HSV and CHT methods performed independently.
	Saccular Brain Aneurysm Detection and Multiclassifier Rupture Prediction Using Digital Subtraction and Magnetic Resonance Angiograms

A0049 Session 5 Presentation 5 (17:10-17:25)	Shakeel M. Anjum, **Khalid Mahmood Malik**, Hamid Soltanian-Zadeh, Hafiz Malik and Ghaus Malik Oakland University, USA *Abstract*—Saccular intracranial aneurysms corresponding to their berry or sac-like shape are characterized as most vulnerable to grow and rupture relatively quicker that other known types, such as, fusiform, distal and dissection. Approximately 80% of aneurysmal Subarachnoid Hemorrhage (aSAH) are reckoned due to burst of saccular aneurysms only. Therefore, timely detection of unruptured saccular brain aneurysms can greatly help neurosurgeons to treat them well before an aSAH occurs, and thus saves precious lives. Most of the research efforts in this respect involve statistical analysis of manually collected retrospective data to predict the risk of aneurysmal rupture. Whereas, geometrical, anatomical and textural characteristics of medical imaging, such as digital subtraction angiography (DSA) and magnetic resonance angiography (MRA), is not investigated for accurate detection of unruptured saccular aneurysms and their individualized prediction of rupture likelihood. The main contribution of this work is a) 98% accurate identification of aneurysms from both DSA and MRA using Multilayer Perceptron Neural Network trained upon robust Haralick textural features of individual regions of interest (ROIs) segmented through Watershed Segmentation and Distance Transformation; b) prediction of aneurysms rupture probability, by categorizing aneurysmal ROIs into 5 classes, using geometrical, anatomical and textural features, with 76.67% accuracy using Decision Support Trees, ensembled with Bagging classifier. Our evaluation is based upon de-identified dataset of 180 images (54 MRA, and 126 DSA), obtained from Henry Ford Hospital, Bloomfield Hills, MI, USA, after IRB approval (No. 11254).
A0022 Session 5 Presentation 6 (17:25-17:40)	Measurement and Analysis of Calcaneus Morphometric Parameters from Computed Tomography Images Irwansyah, **Jiing-Yih Lai**, Terence Essomba and Pei-Yuan Lee National Central University, Taiwan *Abstract*—This study measures three-dimensional morphologic parameters of the calcaneus and finds out the correlation between those parameters. We included 49 males and 50 females healthy calcaneus, aged 21–58 years. Subjects were reconstructed to 3D model directly from computed tomography images and measured their morphological parameters. Thirteen linear distances and four angular parameters were measured with two different tools, computer program, and a digital vernier scale device. T-tests and Pearson correlation analysis were performed to evaluate parameters relationship. Statistical result presented significant differences between male and female calcaneal morphologic

	value except for β and α angles. LAL, CFH, MXB, DAFL, θ, β, and γ angles show strong correlation. There was also a significant correlation between age with MAXL, CBL and γ angle. The p-value in the comparison between computer-assisted and manual measurement for each parameter was less than 0.05, indicating that computer-assisted measurement is an effective method for evaluating the calcaneus morphological parameters.

Session 6

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, November 13, 2018 (Tuesday)

Time: 16:10-17:55

Venue: Meeting Room 2

Session 6: Topic: "Biomedical Engineering"

Session Chair: Prof. Qingli Li

A0007 Session 6 Presentation 1 (16:10-16:25)	Using Storytelling Robot for Supporting Autistic Children in Theory of Mind **Sujirat Attawibulkul**, Natthanicha Sornsuwonrangsee, Wisanu Jutharee and Boonserm Kaewkamnerdpong King Mongkut's University of Technology Thonburi, Thailand *Abstract*—Autistic children have deficit in the understanding of how other people think and feel which is an important factor for social interaction and social communication. The understanding of how other people think and feel is called theory of mind. The storytelling activity could help the autistic children to learn about the theory of mind from the communication between the characters in the story stand point. This study investigated the use of BLISS robot with mobile application in the storytelling activity for supporting the theory of mind in autistic children. Five children between 4 and 12 years old were recruited. All children listened to the story and answered questions about theory of mind from their parents in first week. For second week, all children listened to the story and answered question from BLISS robot that was controlled by their parents. Experimental result suggested that all children stay engaged throughout the storytelling activity. It was shown that BLISS robot can be used to reduce the burden of parent in storytelling activity. Moreover, some autistic children can answer all questions about theory of mind correctly.
A0031 Session 6 Presentation 2 (16:25-16:40)	Computational Study on Motion Criterion and Muscle Activity Pattern in Elderly Gait with Muscle Weakness **Tatsuya Arakawa**, Tomohiro Otani, Yo Kobayashi and Masao Tanaka Osaka University, Japan *Abstract*—The purpose of this study is to understand differences of

	walking strategies in elderly gait from the viewpoint of motion criterion and muscle activity pattern. In the context of forward dynamic gait simulation, we evaluated muscle activations and muscle tension forces using 2-D neuro-musculo-skeletal model with muscle weakness in elder subject. Examined criteria are the minimum specific power criterion and the minimum energy consumption rate. Under the former criterion, the muscular activation is elevated to increase the muscle tension and computationally generate an almost same joint motion as in walking of normal subject. Under the latter criterion, the muscle activity level is kept lower than that under the former criterion and the joint motion generated computationally corresponds to that observed in the clinical gait analysis of elderly. Therefore, the muscle activations and tensions of aged gait with muscle weakness largely depend on the motion criterion, and the results suggest that the muscle activation pattern different from young adult may cause the characteristic kinematics of the elderly gait.
A0037 Session 6 Presentation 3 (16:40-16:55)	Evaluation of TT-Based Local PWV Estimation for Different Propagation Velocities **Li Deng**, Yufeng Zhang and Hong Mo Yunnan University, China *Abstract*—Local pulse wave velocity (PWV) for a common carotid artery (CCA) is usually estimated using a transmit time (TT) method based on time fiduciary points at the feet of the pulse waves. However, the shape of pulse wave is affected because the propagation velocity (PV) and amplitude of the reflected wave changes with vascular wall elasticity. We assess the performance of the TT-based local PWV estimation for different PVs with four timing methods, i.e. the maximum value of the second derivative (M2D), the intersecting tangent (IT), the 20% threshold (TH20) and the maximum value of the first derivative (M1D) methods, for time fiduciary point detection. The wall distension waveforms propagating along a segment of CCA are modelled by a synthesization of the estimated incident and reflected waves for different PVs. The performance of the estimation based on the four methods is evaluated by measuring relative errors (REs). The results show that for the PVs below 6 m/s, the M2D, IT and TH20 methods exhibit good precision with REs less than 11%; for the PVs over 6 m/s, the M2D method is the most accurate than other three methods for the PWV estimation. The M2D method is the most suitable for the PWV estimation under a wide range of PV conditions. It may provide us with useful suggestions for improving the PWV estimation in clinical measurements.
A0033	Assessing the Effect of Low-Intensity Training on Muscle Functions in Community-Dwelling Older Adults

Session 6 Presentation 4 (16:55-17:10)	**Jian-Guo Bau**, Bo-wen Huang, Yue-Der Lin and Taipau Chia Hungkuang University, Taiwan *Abstract*—Exercise is one of the most important methods for health promotion. However, in Taiwan, the proportion of the elderly who meet the standard exercise requirement is low. This study aims to assess the effectiveness of the low-intensity (five-minute a day, five-day a week) lower limb resistance exercise program for six weeks on community-dwelling older adults. Thirteen elderly volunteers, 83.4±6.2 years, were recruited to participate the exercise course. Dynamometer was used to measure the muscle strength of lower extremities. The leg with larger muscle strength of quadriceps was defined as healthy side. The other side was defined as the weak side. The near-infrared spectroscopy was used to evaluate the changes of the oxygen saturation of the quadriceps muscle during 20 times leg-press exercise. The pair t-test was used to compare the differences of muscle strength and oxygen saturation pre- and post- exercise course. The results showed that the muscle strength of quadriceps of the weak side leg was significantly increased ($p<0.05$). It means the imbalance of muscle strength of two legs was improved. In addition, the balance of supply and demand of muscle oxygen has also been effectively improved. This study revealed that even low-intensity exercises can effectively promote the lower limb muscle functions for elderly people.
A0032 Session 6 Presentation 5 (17:10-17:25)	Electrochemical Characteristics of Graphene Oxide Coated on Anodized Titanium for Bone Protein Detection **Lalida Suppaso**, Eakkachai Pengwang and Sirinrath Sirivisoot King Mongkut's University of Technology Thonburi, Thailand *Abstract*—The performance of three-electrode sensor is depended on the fabrication technique of electrodes. In order to achieve the high electrical conductivity of working electrode, the methods of graphene oxide (GO) coating on anodized titanium (ATi) substrate (ATiGO) including electrodeposition, air-dried, and spin coating were studied. The cyclic voltammogram (CV) results indicated that the electrodeposition of ATiGO electrodes gave the clearly better oxidation than other coating methods and also commercial glassy carbon and platinum electrodes at a scan rate of 100 mV/s in $K_3Fe(CN)_6$ and Na_2HPO_4/NaH_2PO_4 electrolyte. The electrodeposition of ATiGO with various applied voltages (5, 10, 20 V) and durations (5, 10, 30 min) were investigated. The CV results showed that the ATiGO at 20 V and 10 min had higher peak current of oxidation than other coating conditions (not including 10 V at 30 min), but it gave the highest peak current of reduction. This study reported the preliminary data of fabrication of working electrode which would be

	further fabricated as a three-electrode sensor used as an implantable bone-protein detecting sensor. This sensor can be an alternative choice for early diagnosing of bone ingrowth next to an orthopedic implant.
A0038 Session 6 Presentation 6 (17:25-17:40)	Matching Pursuit for Inter-Scatterer Spacing Estimation from Ultrasound RF Echo Signals **Xiuhua Zeng** and Yufeng Zhang Yunnan University, China & Qujing Normal University, China *Abstract*—The pathological changes in the diseased tissues could alter the spatial organization of the microstructures of their normal tissues. Ultrasound RF echo signals carry the microstructure information of the tissues whose regular scatterer spacing (SS) can be analyzed and applied as a signature for the quantitative diagnosis of diseases. In this paper, we propose a novel approach based on the matching pursuit (MP) algorithm to improve the ISS estimation from the ultrasound RF echo signals. The signals are decomposed into a linear combination of the Gabor atoms, and then the atoms highly matched the regular component are selected based on the critical point in the curve of the first order difference (FOD) of the reconstructed signal to residue ratio (RSRR). Accordingly, the ISSs can be estimated with the adjacent location indexes of the selected Gabor atoms. Results of simulation experiments with the MP-based and WT-based methods are presented. The results demonstrate that the MP-based method can improve the ISS estimation, especially for those simulated signals with low regular components, and potentially provide more accurate information for the disease diagnosis.
A0043 Session 6 Presentation 7 (17:40-17:55)	An Improved Estimation for Blood Flow Velocity Profile from the Ultrasonic Pulse-Echo RF Signals **Lian Gao**, Yufeng Zhang and Yanhong Li Yunnan University, China *Abstract*—This paper presents a study on blood flow velocity profile estimation based on the pulse-echo RF signals generated with adaptively varying pulse-shooting intervals (VPI). With the purpose of evaluating the correctness and reliability about the estimation of blood flow velocity profile, the relevant simulation experiments are carried out in this paper based on a Field II ultrasound emulation model for common carotid artery without stenosis lesions. In simulation experiments, the RF signals are firstly generated with the fixed pulse-shooting interval (FPI) of $1/10000$ s and VPIs predefined by parabolic velocity profile of blood flow (VPI_PV). Then the relevant PW Doppler signals are obtained for estimating the blood flow velocity profiles by employing the autocorrelation algorithm. It can be found from the results that the estimated blood flow velocity profiles from the PW Doppler signals of VPI_PV have enhancing validity compared with that received from the

	PW Doppler signals of FPI. The blood flow velocity profiles with enhanced validity would be used as basic contents for disease diagnosis.

Session 7

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, November 13, 2018 (Tuesday)

Time: 16:10-17:40

Venue: Meeting Room 3

Session 7: Topic: "Molecular Biology"

Session Chair: Assoc. Prof. Zhifu Sun

A0003 Session 7 Presentation 1 (16:10-16:25)	Analysis of Novel Annotations in the Gene Ontology for Boosting the Selection of Negative Examples Maryam Sepehri and **Marco Frasca** Universita Degli Studi di Milano, Italy Abstract—Public repositories for genome and proteome annotations, such as the Gene Ontology (GO), rarely stores negative annotations, i.e. proteins not possessing a given function. This leaves undefined or ill defined the set of negative examples, which is crucial for training the majority of machine learning methods inferring proteins functions. Automated techniques to choose reliable negative proteins are thereby required to train accurate function prediction models. This study proposes the first extensive analysis of the temporal evolution of protein annotations in the GO repository. Novel annotations registered through the years have been analyzed to verify the presence of annotation patterns in the GO hierarchy. Our research supplied fundamental clues about proteins likely to be unreliable as negative examples, that has been verified into a novel algorithm of our own construction, validated on two organisms in a genome wide fashion against approaches proposed to choose negative examples in the context of functional prediction.
A0021 Session 7 Presentation 2 (16:25-16:40)	Synthesis and Characterization of Methylcellulose-Poly(ethylenimine)2k for Gene Delivery System Hye Ji Lee, Ju Hyeon Jeon and **Tae-il Kim** Seoul National University, South Korea *Abstract*—In this study, methylcellulose-poly(ethylenimine)2k (MC-PEI2k) was synthesized for gene delivery system. First, MC was oxidized by periodate oxidation and PEI2k molecules were attached to oxidized MC via reductive amination reaction between aldehyde

	moieties of oxidized MC and amines of PEI2k. Chemical structures and molecular weights of MC-PEI2k were confirmed by 1H NMR and GPC, respectively. MC-PEI2k could condense pDNA into positively charged and nano-sized polyplex particles. MC-PEI2k showed concentration-dependent but lower cytotoxicity than PEI25k. Transfection efficiency of MC-PEI2k was found to be lower than PEI25k in HeLa cells in serum-free condition but higher in serum condition, due to its good serum-compatibility. These results suggested the potential of MC-PEI2k for gene delivery system.
A1007 Session 7 Presentation 3 (16:40-16:55)	Characterization of Bone Morphogenetic Protein-2 (BMP2) in Sea Cucumber, *Holothuria Scabra*, and its Effect on Mesenchymal Stem Cell Proliferation **Tipok Vivattanasarn**, Buranee Lekskul, Jutarat Saengsuwan, Supawadee Duangprom and Napamanee Kornthong Thammasat University, Thailand *Abstract*—Bone morphogenetic protein-2 (BMP2) plays crucial role in osteogenesis. Exogenous source of BMP2 comes in the form of recombinant human BMP2 (rhBMP2), but the main limitations of this are the high cost and the time-consuming process. Sea cucumber is known for its ability to regenerate following evisceration. This study attempted to identify BMP2 from sea cucumber (*Holothuria scabra*), which may be involved in the regenerative process by stimulating the proliferation of mesenchymal stem cells (MSCs). In this study, we isolated *H. scabra* RNA for molecular cloning and found that the open reading frame of partial sequence of *Hsca*-BMP2 consisted of 2,387 nucleotides, which encoded a deduced 446 amino acid precursor protein for BMP2. These peptides matched the known BMP2 from other sea cucumber species. RT-PCR data revealed the expression of BMP2 within the inner body wall and the radial nerves. We also tested the activity of crude extract protein from *H. scabra* on MSCs taken from human placenta and found that the extract protein could promote MSC proliferation. This research provides evidence for a novel source of exogenous BMP2 that is more cost and time effective than rhBMP2. Further study on the effect of extracted BMP2 on osteogenesis is needed.
A1008 Session 7 Presentation 4 (16:55-17:10)	Identification of Growth Factors in Transcriptome of the Sea Cucumber, *Holothuria Scabra*, and its Roles on Proliferation of Human Mesenchymal Stem Cells **Napamanee Kornthong**, Jutarat Saengsuwan, Supawadee Duangprom, Sirikul Manochantr and Prasert Sobhon Thammasat University, Thailand

	Abstract—Among animal phyla sea cucumbers have the highest ability to rapidly regenerate their body parts that are discarded or damaged. They contain this unique ability, perhaps because of the high expressions of developmental genes and growth factors. In this study, an *in silico* search of proteins, related proteins in the growth factor pathway in *Holothuria scabra* transcriptomes revealed 15 transcripts. The proteins involved in growth factor signaling were predicted and categorized based on previously existing knowledges. The first class comprised the family of transforming growth factor beta family of growth factors (TGF-β superfamily) was attempt to find in this transcriptome. The second class belongs to the ependymin gene. The third class, neurotrophins, and the fourth class, fibroblast growth factors (FGFs) were classified. Moreover, the effects of *H. scabra* extract on the proliferation of mesenchymal stromal cells (MSCs) were conducted. We found that the treatment of *H. scabra* extracts increased the proliferative rate of MSCs and increasing the level of proliferative genes higher than control. Furthermore, these of growth factors-related proteins in *H. scabra* may provide new approach in treatments of human diseases with stem cells, especially when certain growth factors and endogenous pathways in human are inadequate or lost.
A3003 Session 7 Presentation 5 (17:10-17:25)	Ensemble Based Fuzzy with Particle Swarm Optimization Based Weighted Clustering (Efpso-Wc) and Gene Ontology for Microarray Gene Expression **M. Thangamani** and S. Jafar Ali Ibrahim Kongu Engineering College, India *Abstract*—Data clustering proves to be a useful data mining approach for finding the sets of matching objects existing in the dataset. Scalability to manage massive volumes, reliability towards inherent outlier data and validity of clustering outcomes include the important issues in any data clustering technique. With the aim of addressing these problems, an Ensemble based fuzzy with Particle Swarm Optimization based Weighted Clustering (EFPSO-WC) technique that is extensively parallel and distributed in each stage, is introduced in this research work. Here Gene Ontology (GO) can be utilized for establishing the weight owing to the biological relevance exhibited by genes and its optimization is performed employing PSO. In the newly introduced work, Ensemble integrates different clustering outcomes achieved from fuzzy clustering, Fuzzy Weighted Clustering (FWC) and FPSO-WC of a group of objects into one integrated assorted clustering, frequently known as the harmony solution. This clustering can be utilized for the generation of more reliable and balanced clustering outcomes in comparison with a single clustering technique, carry out distributed computing under strict conditions or sharing information. In addition, the effectiveness of the

	newly introduced EFPSO-WC approach in terms of scalability and reliability was the compared with recently performed researches on the same subject. In all of the stated assessment analysis, the proposed technique performed better than the works carried out recently on the same datasets.
A0045 Session 7 Presentation 6 (17:25-17:40)	A Phylogenetic Study of Monalysin Family of Proteobacterial Pore-Forming Toxins **Mirudhula Mukundan**, **Sneha Krishnamurthy** and Jhinuk Chatterjee PES University, India *Abstract*—In order to thoroughly comprehend the working of a protein to make use of its features in wet lab analysis, a rigorous phylogenetic study is crucial to clarify its origins and better understand its mechanism of working. In this study, the pore-forming proteins belonging to the Monalysin family have been clustered with other families of Proteobacterial pore-forming toxins. The focus of this study has been divided into three stages, each one employing a different parameter to be used as the basis to form the dataset for the phylogenetic tree - multiple alignment, pair-wise alignment with a threshold score, and finally motif analysis. The resultant data was analysed and interpreted; and clear relatedness between the Monalysin, Aerolysin, Cytohemolysin and Channel-Forming Leukocidin Cytotoxin (Ctx) Family, with respect to their binary sequence alignment as well as the presence of the common pore-forming motif, ETX_MTX2 (with the exception of Cytohemolysin), which is found to be characteristic to the Monalysin family, was detected. The phylogenetic trees showed significant variation in their form, clearly illustrating the importance of the criteria used to select the pool of proteins, and depicting the patterns of evolution that led to the development of the characteristic features of the Monalysin family of pore-forming toxins. The results of this study can be made use of in the development of strategic, targeted biological control mechanisms to combat problems faced in various sectors, like agriculture.

Poster Session

Afternoon, November 13, 2018 (Tuesday)

Time: 17:40-18:00

Venue: Meeting Room 4

A0006 Poster 1	Implementation of SMART on FHIR in Developing Countries Through SFPBRF **Abrar Ahmad**, Farooque Azam and Muhammad Waseem Anwar National University of Science & Technology, Pakistan *Abstract*—Fast Healthcare Interoperability Resources (FHIR) is an International health standard for health data developed by Health Level Seven – (HL7) an international organization for the development of health data standards. FHIR enables data interoperability as it is based on lightweight open source RESTful services. Many developed countries which already running electronic health record systems are now focused on the adoption of FHIR to unlock its potential benefits by integrating other technologies like Substitutable Medical Applications, Reusable Technology (SMART) platform. In most of the developing countries electronic health record system does not exist because they lag in resources to invest in electronic health record systems and they are still operating on paper based health record system, so they are unable to adopt FHIR and other related technologies like SMART. Due to which, interoperability is not enabled on this paper based data. These countries remain at a distance from the benefits of FHIR and SMART platform to provide better patient care to their patients, quick and efficient clinical decision making and better diagnostics. This paper presents the implementation of SMART on FHIR in healthcare organizations of developing countries through a proposed framework SFPBRF which not only maps paper based health record system's data to HL7's FHIR standard but also integrate the complete SMART on FHIR platform to run SMART apps on this FHIR conformed data. This paper presents successful translation (done by translation engine) of paper based data to HL7 FHIR standard. It also shows the running of open source and internally developed SMART apps on this FHIR conformed data. Thus, by the successful mapping and implementation of SMART on FHIR through proposed framework SFPBRF we can conclude that FHIR can be adopted in healthcare organizations of developing countries and SMART on FHIR can help a lot in achieving better patient care, quick and efficient decision making and better diagnostics in developing countries.

A0008 Poster 2	A Methodical Approach to Epileptic Classification with Multi-Scale Patterns **Xiaoyan Wei** and Yi Zhou Sun Yat-Sen University, China *Abstract*—The life cycle of epileptic patients alternates between inter-ictal and ictal stage, visual inspection and analysis is often used in seizure detection and diagnosis clinically, which is time consuming and error-prone. Modern computer technology shows that different stages of epileptic seizure can be classified by machine learning and pattern recognition. The main work of this paper proposed an automatic seizure detection approach methodically. First the EEG signals were decomposed into respective brain rhythms waves, then the Hurst index were used as features to design discriminative classifiers to classify inter-ictal and ictal EEG segments. The performance of the model was evaluated on the public and private datasets. The results revealed the good accuracy. Thus, this paper may serve as a benchmark in seizure detection procedure and advance the classification accuracy of a seizure.
A0010 Poster 3	Automatic Segmentation of The Prostate on 3D CT Images by Using Multiple Deep Learning Networks **Jiayang Xiong**, Luan Jiang and Qiang li Shanghai Jiao Tong University, China *Abstract*—Automatic segmentation of the prostate on CT images has many applications in prostate cancer diagnosis and therapy. However, prostate segmentation from CT images is a very challenging task due to the low contrast of soft tissue and the large variations of the prostate shape. In this paper, we propose an automatic segmentation method by using a two dimension (2-D) and a three dimension (3-D) convolutional neural network (CNN). First, instead of segmenting the whole image, we extract the volumes of interest (VOI) accurately to remove irrelevant regions by using a CNN based VOI extraction method (CBVEM). Then, we use the 3-D CNN to learn the holistic three-dimension deep features for distinguishing the prostate voxels from the non-prostate voxels in order to obtain the segmentation results. Deep learning networks can automatically learn the deep features based on the data, which are different from the handcrafted features. The proposed method has been evaluated on a dataset of 150 prostate CT images. Experimental results show that our method achieved a Dice similarity coefficient of 89.74% compared to the manual segmentation. Our deep learning based method is faster and returns similar results compared to those atlas-based, deformable model-based and feature-based classification methods. Due to the CBVEM and 3-D CNN, our method also achieves better performances on the same data in a minimum processing time compared to other deep CNN based methods. This proposed method for automatic

	segmentation of the prostate on 3-D CT images can have a variety of clinical applications.
A0011 Poster 4	K-Space Based Free-Breathing Abdominal Water/Fat Separation and Simultaneous R_2^* Estimation **Xi Chen**, Shuo Li and Yiping Du Shanghai Jiao Tong University, China *Abstract*—Chemical shift based water/fat separation requires multiecho acquired at different TEs to reconstruct a water-only image and a fat-only image, which prolongs the acquisition time inherently. While conventional abdominal imaging with Cartesian sampling is required to be performed during breath-holding to avoid respiratory motion artifact. So the achievable resolution and anatomic coverage of abdominal water/fat separation are limited with typical scan duration of 15-20 sec. This work presents a method for free-breathing abdominal water/fat separation to eliminate the scan time limit and the requirement on patient compliance. To achieve this, the motion-robust radial stack-of-stars 3D gradient echo sequence is used for multiecho acquisition. Different from conventional image based water/fat separation, k-space based water/fat separation which is more capable of non-Cartesian sampling is used in this work. Chemical shift artifact correction is done by modeling the phase accumulation along readout direction caused by off-resonance of fat. By modifying the notion of "field map" into "complex field map", simultaneous R_2^* estimation is also achieved. Phantom study demonstrates the feasibility of R2* estimation by comparison with the result of T2*-IDEAL method. Results of preliminary in vivo study on healthy volunteers including thigh, knee and abdominal imaging are also shown.
A0012 Poster 5	Accelerated Myocardial Viability Imaging Using both Simultaneous Multi-Slice and Partially Parallel Acquisition **Zhehao Zhang**, Yuan Zheng,Yiping Du, Wenbo Sun, Jian Xu and Qun Chen Shanghai Jiao Tong University & Shanghai United Imaging Healthcare Co., Ltd., China *Abstract*—Phase-sensitive inversion recovery (PSIR) has been a powerful cardiac magnetic resonance imaging (CMRI) method to assess myocardial viability, which can eliminate the background phase and preserve the sign of the desired magnetization during inversion recovery (IR). However, the conventional PSIR may bring heavy burdens to patients due to the long acquisition time and required breath-holds (BHs). In this study, we proposed a method to integrate simultaneous

	multi-slice (SMS) into PSIR without performing separate calibration scan to reduce the acquisition time and number of BHs. The acquired reference data in PSIR was also utilized to evaluate spatial coil sensitivity so that slice separation can be completed. Additionally, we also implemented this method with partially parallel acquisition (PPA) to further improve the acquisition efficiency, where the same reference data can be utilized for PPA, SMS and PSIR. Phantom and in-vivo experiments were performed to confirm that applying SMS without separate calibration scan is able to significantly reduce acquisition time without compromising image quality or limiting diagnosis. The proposed method can be a practical and efficient method for the assessment of myocardial viability.
A0018 Poster 6	Nano-Second Laser-Treated Surface of Titanium with Apatite Coating Single Process **Seung-Hoon Um**, Yong-Woo Chung, Youngmin Seo and Hojeong Jeon Korea Institute of Science and Technology, South Korea *Abstract*—Titanium is one of the most commonly used materials for body implants and external fixator when a bone fracture occurs, due to its mechanical properties and biocompatibility. However, titanium itself has weak bone conduction and new bone formation ability compared with autogenous bone. To overcome this disadvantage, titanium is coated with hydroxyapatite, which is an inorganic component of bone. There are lots of methods to coat apatite on titanium. But most of the conventional methods require multistep processing, energy and time. We have developed a method to coat apatite in a single process on titanium surface using calcium and phosphoric acid solution and nanosecond laser. Conventional apatite coating process which took more than 24 hours, we were able to shorten the processing time to several ten to hundreds of seconds. Also the thickness of the apatite layer can be controlled by adjusting laser parameters. The result of this study is expected to be a new breakthrough to reduce manufacture processing time, precise control of coating area which was not capable with conventional methods.
A0024 Poster 7	Engineering Technique for Dedifferentiation Inhibition of Nasal Septum Chondrocytes by Compressed Circumstance **Youngmin Seo**, Seung-Hoon Um and Hojeong Jeon Korea Institute of Science and Technology, South Korea *Abstract*—Articular cartilage is difficult to regenerate when damaged, so regeneration or artificial joint transplantation is essential. In the case of regeneration, it is difficult to maintain the characteristics of cartilage, and since the effect of regeneration is minimal, artificial joint transplantation is finally inevitable. However, there is a disadvantage in that the patient

	has a high sense of rejection, needs reoperation, and requires into long - term recovery. We reduced the patient's economic and psychological distress by reusing discarded nasal septal chondrocytes in the nasal septal repair procedure and attempted to overcome the limits of cartilage regeneration using compressed circumstance which is applied to enable mass proliferation while maintaining chondrocyte characteristics. The physical stimulation in the compressed circumstance that was confirmed to maintain the characteristics of chondrocyte by decreasing the expression of the gene, protein and the phenotype change associated with chondrocyte differentiation. Mechanisms for the suppressive dedifferentiation effect of chondrocytes in the hypoxia environment are well known. However, the compressed circumstance has a different mechanism of suppressing dedifferentiation of chondrocytes from hypoxia environment. In this study, we confirmed that the compressed circumstance can maximize dedifferentiation inhibition of chondrocytes through synergy effect of hypoxia environment.
A0026 Poster 8	SCRFD: Spatial Coherence Based Rib Fracture Detection Ming Chen, **Peng Du** and Jieyi Zhao Hangzhou Dianzi University, China *Abstract*—Rib fracture is a very common type of chest injury. Currently, the diagnosis of rib fracture is usually performed by chest CT. Due to the large number of chest CT slices, the diagnosis is very time- consuming. Especially for the detection of non-displaced fractures with very fine fracture locations and multiple fractures in the same patient's ribs, the missed diagnosis rate is still very high. To improve the detection precision, we propose a spatial coherence based rib fracture detection method, first we employ a novel feature extraction method to extract the rib region from CT slice, followed by a novel spatial coherence based convolutional neural network to recognize whether fracture occurs in the rib region. We have compared our method with currently popular object detection method. Experiment results show that our method has drastically improvements on precision and performance over previous methods.
A0035 Poster 9	Clustering Functionally Similar Genes Based on Genome-Wide Expression Patterns Across Multiple Environments **Puyao Ge** and Wentong Li Tsinghua University, China *Abstract*—With the wide application of next-generation sequencing, an enormous amount of DNA and RNA-seq data are being generated for various species. However, the interpretation of gene function falls behind. Using yeast transcriptomic data across multiple environments as

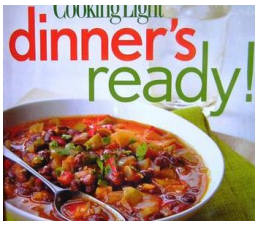
	an example, we proposed a metric for defining the dissimilarity score and use it to cluster genes. Showing significant enrichment of genes in focal pathways, we proved the validity and effectiveness of the clustering method and propose to apply this method to narrow down candidate genes in molecular pathways in not well-studied species. Combining with BLAST search, this clustering method will undoubtedly lead to functional annotations of many genes that are not available currently.
A0042 Poster 10	Oxidation-Sensitive Polymeric Micelle Containing Sulfide Compounds **Tae Hoon Kim** and Jin-Chul Kim Kangwon National University, South Korea *Abstract*—It is also important that drug be targeted to cancer cell in order to treat cancer, but it is also very important that only release drug in cancer cell in a timely manner. It is the manufacture of a micelle with a hydrophobic sulfide group as a way to release the drug in a timely manner in cancer cell only. The micelle with hydrophobic sulfide group retains the sulfide group in normal cell, but under oxidative condition, sulfide group is oxidized to sulfone and becomes hydrophilic. Therefore, micelle lose their amphipathy and disintegrate, and internal drug can be released only in cancer cell in a timely manner. In the study, hydroxyethyl acrylate (HEA) and phenyl vinyl sulfide (PVS) were co-polymerized through free radical reaction. By comparing interfacial tension before and after oxidation of polymer, the PVS oxidized confirmed that become hydrophilization and lose their amphiphilic property. The polymeric micelle was prepared thin film method. The morphology of prepared polymeric micelle was observed spherical through TEM. As H_2O_2 increased, the micelle loaded nile red release profile % increased sharply. Unlike previous studies in which the prepared polymeric micelles are released by external stimuli, they have a difference in releasing the drug in a timely manner from cancer cells (oxidizing conditions) without external stimulation.
A1001 Poster 11	Long-Term Therapeutics Effects of Varying Treatment Time on STEMI Patients with Late PCI **Yue-huan Wu**, Bing Li , Cong Fu and Yu-yu Yao Zhongda Hospital of Southeast University, China *Abstract*—This paper compares the impact of different treatment time of acute ST elevation myocardial infarction (STEMI) patients who received late percutaneous coronary intervention (PCI). Moreover, the paper identifies the independent predictive factors of these patients. Methods: We constructed a prospective cohort collecting data from the Department of Cardiology Zhongda Hospital of Southeast University. All patients

	without early reperfusion from June 2016 to June 2017 were investigated and separated into 3 groups: 2 days＜t≤7 days group, 7 days＜t≤14 days group, t＞14 days group. Kaplan-Meier analysis was used to analyze MACE free survival, and Cox proportional hazards model based multivariate analysis was carried out to determine the variable relevant to survival and MACE free survival. Outcomes: The retrospective study enrolled 188 STEMI patients who received late PCI. Incidence of MACE of group 2 days ＜ t≤7 days group (n=60), 7 days ＜ t≤14 days group(n=92),t ＞ 14 days group(n=36) is 40.0%、39.1%、41.7%, respectively. Cox regression showed that the independent predictor of MACE free survival as follows: diabetes (HR=0.540, 95%CI：0.301～0.970, P=0.039, low molecular heparin(HR=0.332,95%CI：0.114～0.965, P=0.043), long lesion(HR=0.209,95%CI:0.113 ～ 0.386, P<0.001)、collateral circulation (HR=0.189,95%CI: 0.090～0.397, P<0.001) Conclusions Different treatment time had no significant impact on STEMI patients who received late PCI. Diabetes, low molecular heparin, long lesion, collateral circulation were independent predictor of MACE free survival in these patients.
A1002 Poster 12	Effect of Adaptive Changes of Lysophosphatidylethanolamine Content on Ampicillin Resistance of *Yersinia Pseudotuberculosis* **Liudmila Davydova**, Nina Sanina, Svetlana Bakholdina, Anna Stenkova and Anna Zabolotnaya Far Eastern Federal University, Russia *Abstract*—Most antibiotics are targeted at intracellular processes. Therefore, their effects are determined by an ability to penetrate bacterial membranes. Mechanism of reducing permeability of porin channels in Gram-negative bacteria is the least known one among the possible reasons of antibiotic resistance. The adaptive accumulation of lysophosphatidylethanolamine (LPE), which is observed under conditions typical for the parasitic phase (in particular, the availability of glucose) of Gram-negative bacteria *Yersinia pseudotuberculsis* is accompanied by rearrangements in conformation of outer membrane protein OmpF that may impede the porin channel permeability for β-lactam antibiotics. In present study, we report that adaptive accumulation of LPE in membranes of *Y. pseudotuberculosis* grown in the presence of glucose reduces antibacterial effect of ampicillin. In turn, polyphenol extract from buckwheat husks (PEBH) induces both the decrease in the level of LPE and resistance of bacteria to ampicillin. Therefore, PEBH acts synergistically with ampicillin *in vivo* by lowering its MICs and therefore can be used as antibiotic adjuvant to improve an antibiotic's ability to cross the outer membrane. These results showed that strategies for regulation of adaptive changes in lipid matrix of bacterial membranes is a new potentially effective way to increase the

	sensitivity of pathogens to known antibiotics.
A1010 Poster 13	The Lipid Self-Assembly Including the Oxidation-Sensitive Polymer **Seok Ho Park** and Jin-Chul Kim Kangwon National University, South Korea *Abstract*—A variety of methods have been devised for chemotherapy. However, there were problems due to toxicity and expensive raw material value. The monoolein (MO) cubic in this study is very similar to the skin lipid and is not toxic and low in raw materials. In this study, drug release characteristics by external oxidative stimulation were observed by attaching an oxidation-sensitive polymer to the water channel of MO cubic phase. The oxidation-sensitive polymer poly(hydroxyethyl acrylamide-co-phenyl vinyl sulfide) (P(HEAA-co-PVS)) was synthesized by radical polymerization. In the XPS spectrum P(HEAA-co-PVS), the sulfide group of the PVS unit was converted to the sulfoxide group and the sulfone group by H2O2 treatment. When H2O2 was treated on MO cubic equipped with P (HEAA-co-PVS), it was confirmed that allura red AC (a dye) release was accelerated. As the concentration of H2O2 increases, the degree of allura red AC release increases. P (HEAA-co-PVS) would be oxidized to lose its surface activity and diffuse from the water channel and promote drug release.
A1011 Poster 14	Massive Colonoscopy Images Oriented Polyp Detection Ming Chen, **Peng Du** and Dong Zhang Hangzhou Dianzi University, China *Abstract*—Since more than 90% of colorectal cancers are converted from colorectal polyps, colonoscopy is the most effective method for early detection of colorectal polyps. However, artificial polyp judgement leads to a high missed diagnosis rate during colonoscopy inspection. To reduce the missed diagnosis rate, we propose an end-to-end deep learning based polyp detection method combining a series of pretreatment methods with a multiple classification based detection network. We have compared our method with several currently popular object detection methods. Experiment results show that our method has effective improvements on detection precision and performance.
A2001 Poster 15	Real Time Multiple Face Recognition: A Deep Learning Approach Shobhit Mittal, **Shubham Agarwal** and Madhav J. Nigam Indian Institute Of Technology Roorkee, India *Abstract*—Though a lot of research has already been done in the field of Face Recognition, one amongst the remaining challenges is recognizing

	multiple faces in weird conditions in a large group size. A robust face recognition system has been developed which detects faces in multiple, occluded, posed images obtained under low illumination conditions. The detector is a trained 34 layered Residual Network which obtains an accuracy of 98.4% on Visual Geometry Group Dataset [2]. A hybrid model has been proposed by combining the Residual Network detector with the novel approach of face embedding using triplet loss function [3] for recognition. The numerical and graphical results attached in the report depict the effectiveness of the proposed model for a variety of conditions. A 22 layered Inception Network has been trained for feature extraction and it achieves an accuracy of 99.5% on Labeled Faces in the Wild Dataset [5]. To achieve a similar accuracy on real life scenarios different methods like dimensionality reduction and data augmentation have been implemented. A mobile application has also been developed which utilizes the above described hybrid model for identification of people present in a large group. This application outweighs the fingerprint biometric in terms of speed, cost and group size.
A2025 Poster 16	Asymmetric Distance Learning for Unsupervised Video Person Re-Identification with Tracklet Neighborhood Re-Ranking **Xixi Hu** and Fengyu Zhou Shandong University, China *Abstract*—The gruelling human-annotation and lack of sufficient labeled data make unsupervised person re-identification (re-ID) an important component in research. This paper proposes a re-ID system for unsupervised video-based re-ID, which mainly contains an asymmetric distance learning approach and a re-ranking meth-od. Specifically, using the sequence information provided by video, asymmetric learning makes a distinctive projection for features in each view, while label estimation makes this procedure efficient and effective. To further refine the results of the ranking list, an unsupervised re-ranking technique based on the already computed distance is introduced to the system. We show that both of our asymmetric distance learning and re-ranking method have achieved state-of-the-art performance on PRID-2011, iLIDS-VID and MARS datasets, meanwhile restrains the computational costs. The experiments show that our asymmetric learning method is suitable for video-based re-ID with multiple cameras, and the proposed re-ranking method is a good solution to refine the ranking list for video-based re-ID.
A1013 Poster 17	Medical Lithium Battery Based on NARX Neural Network and AIPF Artificial Intelligence Algorithm PHM System Design **Cheng He**, Changchun Liu, Tao Wu, Yang Wu and Huanyi Wang Shanghai Polytechnic University, China *Abstract*—In order to solve the problem of failure of patients with

	failures caused by the uncertainty of lithium-ion batteries in medical electronic equipments, a set of prognostics and health management (PHM) systems for lithium-ion batteries in medical electronic equipment was proposed. An experiment platform for data testing and degradation status simulation of lithium batteries for medical electronic equipment was built. In order to reflect the health status of lithium-ion batteries for medical electronic devices, the four health factors of lithium batteries are extracted as characteristics of the degradation status of lithium-ion batteries for medical electronic devices, and they are passed through a nonlinear auto-regressive with exogenous inputs (NARX) neural network. The data of the health factors were trained and used for capacity estimation after training, and the equal interval discharge time series could be used to better characterize the lithium battery health status. In order to improve the precision of the Particle Filter-PF and more accurately predict the Reamaling Useful Life-RUL, the Artificial Immune Particle Filter (AIPF) and the Empirical Model for Lithium The battery performs the remaining life prediction, and compares the PF prediction result with the AIPF prediction result, and finds that the AIFF prediction is more accurate, indicating that AIFF effectively inhibits the particle degradation problem in the PF re-sampling process, and verifies the failure prediction of the lithium ion battery for medical electronic equipment. Health management system feasibility and enforceability.



Dinner	
18:00-20:00	**Lobby of Meeting Room 1**

Conference Venue

Conference Center, Okinawa Institute of Science and Technology Graduate University, Japan

https://www.oist.jp/conference-venue#Conference-Center

Email: reservation@oist.jp Contact Number: +81-(0)98-966-8173

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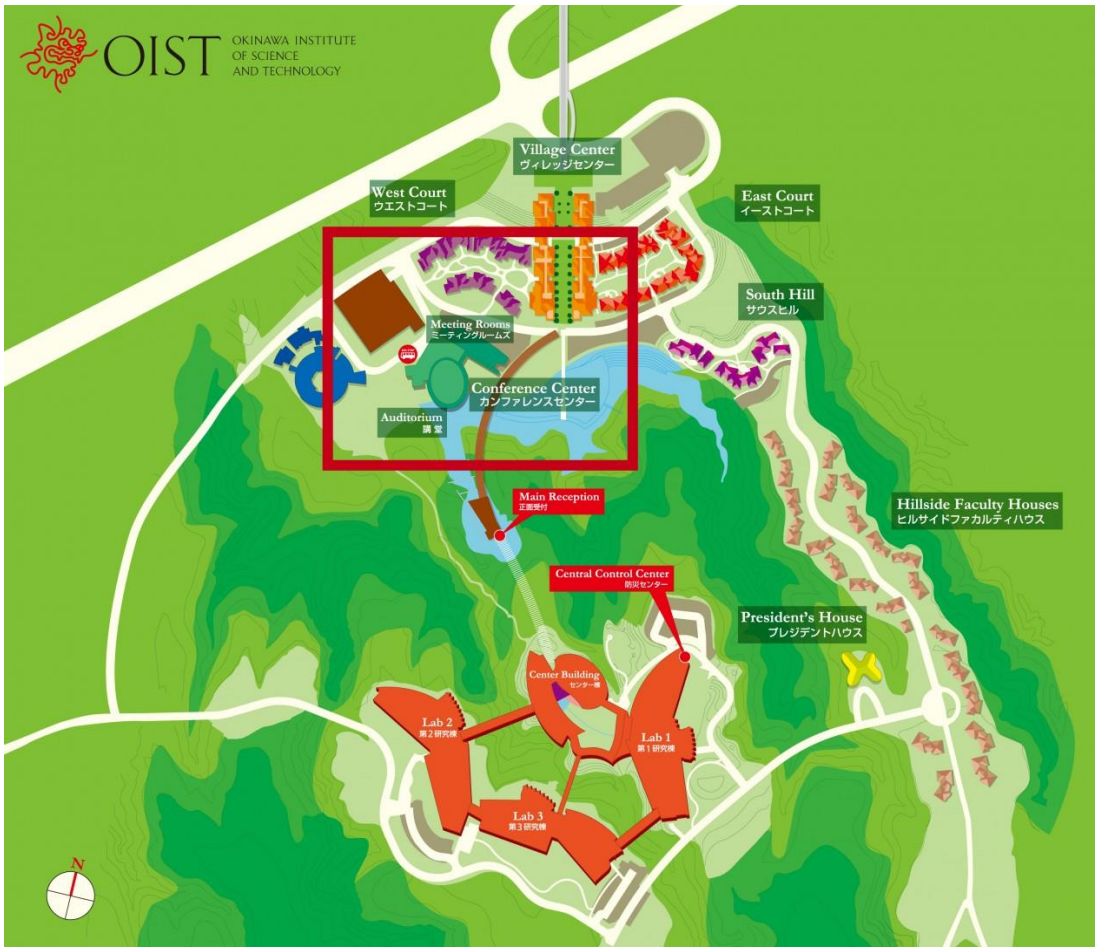
Map



Academic Tour

9:00-17:40, November 14, 2018 (Wednesday)

Tips: 1. Gather at Academic Center: Okinawa Institute of Science and Technology Graduate University, Japan before 8:50 a.m.

2. The following places are for references, and the final schedule should be adjusted to the actual notice.

3. The quotation doesn't include lunch and paid area at the Shuri Castle and Karate Kaikan

Time	Specific Arrangement
9:00-12:30	1. Departure at OIST; 2. Manza-mo; 3. Onna Marine Park; 4. Shuri Ryusen
12:40-13:25	5. Lunch at 琉球茶房あしびうなぁ
13:30-17:40	6. Shuri Castle and surrounding area; 7. Karate Kaikan; 8. Kokusai Dori (International Street); 9. Naha Airport

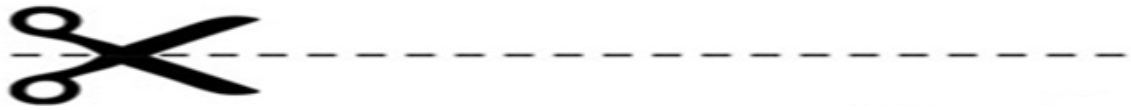
Manzamo is dramatic coral cliffs facing the East China Sea, with the natural vegetation covering its top which has been designated Okinawa Kaigan Quasi-National Park. Not merely the spectacular views of the ocean but also waves crushing into the cliffs and refreshing air are always enhanced the most by sunset.

Shuri Castle is a Ryukyuan gusuku in Shuri, Okinawa and also the palace building of the Ryukyu kingdom. It used to be the place where the King handled state affairs, received envoys and held important celebrations. It combines the unique architectural styles and superb stone masonry technology of Chinese and Japanese city-building cultures, greatly showing cultural and historical values.

Karate Kaikan is a complex south of Naha on Okinawa Island. Karate has a long history in Okinawa, dating back to the times of the Ryukyu Kingdom when the martial art was practiced in order to defend the king. Like today, the martial art was practiced in promotion of peace and taught discipline and mental as well as physical strength.

Kokusai Dori is the famous shopping street in downtown Naha. Lined on either side by souvenir shops, glass-bead and jewelry shops, cafes, restaurants, bars and street vendors, this broad and bustling street has quite some creepy surprises to offer too. The shops and restaurants remain open late in night attracting tourists and locals alike. Along with sampling the local produce, one can enjoy the famous Okinawan music too.

Note



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(Please fill this form and return it to conference specialist during the conference days.)

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Affiliation	

Please indicate your overall satisfaction with this conference with "√"

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Did the conference fulfill your reason for attending?	Yes– Absolutely □ Yes- But not to my full extent □ No□ (If "No", please tell us the main reason)

Would you please list the top 3 to 5 universities in your city?	
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Any Other Suggestions/Comments	

Thank you for taking time to participate in this conference evaluation. Your comments will enable us to execute future conferences better and tailor them to your needs!