

# January 19-20, 2017

Tenbusu, Naha, Okinawa, Japan http://ifmia2017.may-pro.net

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Multidisciplinary Computational Anatomy (Grants-in-Aid for Scientific Research of MEXT, Japan)



International Forum on Medical Imaging in Asia 2017

January 19-20, 2017 Tenbusu, Naha, Okinawa, Japan

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### Greetings

#### Welcome Message from the Conference General Chair

Dear Conference Participants,

It is my great pleasure to welcome you to the International Forum on Medical Imaging in Asia (IFMIA) 2017 in Okinawa, Japan. IFMIA is an international conference for the presentation and discussion of the most recent advancements in this field. The conference is open to scientists, engineers, and clinicians from all Asian countries to present, discuss, and exchange new ideas and the latest research outcomes in medical imaging.

The main topics are:

- Medical imaging and reconstruction theory (CT, MR, X-ray, US, PET, SPECT, OCT, Biological image, Histological image, etc.)
- Medical image analysis (Segmentation, Registration, Feature extraction, etc.)
- Computational anatomy and computational physiology
- Computer aided diagnosis
- Computer aided surgery and therapy (Medical robots, Surgical and interventional systems, etc.)
- Radiogenomics / Radiomics
- Visualization, Interactions, Virtual/augmented reality, and Simulations
- Medical informatics (PACS, IHE, Telemedicine, E-health, etc.)

130 abstracts were submitted and 104 of these have been accepted for presentation at the conference after a peer review process. The rejection rate was 20%, and the acceptance rate of oral presentations was also 20%. The program is complemented by three plenary talks and eight invited talks organized through the efforts of our general co-chairs and program chairs. Additionally, the organizing committee and secretary worked tirelessly to ensure the best quality of experience for the delegates. Finally, I would also like to thank our sponsors and supporters for their contributions to the conference.

I am delighted to give a warm welcome to all you.

Warmest Regards,

Akinobu Shimizu General Chair The International Forum on Medical Imaging in Asia (IFMIA) 2017

### Committee

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### **Floor Plan**

#### Floor map at-a-glance



#### Floor map for posters





Two posters are assigned to each side of the poster board.

## Program At A Glance

January 19		
9:00-	Registration	
9:25-9:30	Opening	
9:30-10:38	Oral 1 (Reporting system, Image processing for CAD)	
10:50-11:50	Oral 2 (Image processing for CAD and CAS)	
11:50-13:00	Lunch	
13:00-13:30	Plenary talk 1	
13:30-14:26	Oral 3 (Ultrasound)	
14:30-15:10	Poster teaser 1	
15:10-16:10	Poster session 1 + Coffee break	
16:10-16:40	Plenary talk 2	
16:40-17:24	Oral 4 (Multidisciplinary computational anatomy)	
17:30-18:06	Oral 5 (Multidisciplinary computational anatomy)	
19:00-	Reception	

January 20		
9:00-	Registration	
9:15-10:03	Oral 6 (SPECT, PET)	
10:05-10:57	Oral 7 (EIT, CT)	
11:05-12:09	Oral 8 (CBCT, Tomosynthesis)	
12:09-13:10	Lunch	
13:10-13:40	Plenary talk 3	
13:40-14:36	Oral 9 (Deep learning)	
14:40-15:20	Poster teaser 2	
15:20-16:20	Poster session 2 + Coffee break	
16:20-16:40	Award ceremony and closing	

### **Plenary Talks**

#### Plenary talk 1 : Photoacoustic Imaging for Preclinical Research with 3D Cell Culture Systems

January 19, 13:00 - 13:30, Tenbusu Hall

#### Pai-Chi Li

Distinguished Professor Department of Electrical Engineering, National Taiwan University, Taiwan Web site : http://cc.ee.ntu.edu.tw/~ultrasound/teacher.htm

**Biography :** Pai-Chi Li received the Ph.D. degree in Electrical Engineering: Systems, from the University of Michigan, Ann Arbor in 1994. He joined Acuson Corporation, Mountain View, CA, as a member of the Technical Staff in June 1994. In August 1997, he went back to the Department of Electrical Engineering at National Taiwan University, where he is currently Associate Dean of College of Electrical Engineering and Computer Science, Distinguished Professor of Department of Electrical Engineering and Institute of Biomedical Electronics and Bioinformatics. He served as Founding Director of Institute of Biomedical Electronics and Bioinformatics in 2006-2009 and National Taiwan University YongLin Biomedical Engineering Center in 2009-2011. He is also TBF



Chair in Biotechnology. Dr. Li is IEEE Fellow, IAMBE Fellow, AIUM Fellow and SPIE Fellow. He was also Editorin-Chief of Journal of Medical and Biological Engineering, Associate Editor of Ultrasound in Medicine and Biology, Associate Editor of IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, and on the Editorial Board of Ultrasonic Imaging and Photoacoustics.

**Abstract :** With the knowledge of cell interaction between tumor and therapeutic cells, it can help to develop cellbased therapeutic strategies such as immunotherapy. The ability to track cells in vivo or in vitro requires development of molecular probes and 3D molecular imaging systems. Specifically, 3D in vitro models allow the use of various imaging tools in cell tracking. To this end, optical resolution photoacoustic microscopy (OR-PAM) has the potential as a molecular imaging tool for cell migration analysis in 3D cultures. OR-PAM provides superior spatial resolution of micrometer level at 1-mm depth. With the aid of exogenous molecular contrast agents, OR-PAM systems can further provide cellular information. In this study, we verified the feasibility of gold nanorods (AuNRs) contrast-enhanced OR-PAM technique for depicting an in vitro 3D tumor microenvironment. The technique can provide better morphology in 3D microenvironment and is highly potential for preclinical development. The AuNRs contrast-enhanced OR-PAM is highly potential for preclinical screening requiring cell tracking. We will present our system setup, as well as experimental results on the relations between matrix stiffness and cancer cell behaviors. The implication in cancer mechanobiology will also be discussed.

## Plenary talk 2 : Recent Progress of Multidisciplinary Computational Anatomy January 19, 16:10 - 16:40, Tenbusu Hall

#### **Makoto Hashizume**

Distinguished Professor Department of Advanced Medical Initiatives, Kyushu University, Japan Web site : http://hyoka.ofc.kyushu-u.ac.jp/search/details/K001936/english.html http://wiki.tagen-compana.org/mediawiki/index.php/Main\_Page

**Biography :** Dr. Makoto Hashizume graduated after Kyushu University School of Medicine in 1979 and finished residency at General Surgery II, Kyushu University Hospital. He obtained PhD in 1984 from Graduate School of Medical Sciences, Kyushu University, in the area of pathology for portal hypertension. He promoted to Professor and Chairman, Department of Disaster and Emergency Medicine, Faculty of Medical Sciences, Kyushu University in 1999. He is currently the director of Centre for Advanced Medical Innovation, Kyushu University, the director of Department of Integration of Advanced Medicine and Innovative Technology, Kyushu University Hospital (CAMIT), and Distinguished Professor and Chairman, Department of Advanced Medical Initiatives,



Faculty of Medical Sciences, Kyushu University. He is at work on development of minimally invasive surgical robotic system with surgical navigation system. He received an official commendation for innovative technology from the Minister of Education, Culture, Sports, Science and Technology in 2006. He also won "the special prize of this year's robot 2007" for MR compatible surgical robotic system.

Abstract : The project, "Multidisciplinary Computational Anatomy and its Application to Highly Intelligent Diagnosis and Therapy (multidisciplinary computational anatomy in short)" was funded by MEXT Grant-in-Aid for Scientific Research on Innovative Areas in 2014. Multidisciplinary computational anatomy comprises scientific research on innovative areas based on medical images integrated with those factors of information such as (1) the spatial axis, from a cell size to an organ size level, (2) the time series axis, from an embryo to post mortem body, (3) the functional axis, such as medical image modality, physiology or metabolism, and (4) the pathological axis, from a healthy physical condition to a diseased condition. It is a new scientific area that establishes a mathematical analysis base for a comprehensive and useful understanding of the human body, and defines a new mathematical method for early detection and a highly intelligent diagnosis and treatment for the diseases with a difficulty in them. A new grant for the international activity has been accepted by MEXT last year and it has started to accelerate the global initiatives in collaboration with foreign leading centers in the new frontier over the world.

## Plenary talk 3 : Compressed Sensing and Deep Learning for Medical Imaging January 20, 13:10 - 13:40, Tenbusu Hall

#### Jong Chul Ye

KAIST Endowed Chair Professor Department of Bio/Brain Engineering, Korea Advanced Institute of Science and Technology (KAIST), Korea Web site : http://bispl.weebly.com/professor.html

**Biography :** Jong Chul Ye received the B.Sc. and M.Sc. degrees from Seoul National University, Seoul, Korea, and the Ph.D. degree from Purdue University, West Lafayette, IN, USA. He joined KAIST-Korea Advanced Institute of Science and Technology, Daejeon, Korea, in 2004, where he is currently KAIST endowed Chair Professor and the Professor of the Department of Bio/Brain Engineering. Before joining KAIST, he worked at Philips Research, and GE Global Research, both in New York. His current research interests include compressed sensing, machine learning and statistical signal processing for various imaging modalities such as MRI, fNIRS, CT, PET, optics, etc. He has served as an Associate Editor of IEEE Trans. On Image Processing, and IEEE Trans.



On Computational Imaging, and an Editorial Board Member for Magnetic Resonance in Medicine. His group was the first place winner of the 2009 Recon Challenge at the International Society for Magnetic Resonance in Medicine (ISMRMR) Workshop using k-t FOCUSS algorithm, and one of the winners at 2016 Low Dose CT Grand Challenge organized by the American Association of Physicists in Medicine (AAPM) using WaveNet deep learning algorithm. In 2011, he received Beckman Senior Fellowship award from Univ. of Illinois at Urbana-Champaign. He was the advisor of Student's Best Paper Awards at 2013 and 2016 IEEE Symposium on Biomedical Imaging.

**Abstract :** Compressed sensing (CS) has become one of the most important topics in modern medical imaging. CS overcomes classical spatio- and/or temporal- resolution limits in many medical imaging systems, as well as gives an opportunity to design new types of systems. Moreover, the sparse recovery principle in CS is closely related to the sparse coding principle in recent deep learning. In this talk, I will review our 10 year research activities on compressed sensing and deep learning approaches for medical imaging such as MR, CT, etc. Specifically, I will focus on our pioneering works in this field - k-t FOCUSS, ALOHA, WaveNet and its variations that can overcome the many of the limitation of the existing methods.

### **Invited Talks**

#### **O1-I-1 : A Framework for Sharing Medical Image Report and Annotations using XML** January 19, 9:30 - 9:50

#### **Prof. Woei-Chyn Chu**

Department of Biomedical Engineering, National Yang-Ming University, Taiwan

Abstract : Medical imaging plays an important role in clinical diagnoses. Radiologists need to make annotations on medical images to reveal abnormal findings. Digital Imaging and Communications in Medicine (DICOM) has defined a standard (DICOM Presentation state object) for handling image annotations. Both images and annotations could be presented on Picture Archiving and Communication System (PACS) viewer automatically and consistently to aid different reviewers to examine the findings. However, because many commercial PACS have not yet support full DICOM specifications, it is not an easy task to share the annotations across these imaging systems. Thus making it hard for the subsequent diagnoses. We propose a Web-based framework that aims at sharing the mammogram reports. The solution of annotation and markup display are consistent in the medical communities on the Health Promotion Administration (HPA) breast cancer screening project in Taiwan. Results and discussion will be reported in the conference.

#### **O3-I-1 : Ultrasound Structure Quantification for Liver Characterization** January 19, 13:30 - 13:50

#### **Prof. Po-Hsiang Tsui**

Department of Medical Imaging and Radiological Sciences, Chang Gung University, Taiwan

Abstract : Acoustic structure quantification (ASQ) is a recently developed technique widely used for detecting liver fibrosis and fatty liver. Ultrasound Nakagami parametric imaging based on the Nakagami distribution has been widely used to model echo amplitude distribution for tissue characterization. We explored the feasibility of using ultrasound Nakagami imaging as a model-based ASQ technique for assessing liver fibrosis and fatty liver. At first, we investigate the relationship between changes in backscattered statistics and the concentration of fatty droplets in the liver. Fatty liver was induced in rats fed a methionine-choline-deficient diet. Results show that the ultrasound Nakagami parameter has an excellent correlation with the concentration of fatty droplets, demonstrating that ultrasound backscatter statistics depend on the degree of fatty liver in rats. Concurrently, fibrosis in rat livers was induced by an intraperitoneal injection of dimethylnitrosamine. The results showed that the Nakagami image performs well in visualizing different degrees of liver fibrosis in rats. Finally, standard ultrasound examinations were performed on human subjects with liver fibrosis. The diagnostic value of ultrasound Nakagami imaging was evaluated using receiver operating characteristic (ROC) curves. The Nakagami parameter obtained through ultrasound Nakagami imaging decreased with an increase in the METAVIR score, representing an increase in the extent of pre-Rayleigh statistics for echo amplitude distribution. The area under the ROC curve (AUROC) was 0.88 for the diagnosis of any degree of fibrosis ( $\geq F1$ ). Ultrasound Nakagami imaging is a model-based ASQ technique that may be beneficial for the clinical diagnosis of early liver fibrosis.

#### O4-I-1 : Mathematical Foundations for 3D Reconstruction of Micro Anatomical Structures from Serial Histological Sections

January 19, 16:40 - 17:00

#### Prof. Hidekata Hontani

#### Nagoya Institute of Technology, Japan

Abstract : An ongoing research project, Multidisciplinary Computational Anatomy, aims to construct computational models, which represent multiple aspects of human bodies, using sets of medical images. The aspects to be represented can be classified into four categories: (1) Spatial scale, (2) temporal dynamism, (3) vital function, and (4) pathology. For example, a model that represents a spatial scale aspect of human bodies would describe the varieties and the correlations between the structures of the micro-anatomies observed by microscope images and those of the macro-anatomies observed by MR images. One of the most important techniques for the construction of such the multidisciplinary computational anatomy models is image registration: One must explicitly make correspondences between given images, which are obtained from different modalities or which are of different patients of different ages. In this talk, we represent some topics of image/model registration. In this project, we are now constructing a model of pancreas cancer from sets of (1) in-vivo 3D MR images of KPC mice and of (2) 2D microscope images of the pancreases extracted from the mice. The in-vivo MR images of one mouse are captured several times for observing the temporal changes of tumors of the pancreas cancer. A series of the 2D microscope images are captured by slicing the processed pancreas spatially densely in order for reconstructing a 3D microscope image from the 2D images. Image registration of the 3D MR images is required for describing the temporal change of the tumors. Image registration of the 2D microscope images is required for the reconstruction of the 3D image. Image registration between the 3D MR image that was captured just before the pancreas was extracted and the 3D reconstructed microscope image is required in order for analyzing the correlations between the macro structures and micro-structures observed in each of the 3D images. In this talk, we represent these image registrations from a mathematical point of view.

#### **O7-I-1 : Electrical Impedance Tomography for Pulmonary Function Analysis** January 20, 10:05 - 10:25

#### **Prof. Kuo-Sheng Cheng**

Department of Biomedical Engineering / Medical Device Innovation Center, National Cheng Kung University, Taiwan

Abstract: Electrical Impedance Tomography (EIT) is a novel imaging technology for industrial applications as well as medical applications. It usually applies currents to a peripheral electrode-array and then measures the resulting voltages using two-electrode or four electrode approach. From these applications and measurements, it may produce the bioimpedance images for the cross-section of body. Currently, it has found to be very useful in a variety of clinical applications, especially the pulmonary function analysis. This technique has the advantages of low-cost, real-time, and long-term monitoring. Generally, it is not easy to characterize the air distribution in dynamics and real-time for clinical diagnosis. Electrical impedance tomography may play an important role for alleviating this problem. In this paper, how to apply the electrical impedance images to quantify and analyze the distribution of air in the lungs is discussed. Some aspects of Experimental design, Measurement calibration, and 3D visualization are included. During the experiment, five layers of thoracic sections are measured under spontaneous breathing for each subject. The impedance images and flows via mouth are both synchronously acquired. Then, the images are interpolated for three dimension reconstruction and the flow signals are also interpolated for registering to the images. In the measurement calibration, the flow measurement obtained from spirometer is used as gold standard for calibration using regression method. With the correction factors, the volume in impedance image may be quantified and compared. From the experimental results, the error may be smaller than 10 % in 3D measurement, and on the contrary greater than 100% in 2D measurement. Therefore, 2D EIT is not easy to quantify the air distribution of the lung perfusion in the current clinical application. 3D EIT has great potential to provide the lung air distribution.

### **O7-I-2 : Practical Interior Tomography**

January 20, 10:25 - 10:45

#### Prof. Hiroyuki Kudo

Division of Information Engineering, Faculty of Engineering, Information and Systems, University of Tsukuba / JST-ERATO Momose Quantum-Beam Phase Imaging Project, Japan

Abstract: This work deals with image reconstruction in interior tomography (also called as local tomography), in which the aim is to reconstruct a 2-D image f(x,y) on a small region-of interest (ROI) S from limited (truncated) projection data corresponding to only a set of straight lines passing through the ROI S. For a long time (until 2007), it had been believed that exact reconstruction in interior tomography is impossible. However, exact reconstruction methods have appeared in the late 2000's by using a small prior knowledge on the object f(x,y). The first exact approach was proposed by Ye et al. and Kudo et al. with the name "prior knowledge based interior tomography", in which they used a prior knowledge that the object f(x,y) is known on an arbitrarily small prior knowledge region B located inside the ROI S to achieve exact reconstruction. The second exact approach was proposed by Yu et al. and Yang et al. with the name "Compressed Sensing based interior tomography", in which they used a prior knowledge that the object f(x,y) is piecewise constant over the whole ROI S to achieve exact reconstruction. The purpose of this paper is two-fold. First, we further advance the solution uniqueness of interior tomography mentioned above and prove the following result. If we know that the object f(x,y) is piecewise constant on an arbitrarily small prior knowledge region B located inside the ROI S, f(x,y) can be uniquely reconstructed over the whole ROI S. To the best of our knowledge, this result is much stronger than all the existing uniqueness results on interior tomography, which allows us to achieve exact reconstruction using a significantly smaller prior knowledge. Second, based on this new theoretical result, we propose a practical strategy of interior tomography, in which the prior knowledge region B is fixed on a boundary region (for example, a frame, left+right edges, or four corners, etc.) of ROI S without identifying where is a region having a piecewise constant intensity value inside S. Through numerical simulations and real-data experiments using X-ray tomography data, we demonstrate that the proposed method works quite well in practice.

### **O8-I-1 : Fiducial-based Simultaneous Correction for Irreproducible Gantry Motion and Involuntary Patient Motion for Geometrically Uncalibratable, C-armbased Cone-beam Computed Tomography Systems**

January 20, 11:05 - 11:25

#### Dr. Jang-Hwan Choi

Electronics and Telecommunications Research Institute, Korea

Abstract: Purpose: The aim of this study was to compensate for irreproducible gantry motion and involuntary patient motion for C-arm-based cone-beam computed tomography (CBCT) systems. Methods: Employing a spiral bead-based calibration phantom, the exact gantry trajectories of a C-arm-based CBCT system with a flat panel were computed over 10 consecutive scans, based on which the trajectory reproducibility was analyzed. Our method was tested on five CT datasets acquired from five healthy subjects while they stood in the scanner. First, fiducials (a surrogate of patient motion) were attached over the patients' knees. Then, the fiducials were automatically detected in 2D projections and reconstructed using the initial imperfect projection matrices and the Feldkamp-Davis-Kress algorithm. Each fiducial in the initial 3D reconstruction was determined as its 3D reference. Before back-projection, the 3D voxels were warped based on a rigid transformation for each projection to compensate for the motion of the patient and/or irreproducible gantry. The transformations were optimized to minimize the distances between the forward-projected 3D references and their detected 2D positions. Results: Ten separate and consecutive scans of a calibration phantom revealed an average primary angle shift of 0.6±0.3° (0.9° at max) over the pi-plus-fan gantry angle. A numerical patient motion metric of the residual fiducial deviation from a static position was 3.2±2.4mm (corresponding to 15.7 detector pixels), which is considerably larger than the detector pixel size of 313µm. The compounding motion factors (i.e., irreproducible gantry motion and patient motion) resulted in severe motion artifacts in the original reconstruction. Reconstruction with the proposed method achieved an improved soft-tissue visibility and recovered sharp edges at the interface of the bone and its surrounding tissue. Conclusions: We proposed a fully automated geometry calibration method for CBCT systems with irreproducible trajectories. In a patient validation, the method performed robustly even in the presence of patient motion.

### **O8-I-2 :** X-ray Imaging Techniques for Dental Applications

January 20, 11:25 - 11:45

#### **Prof. Seungryong Cho**

Department of Nuclear and Quantum Engineering, Korea Advanced Institute of Science and Technology, Korea

**Abstract :** As flat-panel based X-ray cone-beam CT (CBCT) technology advances, its applications are fast growing in various fields. Dental applications, as catch-phrased by digital dentistry, are greatly benefitted by the CBCT technologies. Treatment planning can be more accurately constructed, patient-specific tasks can be tailored, and the existing procedures can be replaced by more robust and efficient ones. It would be desirable if all these benefits come at a low-dose cost. Additionally, CBCT images are in general prone to various image artifacts including scatter artifacts, beam-hardening artifacts, and metal artifacts. Reduction and/or correction approaches are accordingly important to secure acceptable image qualities for clinical applications. In this paper, we briefly summarize the techniques that we have developed to meet such demands in CBCT. We will also introduce a 3D manufacturing method based on CBCT images.

#### **O9-I-1 : Applying Transfer Method for Deep Learning from Application Viewpoint** January 20, 13:40 - 14:00

#### **Prof. Hayaru Shouno**

#### The University of Electro-Communications, Japan

**Abstract :** Deep convolutional neural networks (DCNNs), which are inspired from the vision system, show good performances for the object classification task in these years, and it becomes a de facto standard feature representation method in the field of computer vision. DCNN is a kind of multi layer neural network, which can learn feature representation provided from the input of large amount of training data. Requiring the large amount of data in the medical imaging is a hard problem, so that we investigated a transfer style learning method for DCNN. The transfer method requires small amount of medical image dataset and large amount of other labeled image dataset.

We introduced a simple method, that is, the initial state of the DCNN has already been trained with large amount of natural images. Thus the DCNN could be suitable for a general object recognition task. Then we train the DCNN with diffuse lung disease (DLD) pattern classification task for fine-tuning. In the result, we found the transfer-style learning shows higher performance rather than that of the DCNN trained with only DLD dataset. We also investigated the difference between the DCNN with transfer style learning and with only DLD dataset from the viewpoint of clustering in the feature space. As the result, we found the transfer style DCNN has denser cluster representation rather than that of the one trained with only DLD dataset. Thus, we conclude the pre-matured initial state is important for such novel pattern classification.

### **Oral Session**

#### **Oral 1 (Reporting system, Image processing for CAD)**

#### January 19, 9:30-10:38

Chairs: Shouhei Hanaoka (The University of Tokyo, Japan), Kuo-Sheng Cheng (National Cheng Kung University, Taiwan)

- **O1-I-1 A Framework for Sharing Medical Image Report and Annotations using XML** *Woei-Chyn Chu (National Yang-Ming University, Taiwan)*
- O1-1 Probabilistic atlas model of asymptomatic intracranial aneurysms on a computer-aided framework for detecting aneurysms

Kazuya Hirakawa (Department of Health Sciences, Graduate School of Medical Sciences, Kyushu University), Hidetaka Arimura (Faculty of Medical Sciences, Kyushu University), Ze Jin (Department of Health Sciences, Graduate School of Medical Sciences, Kyushu University / Research Fellow of the Japan Society for the Promotion of Science), Shingo Kakeda (Department of Radiology, University of Occupational and Environmental Health), Fumio Yamashita, Makoto Sasaki (Institute for Biomedical Sciences, Iwate Medical University), Yukunori Korogi (Department of Radiology, University of Occupational and Environmental Health)

## O1-2 Automated prostate cancer detection via multi-parametric MRI texture feature classification

YoungGi Kim, Julip Jung, Helen Hong (Department of Software Convergence, Seoul Women's University, Seoul, Republic of Korea), SungIl Hwang, HakJong Lee (Department of Radiology, Seoul National University Bundang Hospital, Bundang, Republic of Korea)

## O1-3 Detection of the extracapsular spread in lymph nodes with quantitative texture analysis of FDG-PET images for head and neck cancer

Yu-Hua Fang, May Su (Department of Biomedical Engineering, National Cheng Kung University), Tsung-Ying Ho, Tzu-Chen Yen (Department of Nuclear Medicine, Chang Gung Memorial Hospital, Linkou)

#### O1-4 Tumor Diagnosis of 3-D Breast Elastography

Yao-Sian Huang, Ruey-Feng Chang (Department of Computer Science and Information Engineering National Taiwan University, Taipei, Taiwan), Etsuo Takada, Sachiyo Konno (Center of Medical Ultrasonics, Dokkyo Medical University), Chiun-Sheng Huang (Department of Surgery, National Taiwan University Hospital, Taipei, Taiwan), Ming-Hao Kuo (Department of Computer Science and Information Engineering National Taiwan University, Taipei, Taiwan)

#### Oral 2 (Image processing for CAD and CAS)

#### January 19, 10:50-11:50

Chairs: Hidekata Arimura (Kyushu University, Japan), Helen Hong (Seoul Women's University, Korea)

- O2-1 Modeling 3D Cell Nucleus by Template-based Deformable Model with Confined-region Determined by Cellular Characteristics Seoyoung Kim, Taeho Kim (KAIST)
- O2-2 MR Image Segmentation of Marmoset Brain Using Prediction of Shape Development by Gaussian Process

Yui Nakagawa, Atsushi Saito (Tokyo University of Agriculture and Technology), Junichi Hata (Department of Physiology, Keio University School of Medicine / Laboratory for Marmoset Neural Architecture, Brain Science Institute RIKEN /Central Institute for Experimental Animals), Satoko Takemoto (Image Processing Research Team, RIKEN), Yuji Komaki, Erika Sasaki (Department of Physiology, Keio University School of Medicine / Central Institute for Experimental Animals), Hideyuki Okano (Department of Physiology, Keio University School of Medicine / Laboratory for Marmoset Neural Architecture, Brain Science Institute RIKEN), Hideo Yokota (Image Processing Research Team, RIKEN), Akinobu Shimizu (Tokyo University of Agriculture and Technology)

#### O2-3 Pattern Analysis of the Kinematics in Ultrasound Videos of the Common Carotid Artery - Application to Cardiovascular Risk Evaluation

Guillaume Zahnd (Imaging-based Computational Biomedicine Lab, Nara Institute of Science and Technology, Japan), Diane Galbrun, Sami Qorchi (Université de Lyon, CREATIS; CNRS UMR 5220; INSERM U1044; INSA-Lyon; Université Lyon 1; France), Kozue Saito (Department of Stroke and Cerebrovascular Diseases, National Cerebral and Cardiovascular Center, Osaka, Japan), André Sérusclat (Department of Radiology, Louis Pradel Hospital; Hospices Civils de Lyon; Université Lyon 1, Lyon, France), Philippe Moulin (Department of Endocrinology, Louis Pradel Hospital; Hospices Civils de Lyon; Université Lyon 1, Lyon, France), Kazuyuki Nagatsuka (Department of Stroke and Cerebrovascular Diseases, National Cerebral and Cardiovascular Center, Osaka, Japan), Maciej Orkisz (Université de Lyon, CREATIS; CNRS UMR 5220; INSERM U1044; INSA-Lyon; Université Lyon 1; France), Yoshito Otake, Yoshinobu Sato (Imaging-based Computational Biomedicine Lab, Nara Institute of Science and Technology, Japan)

## **O2-4** Assessment of Co-registration Accuracy of Gamma Knife Icon<sup>TM</sup> Cone Beam Computed Tomography:Preliminary Results

Hyun-Tai Chung (Seoul National University, Korea), Tae Hoon Kim (Department of Nuclear Engineering, Hanyang University, Seoul 04763, Korea), Jin Wook Kim, Sun Ha Paek, Dong Gyu Kim (Department of Neurosurgery, Seoul National University, Seoul 03080, Korea)

#### O2-5 3D Surgical Planning and Analysis Software for Orbital Fracture Reconstruction

Youngjun Kim, Hyeun A Kim, Hyunchul Cho, Sunhee Kim, Jerome Charton, Deukhee Lee, Sehyung Park (Center for Bionics, Korea Institute of Science and Technology), Woo Shik Jeong, Jong Woo Choi (Department of Plastic and Reconstructive Surgery, University of Ulsan College of Medicine, Asan Medical Center)

#### **Oral 3 (Ultrasound)**

January 19, 13:30-14:26

Chairs: Koichi Ito (Tohoku University, Japan), Po-Hsiang Tsui (Chang Gung University, Taiwan)

- **O3-I-1** Ultrasound Structure Quantification for Liver Characterization Po-Hsiang Tsui (Chang Gung University, Taiwan)
- O3-1 Cyclic Magnetomotive Ultrasound for Sentinel Lymph Node Identification: In Vivo Small Animal Study

Yu-Chun Chang, Meng-Lin Li (National Tsing Hua University)

#### O3-2 Estimation of myocardial strain rate using high-frame-rate echocardiography

Kaori Kaburaki (Graduate School of Science and Engineering for Education, University of Toyama, Japan), Tadashi Yamaguchi (Center for Frontier Medical Engineering, Chiba University, Japan), Hideyuki Hasegawa (Graduate School of Science and Engineering for Education, University of Toyama, Japan)

#### O3-3 Freehand 3D Ultrasound Volume Reconstruction Using an Accurate Probe Localization Method

Shuya Ito (Tohoku University, Japan), Koichi Ito, Takafumi Aoki (Tohoku University., Japan), Jun Ohmiya, Satoshi Kondo (Konica Minolta, Inc., Japan)

#### **Oral 4 (Multidisciplinary computational anatomy)**

January 19, 16:40-17:24 Chairs: Kensaku Mori (Nagoya University, Japan)

#### O4-I-1 Mathematical Foundations for 3D Reconstruction of Micro Anatomical Structures from Serial Histological Sections

Hidekata Hontani (Nagoya Institute of Technology, Japan)

### O4-1 Multi-scale Image Fusion Between Pre-operative Clinical CT and X-ray microtomography of Lung Pathology

Holger Roth (Information & Communications, Nagoya University, Japan), Kai Nagara, Hirohisa Oda, Masahiro Oda (Graduate School of Information Science, Nagoya University, Japan), Tomoshi Sugiyama, Shota Nakamura (Nagoya University Graduate School of Medicine), Kensaku Mori (Information & Communications, Nagoya University, Japan / Graduate School of Information Science, Nagoya University, Japan)

### O4-2 A reaction-diffusion algorithm for segmentation of liver sinusoid in rats fed a high fat and cholesterol diet and their evaluations

Hiroto Shoji (Kyoto Prefectural University of Medicine, Japan), Kohtaro Yamada (National Institute of Technology, Anan College, Tokushima, Japan)

#### **Oral 5 (Multidisciplinary computational anatomy)**

#### January 19, 17:30-18:06

Chairs: Yoshinobu Sato (Nara Institute of Science and Technology, Japan)

O5-1 Development of Local Integral Type Reconstruction Formula for Magnetic Resonance Elastography

Ryo Urume (Graduate School of Technology, Chiba University), Mikio Suga (Graduate School of Technology, Chiba University / Center for Frontier Medical Engineering, Chiba University), Suguru Maekawa, Hiroshi Fujiwara (Graduate School of Informatics, Kyoto University)

## O5-2 An Age Estimation Method Using Brain Local Features of T1-Weighted Images and Its Performance Evaluation

Ryuichi Fujimoto, Koichi Ito (Graduate School of Information Sciences, Tohoku University), Kai Wu (South China University of Technology), Kazunori Sato, Yasuyuki Taki (Institute of Development, Aging and Cancer, Tohoku University), Hiroshi Fukuda (Tohoku Medical and Pharmaceutical University), Takafumi Aoki (Graduate School of Information Sciences, Tohoku University)

#### O5-3 A Spatiotemporal Statistical Model for Landmarks of Oral and Maxillofacial Area During the Human Embryonic Period

Masashi Kishimoto, Atsushi Saito (Tokyo University of Agriculture and Technology), Tetsuya Takakuwa, Shigehito Yamada (Kyoto University), Akinobu Shimizu (Tokyo University of Agriculture and Technology)

#### **Oral 6 (SPECT, PET)**

January 20, 9:15-10:03

Chairs: Yuichi Kimura (Kindai University, Japan)

- **O6-1 Imaging of single pinhole SPECT with a TEW scatter correction** *Xiaona Shan, Yutaro Hemuki, Koichi Ogawa (Hosei University,Japan)*
- O6-2 Radioactivity estimation of pulmonary artery from axillary vein on dynamic scintigrams by using 3-layer artificial neural networks

Kasumi Hirose, Takeshi Hara (Department of Intelligent Image Information, Gifu University Graduate School of Medicine), Yuki Tanaka, Taiki Nozaki, Masaki Matsusako (Department of Radiology, St. Luke's International Hospital), Tetsuro Katafuchi (Department of Radiological Technology, Gifu University of Medical Science), Chisako Muramatsu, Xiangrong Zhou, Hiroshi Fujita (Department of Intelligent Image Information, Gifu University Graduate School of Medicine)

- O6-3 Cancelled
- O6-4 Imaging simulation of a D-shape PET scanner for improved sensitivity and reduced cost in a whole-body imaging

Abdella M. Ahmed, Hideaki Tashima, Taiga Yamaya (National Institute of Radiological Sciences, 4-9-1 Anagawa, inage-ku, Chiba 263-8555, Japan)

#### Oral 7 (EIT, CT)

January 20, 10:05-10:57

Chairs: Yuichi Kimura (Kindai University, Japan), Woei-Chyn Chu (National Yang Ming University, Taiwan)

- **O7-I-1** Electrical Impedance Tomography for Pulmonary Function Analysis Kuo-Sheng Cheng (National Cheng Kung University, Taiwan)
- **O7-I-2** Practical Interior Tomography

*Hiroyuki Kudo (University of Tsukuba, JST-ERATO Momose Quantum-Beam Phase Imaging Project, Japan)* 

O7-1 Applying dynamical method of discrete tomography to X-ray CT imaging

Nakahama Kazuhiro (Shimane Prefectural Central Hospital / Graduate School of Health Sciences, Tokushima University), Takeshi Kojima, Tetsuya Yoshinaga (Institute of Biomedical Sciences, Tokushima University)

#### **Oral 8 (CBCT, Tomosynthesis)**

January 20, 11:05-12:09

Chairs: Yeong-Gil Shin (Seoul National University, Korea)

<b>O8-I-1</b>	Fiducial-based Simultaneous Correction for Irreproducible Gantry Motion and	
	Involuntary Patient Motion for Geometrically Uncalibratable, C-arm-based Cone-beam	
	Computed Tomography Systems	
	Jang-Hwan Choi (Electronics and Telecommunications Research Institute, Korea)	
<b>O8-I-2</b>	X-ray Imaging Techniques for Dental Applications Seungryong Cho (Korea Advanced Institute of Science and Technology, Korea)	
O8-1	Study for Application of Compressed-sensing scheme to Region-of-interest (ROI) Digital Tomosynthesis (DTS) Assisted from Scout View for Low-dose, High-quality X-ray Imaging	

So young Park, Guna Kim, Uikyu Je, Yeonok Park, Hyosung Cho (Department of Radiation Convergence Engineering, Yonsei University)

**O8-2** Cupping Artifacts Reduction for Synthetic Mammograms by Sine Function Addition Hyeongseok Kim, Taewon Lee, Jonghwan Min, Kihong Son, Sohail Sabir, Sanghoon Cho (Department of Nuclear & Quantum Engineering, Korea Advanced Institute of Science and Technology, Daejeon, Republic of KOREA)

#### **Oral 9 (Deep learning)**

#### January 20, 13:40-14:36

Chairs: Hyoungseop Kim (Kyushu Institute of Technology), Seungryong Cho (Korea Advanced Institute of Science and Technology, Korea)

- **O9-I-1** Applying Transfer Method for Deep Learning from Application Viewpoint Hayaru Shouno (The University of Electro-Communications, Japan)
- **O9-1** Improvement of detection sensitivity of architectural distortion in mammogram: hybrid false-positive reduction using convolutional neural network Mizuki Yamazaki, Atsushi Teramoto, Ryoichi Kato (Graduate School of Health Sciences, Fujita Health University), Hiroshi Fujita (Graduate School of Medicine, Gifu University)

#### **O9-2** Classification of Polyp Candidates on CTC Based on 3D-CNN

Tomoki Uemura, Huimin Lu, Hyoungseop Kim (Kyushu Institute of Technology), Rie Tachibana (National Institute of Technology, Oshima College), Toru Hironaka, Janne Nappi, Hiroyuki Yoshida (Massachusetts General Hospital / Harvard Medical School)

#### **O9-3** Towards Good Features for Skin Cancer Classification

Quoc Thanh Phan, Se Young Chun (Ulsan National Institute of Science and Technology)

### **Poster Session**

#### Poster teaser 1

January 19, 14:30-15:10 Chairs: Syoji Kobashi (University of Hyogo, Japan)

#### **Poster session 1**

January 19, 15:10-16:10

#### P1-1 Performance Characterization of Image Quality in Fluoroscopy and CT for Flat Panel Detector-based C-arm CBCT System

Bo Kyung Cha, Sungchae Jeon (KERI), Chang-Woo Seo, Jongduk Baek, Shinkook Choi, Changwoo Lee (Yonsei University)

P1-2 Respiratory Motion-Compensated Cone-Beam CT Image Reconstruction Using Thin-Plate Spline-Based Motion Vector Fields

Soon-Been Kim (Seoul Women's University), Seung-Hoon Chae, Yoonseon Song, Ji-Wook Jeong, Sooyeul Lee, Jang-Hwan Choi (Electronics and Telecommunications Research Institute)

#### P1-3 Low dose CT perfusion using hybrid iterative reconstruction algorithm Tomomi Ohmura (Department of Radiology and Nuclear Medicine, Research Institute for Brain and Blood Vessels-Akita), Yongbum Lee (Department of Radiological Technology, Graduate School of Health Sciences, Niigata University), Noriyuki Takahashi, Hideto Toyoshima (Department of Radiology and Nuclear Medicine, Research Institute for Brain and Blood Vessels-Akita)

- P1-4 CT Motion Compensation based on Patient Motion Data from a 3D Depth Camera Seunghyuk Moon (School of Integrated Technology, and Yonsei Institute of Convergence Technology)
- P1-5 Sparse-view filtered-backprojection (FBP) reconstruction in computed tomography (CT) using sinogram normalization-based interpolation and total-variation minimization methods

Guna Kim, Chulkyu Park, Kyuseok Kim, Soyoung Park, Hyosung Cho (Department of Radiation Convergence Engineering, Yonsei University)

## P1-6 Numerical simulation and experiment of phase contrast x-ray imaging (PCXI) using a single antiscatter grid

*Hyunwoo Lim, Hunwoo Lee, Yeonok Park, Hyosung Cho (Department of Radiation Convergence Engineering, Yonsei University)* 

- P1-7 Reconstruction of 3-D Rotator Cuff Shape for Tear Diagnosis in Open MR Images Kazuki Ishiro, Manabu Nii (University of Hyogo), Tomoyuki Muto, Hiroshi Tanaka, Hiroaki Inui (Nobuhara Hospital & Institute of Biomechanics), Syoji Kobashi (University of Hyogo), Katsuya Nobuhara (Nobuhara Hospital & Institute of Biomechanics)
- P1-8 The new reconstruction method for sparse MRA image based on the combination of LASSO regression and Kida's optimum approximation

Yuichi Kida (The School of Pharmaceutical sciences, Ohu University), Takuro Kida (Professor Emeritus, Tokyo Institute of Technology)

#### P1-9 Accelerated MR-based Pulse Wave Velocity Measurement in Head and Neck

Tzu-Cheng Chao (Department of Computer Science and Information Engineering, National Cheng-Kung University, Tainan, Taiwan), Yo-Chia Cheng (Department of Automatic Control Engineering, Feng Chia University, Taichung, Taiwan), Teng-Yi Huang (Department of Electrical Engineering, National Taiwan University of Sciense and Technology, Taipei, Taiwan), Yi-Jui Liu (Department of Automatic Control Engineering, Feng Chia University, Taichung, Taiwan)

#### P1-10 Non-uniform sampling pitch acquisition method in myocardial SPECT

Kei Tsukamoto (Fujita Health University Graduate School of Health Sciences Master Course in Health Sciences), Seiji Shirakawa, Atsushi Teramoto (Fujita Health University Graduate School of Health Sciences Master Course in Health Sciences / Fujita Health University School of Health Sciences Faculty of Radiological Technology), Masataka Endo, Ayano Sagisaka, Kazutaka Nakashima, Toshihito Hirose (Fujita Health University School of Health Sciences Faculty of Radiological Technology), Ryoichi Kato (Fujita Health University Graduate School of Health Sciences Master Course in Health Sciences / Fujita Health University School of Health Sciences Faculty of Radiological Technology)

#### P1-11 Performance Evaluation of Kinetics-Based Denoising Algorithm for PET Amyloid Imaging

Kosuke Fuji, Takahiro Yamada, Takashi Nagaoka, Yuichi Kimura (Kindai University, Graduate School of Biology-Oriented Science and Technology)

#### P1-12 Investigation of Potential Usability of Machine Learning to Diagnosis of Parkinson Disease Using SPECT DaTSCAN

Shogo Watanabe, Takashi Nagaoka, Yuichi Kimura (Kindai University, Graduate School of Biology-Oriented Science and Technology)

P1-13 Dynamic PET denoising using Robust PCA Hanvit Kim, Se Young Chun (Ulsan National Institute of Science and Technology)

## P1-14 Generation of enhanced synthetic mammogram from digital breast tomosynthesis using the dual-tree complex wavelet transform

Seung-Hoon Chae, Ji-Wook Jeong, Jang-Hwan Choi (Electronics and Telecommunications Research Institute), Eun Young Chae, Hak Hee Kim (Asan Medical Center, College of Medicine, University of Ulsan), Young-Wook Choi (Korea Electrotechnology Research Institute), Sooyeul Lee (Electronics and Telecommunications Research Institute)

## P1-15 A generic approach to multiple organs segmentation in 3D CT or FDG-PET images based only on a deep convolutional network

Xiangrong Zhou, Ryosuke Takayama, Kenshiro Takeda, Takeshi Hara (Department of Intelligent Image Information, Division of Regeneration and Advanced Medical Sciences, Graduate School of Medicine, Gifu University), Masaya Kato, Satoshi Ito (Department of Radiology, Daiyukai General Hospital), Hiroshi Fujita (Department of Intelligent Image Information, Division of Regeneration and Advanced Medical Sciences, Graduate School of Medicine, Gifu University)

#### P1-16 Implementation of Stacked Convolutional Neural Networks for the Classification of Lung Adenocarcinoma Transcriptome Subtypes

Naoaki Ono, Victor Andrew Antonio (Graduate School of Information Science, Nara Institute of Science and Technology, Japan), Akira Saito (Division for Health Service Promotion, University of Tokyo, Japan), Tetsuo Sato, Md. Altaf-Ul-Amin, Shigehiko Kanaya (Graduate School of Information Science, Nara Institute of Science and Technology, Japan)

#### P1-17 A 2-staged Transfer Learning Method with Deep Convolutional Neural Network for Diffuse Lung Disease Analysis

Aiga SUZUKI, Satoshi SUZUKI (University of Electro-Communications), Shoji KIDO (Yamaguchi University), Hayaru SHOUNO (University of Electro-Communications)

## P1-18 Discrimination of metallic objects in dental panoramic x-ray image with a photon counting technique and an artificial neural network

Akihiro Yasuda, Koichi Ogawa (Hosei University), Tatsumasa Fukui, Akihisa Katsumata (Asahi University)

#### P1-19 An Automated Breast Mass Detection Algorithm on Digital Breast Tomosynthesis Images using Hough transform and Convolutional Neural Networks

Ji-Wook Jeong (ETRI, Daejeon, South Korea), Seung-Hoon Chae (ETRI, Daejeon, Republic of Korea), Eun Young Chae, Hak Hee Kim (Asan Medical Center, Seoul, Republic of Korea), Young Wook Choi (KERI, Ansan, Republic of Korea), Sooyeul Lee (ETRI, Daejeon, Republic of Korea)

#### P1-20 A Deep Learning Approach to Automated Mammographic Breast Density Estimation

Chul Kyun Ahn, Byungjun Park, Heongmin Jin (Graduate School of Convergence Science and Technology, Seoul National University), Changyong Heo (Advanced Institutes of Convergence Technology, Seoul National University), Zepa Yang, Jaewon Lee (Graduate School of Convergence Science and Technology, Seoul National University), Jong Hyo Kim (Graduate School of Convergence Science and Technology, Seoul National University / College of Medicine, Seoul National University / Department of Radiology, Seoul National University Hospital / Advanced Institutes of Convergence Technology, Seoul National University)

### P1-21 Development of automated fracture detection method in head CT images using surface selective black-hat transform

Ayumi Yamada, Atsushi Teramoto, Ryoichi Kato (Graduate School of Health Sciences, Fujita Health University), Kohei Kudos, Tomato Otsuka, Hirofumi Anno (Daido Hospital), Hiroshi Fujita (Graduate School of Medicine, Gifu University)

### P1-22 Teeth classification in cone-beam CT using deep convolutional neural network for forensic identification.

Yuma Miki (Department of Intelligent Image Information, Graduate School of Medicine, Gifu University, Gifu, Japan), Chisako Muramatsu (Department of Intelligent Image Information, Graduate School of Medicine, Gifu University, 1-1 Yanagido, Gifu 501-1194, Japan), Tatsuro Hayashi (Media Co., Ltd., 3-26-6 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan), Xiangrong Zhou, Takeshi Hara (Department of Intelligent Image Information, Graduate School of Medicine, Gifu University, 1-1 Yanagido, Gifu 501-1194, Japan), Akitoshi Katsumata (Department of Oral Radiology, School of Dentistry, Asahi University, 1851 Hozumi, Mizuho, Gifu 501-0296, Japan), Hiroshi Fujita (Department of Intelligent Image Information, Graduate School of Medicine, Gifu University, 1-1 Yanagido, Gifu 501-1194, Japan)

## P1-23 Analysis of pelvis and femur alignment in the standing position using automated 2D-3D registration: Toward large-scale population analysis

Koki Koyama, Yoshito Otake (Graduate School of Information Science, Nara Institute of Science and Technology), Keisuke Uemura, Masaki Takao, Takeshi Ogawa (Department of Orthopaedic Medical Engineering, Osaka University Graduate School of Medicine), Yuta Hiasa, Futoshi Yokota (Graduate School of Information Science, Nara Institute of Science and Technology), Nobuhiko Sugano (Department of Orthopaedic Medical Engineering, Osaka University Graduate School of Medicine), Yoshinobu Sato (Graduate School of Information Science, Nara Institute of Science and Technology)

#### P1-24 Post-operative implanted knee joint function: an assessment on prediction

Belayat Hossain (Graduate School of Engineering, University of Hyogo, JAPAN), Manabu Nii (Graduate School of Engineering, University of Hyogo, JAPAN / WPI Immunology Research Center, Osaka University, JAPAN), Takatoshi Morooka, Makiko Okuno, Shiichi Yoshiya (Department of Orthopaedic, Hyogo College of Medicine, JAPAN), Syoji Kobashi (Graduate School of Engineering, University of Hyogo, JAPAN / WPI Immunology Research Center, Osaka University, JAPAN)

### P1-25 Identification of Alzheimer's disease patient from 3D-stSSM using machine learning algorithm

Saadia Binte Alam (Graduate School of Engineering, University of Hyogo), Syoji Kobashi (Graduate School of Engineering, University of Hyogo / WPI Immunology research center, Osaka University, Japan)

## P1-26 Automated classification of arteries and veins in retinal images for measurement of arteriolar-to-venular diameter ratio.

Kazuki Samo (Division of Electronic Systems Engineering, Graduate School of Engineering, the University of Shiga Prefecture), Yuji Hatanaka, Kazunori Ogohara, Wataru Sunayama (Department of Electronic Systems Engineering, School of Engineering, the University of Shiga Prefecture), Chisako Muramatsu, Hiroshi Fujita (Department of Intelligent Image Information, Graduate School of Medicine, Gifu University)

## P1-27 A preliminary study on template-matching-based tracking of cervical vertebral bodies in videofluorography during swallowing.

Kojiro Mekata (Department of Computer Science, Graduate school of Systems and Information Engineering, University of Tsukuba / Department of Rehabilitation, Kobe Red Cross Hospital), Hotaka Takizawa (Department of Computer Science, Graduate school of Systems and Information Engineering, University of Tsukuba), Jun Matsubayashi (Laboratory of Neurorehabilitation, Department of Human Health Sciences, Graduate School of Medicine), Tomoyuki Takigawa (Department of Orthopaedic Surgery, Okayama University Hospital), Kazukiyo Toda, Yasuo Ito (Department of Orthopaedic Surgery, Kobe Red Cross Hospital), Hiroyuki Kudo (Department of Computer Science, Graduate school of Systems and Information Engineering, University of Tsukuba / JST-ERATO Quantum-Beam Phase Imaging Project)

#### P1-28 Cancelled

## P1-29 Airway segmentation from 3D chest CT volumes based on volume of interest using gradient vector flow

Qier Meng (Graduate School of Information Science, Nagoya University, Japan), Takayuki Kitasaka (Faculty of Information Science, Aichi Institute of Technology), Masahiro Oda (Graduate School of Information Science, Nagoya University), Kensaku Mori (Strategy Office, Information & Communications, Nagoya University / Graduate School of Information Science, Nagoya University)

#### P1-30 This poster moved to the next to P2-38.

P1-31 Cancelled

#### P1-32 Cancelled

P1-33 Preoperative planning system of breast magnetic resonance imaging using threedimensional image processing and reconstruction

Chien-CHaun Ko (Department of Computer Science and Information Engineering, ChiaYi, TAiwan, R.O.C), Shi-Hua Chen (Division of Radiology, Taichung Veterans General Hospital, Taiwan, R.O.C.), Pin-Wei Hung (Department of Computer Science and Information Engineering, ChiaYi, TAiwan, R.O.C)

P1-34 Initial study on uterine peristalsis quantification using Cine MR images Haruna Wada, Syoji Kobashi, Manabu Nii (University of Hyogo), Akira Nakashima, Isamu Komesu, Yoshimitsu Tokunaga, Tetsuro Sakumoto (Soranomori Clinic)

## P1-35 Feasibility of an automated framework for estimation of patient positioning errors in radiation therapy using range images acquired by an infrared ray-based range sensor

Mazen Soufi (Graduate School of Medical Sciences, Kyushu University), Hidetaka Arimura (Faculty of Medical Sciences, Kyushu University), Katsumasa Nakamura (Hamamatsu University School of Medicine), Taka-aki Hirose (Graduate School of Medical Sciences, Kyushu University), Yoshiyuki Umedu (Kyushu University Hospital), Yoshiyuki Shioyama (Saga Heavy Ion Medical Accelerator in Tosu), Fukai Toyofuku (Professor Emeritus, Kyushu University)

## P1-36 Deformable image registration method using internal organ constraint in cervical cancer radiotherapy case

Nadhifa Ayunisa, Yoshihiro Kuroda (Graduate School of Engineering Science, Osaka University), Noriyuki Kadoya (Department of Radiation Oncology, Tohoku University School of Medicine), Shunsuke Yoshimoto, Osamu Oshiro (Graduate School of Engineering Science, Osaka University)

#### P1-37 Analysis of Electrophysiological Techniques for Brain Mapping Using a Multiscale Model Based on Medical Images

Jose Gomez-Tames, Shinta Aonuma, Takaharu Kutsuna, Akimasa Hirata (Department of Electrical and Mechanical Engineering, Nagoya Institute of Technology, Nagoya Japan)

#### P1-38 Cardiac Computational Modeling Project using Human Specimens with Congenital Heart Disease

Ryo Haraguchi (University of Hyogo), Taka-aki Matsuyama (Kyoto Prefectural University of Medicine), Yoshiaki Morita, Hatsue Ishibashi-Ueda (National Cerebral and Cardiovascular Center Hospital), Hirofumi Seo (SCIEMENT, Inc.)

#### P1-39 Realistic 3D printed-anatomical model for medical application

Sang Joon Park, Doohee Lee, Jung Hoon Kim, Ijin Joo, Jin Mo Goo, Jin Wook Chung (Seoul National University Hospital)

#### Poster session 2

#### January 20, 15:20-16:20

#### P2-1 Evaluation of Metal Artifact Reduction Using Dynamical Image Reconstruction in X-ray CT

Yusaku Yamaguchi (Shikoku Medical Center for Children and Adults, National Hospital Organization), Omar M. Abou Al-Ola (Tanta University), Shintaro Harano (Graduate School of Health Sciences, Tokushima University), Takeshi Kojima, Tetsuya Yoshinaga (Institute of Biomedical Sciences, Tokushima University)

#### P2-2 3D MTF Estimation of a Cone-beam CT System Using Sphere Phantoms

Hoon-dong Song, Changwoo Lee (School of Integrated Technology, and Yonsei Institute of Convergence Technology)

### P2-3 A novel method of improving image quality in spectral CT by use of a hybrid half-fan mode

Jieun Chang, Sunhee Wi, Miran Park, Hyekyun Chung, Donghyun Lee, Gyuseong Cho (Department of Nuclear & Quantum Engineering, Korea Advanced Institute of Science and Technology, Daejeon, Republic of Korea)

#### P2-4 Quantitative analysis on the effect of CT scanning parameters on features of lung nodule: A preliminary lung nodule phantom study

Young Jae Kim (Biomedical Engineering Branch, Division of Precision Medicine and Cancer informatics, National Cancer Center), Hyun-Ju Lee (Department of Radiology, Seoul National University Hospital), Seung Hyun Lee (Department of Plasma Bio Display, Kwangwoon University), Kwang Gi Kim (Biomedical Engineering Branch, Division of Precision Medicine and Cancer informatics, National Cancer Center)

P2-5 Tomosynthesis from images at free acquisition orbit using a portable X-ray detector Kohei Sato (Graduate School of Engineering, Chiba University), Takashi Ohnishi, Masashi Sekine, Hideaki Haneishi (Center for Frontier Medical Engineering, Chiba University)

#### P2-6 Stereoscopic 3D X-ray Imaging for a Real-time Surgical Image Guide Jeongwon Yang, Bo Kyung Cha (Korea Electrotechnology Research Institute, Korea)

## P2-7 Verification of incident photon fluence per air kerma on detective quantum efficiency calculation for various measurement conditions in mammography units

Natsuki Otani (Department of Radiological Technology, Gradual School of Medicine, Nagoya University), Shuji Koyama (Brain and Mind Research Center, Nagoya University), Tomonobu Haba (Department of Radiology, Fujita Health University Hospital), Tomoki Shibahara (Department of Radiological Technology, Gradual School of Medicine, Nagoya University)

P2-8 Study on Multi-frame Sparsifying Transform Function in Compressed Sensing Reconstruction of MR Phase-varied Images

Mone Shibuya, Satoshi Ito (Utsunomiya University)

#### P2-9 Motion correction algorithm for ECV Map in cardiac MRI

Subaru Nakayama, Tetuo Sato (Nara Institute of Science and Technology), Nobuyasu Ichinose (Toshiba Medical Systems Corporation), Shigehide Kuhara (Kyorin University), Shigehiko Kanaya, Kotaro Minato (Nara Institute of Science and Technology), Cesar Nomura (Incor / University of Sao Paulo Medical School)

## P2-10 Methods to combine multiple phase-cycled balanced steady state free precession MRI for phase imaging

Jae-Woong Kim (Korea Advanced Institute of Science and Technology), Seong-Gi Kim (Center for Neuroscience Imaging Research, Institute for Basic Science (IBS), Suwon, South Korea / Department of Biomedical Engineering, Sungkyunkwan University, Suwon, South Korea)

#### P2-11 Cancelled

## P2-12 Speed of sound evaluation of cell organelles of rat liver with ultra-high frequency ultrasound

Kazuyo Ito (Chiba University), ZhiHao Deng (Graduate School of Engineering, Chiba University), Kenji Yoshida (Center for Frontier Medical Engineering, Chiba University), Hitoshi Maruyama (Graduate School of Medicine, Chiba University), Tadashi Yamaguchi (Center for Frontier Medical Engineering, Chiba University)

#### P2-13 Simulation of Deforming Hunamn Tissue by Multiple Deep Neural Networks

Kaoru Kobayashi, Ken'ichi Morooka (Graduate School of Information Science and Electrical Engineering, Kyushu University), Yasushi Miyagi (Department of Stereotactic and Functional Neurosurgery, Fukuoka Mirai Hospital), Takaichi Fukuda (Graduate School of Medical Sciences, Kumamoto University), Tokuo Tsuji (Faculty of Mechanical Engineering, Kanazawa University), Ryo Kurazume (Graduate School of Information Science and Electrical Engineering, Kyushu University), Kazuhiro Samura (Department of Neurosurgery, Fukuoka University Hospital,)

### P2-14 A preliminary study on the automated classification of lung cancers in microscopic images using deep convolutional neural networks

Atsushi Teramoto (School of Health Sciences, Fujita Health University), Tetsuya Tsukamoto, Yuka Kiriyama (School of Medicine, Fujita Health University), Ryoichi Kato (School of Health Sciences, Fujita Health University), Hiroshi Fujita (Graduate School of Medicine, Gifu University)

#### P2-15 Detection of Unruptured Aneurysms on MRA Images By Using GC Filter Bank and Neural Network

Kengo Mori (Department of Intelligent Image Information, Graduate School of Medicine, Gifu University), Yoshikazu Uchiyama (Department of Medical Physics, Faculty of Life Science, Kumamoto University), Takeshi Hara, Hiroshi Fujita (Department of Intelligent Image Information, Graduate School of Medicine, Gifu University)

#### P2-16 Cancelled

#### P2-17 Panoramic Dental Tomosynthesis auto-focusing using Convolutional Neural Network (CNN) Method

Taejin Kwon, Hoyeon Lee, Taewon Lee, Changhwan Kim, Yunhee Kim (Department of Nuclear & Quantum Engineering, Korea Advanced Institute of Science and Technology, Daejeon, Republic of KOREA)

#### P2-18 GPU Implementation of SLIC Supervoxel Oversegmentation

Hirohisa Oda (Graduate School of Information Science, Nagoya University), Kanwal K. Bhatia (Division of Imaging Sciences and Biomedical Engineering, King's College London), Masahiro Oda (Graduate School of Information Science, Nagoya University), Takayuki Kitasaka (Faculty of Information Science, Aichi Institute of Technology), Shingo Iwano (Nagoya University Graduate School of Medicine), Julia A. Schnabel (Division of Imaging Sciences and Biomedical Engineering, King's College London), Kensaku Mori (Information & Communications, Nagoya University / Graduate School of Information Science, Nagoya University)

#### P2-19 Detection of Abnormal Accumulations on a Bone Scintigram Utilizing Anatomical Structure Information

Yuta Minami, Atsushi Saito (Tokyo University of Agriculture and Technology), Mitsutaka Nemoto, Shohei Hanaoka (The University of Tokyo Hospital), Shigeaki Higashiyama, Joji Kawabe, Susumu Shiomi (Osaka City University), Akinobu Shimizu (Tokyo University of Agriculture and Technology)

## P2-20 Automated muscle segmentation from CT images of the hip and thigh using hierarchical multi-atlas method-Validation using large-scale datasets-

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  - Each plenary talk has been allocated a 30-minute time slot ( 25-minute presentation followed by 5-minute discussion ).
  - Each invited talk has been allocated a 20-minute time slot (15-minute presentation followed by 5-minute discussion).
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- 3. Time schedule of poster presentation

Date	Installation	Poster Teaser (1-minute oral presentation)	Poster Presentation	Removal
January 19	9:00-10:30	14:30-15:10	15:10-16:10	17:00-18:00
January 20	9:00-10:30	14:40-15:20	15:20-16:20	16:20-16:50

Presenters are requested to install and remove their posters by themselves. Posters that remain mounted after the designated removal time may be disposed of.

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- The purpose of "1-minute teaser presentation" is not to explain all what you have done, but to attract audience to visit your poster.
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- The "pptx file" of your slides should not be bigger than 5MB.
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  - A presentation which has not been received until this deadline will not be included in the teasers session at IFMIA2017

### **General Information**

Conference Name	The International Forum on Medical Imaging in Asia 2017			
Date	January 19-20, 2017			
Location	Tenbusu Naha, 3-2-10, Makishi, Naha, Okinawa, Japan Oral : 4th floor, Tenbusu Hall Poster : 4th floor, Lesson Room and Lobby of Tenbusu Hall Organizing committee meeting at lunch time : 3rd floor, Team Mirai no Ie			
Registration	Time         January 19         9:00 - 18:00           January 20         9:00 - 15:00			
	Location Registration desk, 4 Registration Fees	th noor		
	Registration rees		Early Dird	Lata/On Sita
	Degular (with recention for infor	motion analysis	Early Bird	22 000 IDV
	Regular (with reception for infor	mation exchange)	28,000	33,000JPY
	Regular (with reception)	motion anahongo)	25,000	28,000JPY
	Student (with reception for infor	mation exchange)	10,000	20,000JPY
	Additional conference recention	for an accompanying person	5,000	5 000 IPV
	Additional conference reception		5,000	5,00031 1
Language	<ul> <li>On the payment of on-site registration at the registration desk, either cash (Japanese yen only) or credit ca (VISA, MASTER, AMEX, JCB) is acceptable.</li> <li>For each pre-registered attendant, a name card will be printed in advance and handed to thattendant together with all other items at the registration desk.</li> <li>Registration for the IFMIA2017 entitles you to: <ul> <li>Full participation at the IFMIA2017</li> <li>Coffee breaks</li> <li>A booklet and a USB Stick for IFMIA2017 proceedings</li> </ul> </li> <li>The conference language is English.</li> </ul>			
Award ceremony	IFMIA2017 award ceremony will be held at Tenbusu Hall on January 20, 16:20 - 16:40.			
Reception for inform	ation exchange January 19, 19:00 - 21:00 at Tenbu	usu Hall (4th floor)		
Coffee breaks	Drinks (coffee, water, etc.) are available during poster sessions.			
Smoking policy	Please refrain from smoking except in the designated smoking space in the venue.			
Venue	Access to Tenbusu Naha: Abou Rail <sup>2</sup> Climate in Okinawa: Temp	ut 25minutes from the Naha A . Near Makishi Station. perature of January in Naha is b	Airport on th between 14 a	e monorail "Yui- nd 20.
Contact	Secretariat of IFMIA2017 c/o May project Inc. 5-1-1, Heiwajima, Ohta-ku, Tokyo 143-0006 JAPAN TEL : +81-3-5767-5531 E-mail : ifmia2017@may-pro.net	)		

Co-sponsors	Okinawa Convention & Visitors Bureau Tateisi Science and Technology Foundation The Uehara Memorial Foundation Nihon Medi-Physics Co.,Ltd. The Japanese Society of Medical Imaging Technology JSMBE SIG-MBI (Japanese Society for Medical and Biological Engineering, Special Interest Group of Medical and Biological Imaging) Medical Imaging and Information Sciences IEICE (The Institute of Electronics, Information and Communication Engineers) Multidisciplinary Computational Anatomy (Grants-in-Aid for Scientific Research of MEXT Japan)
History of the IFMIA	IFMIA2007; January 25-27, 2007, Cheju National University, Cheju, Korea IFMIA2009; January 18-21, 2009, National Taiwan University, Taipei, Taiwan IFMIA2011; January 18-19, 2011, Tenbusu Naha, Okinawa, Japan IFMIA2012; November 16-17, 2012, KAIST, Daejeon, Korea IFMIA2015; January 11-13, 2015, National Cheng Kung University, Tainan, Taiwan
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