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Andrzej Krol
Barjor S. Gimi
Editors

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Introduction

The 2020 SPIE Biomedical Applications in Molecular, Structural and Functional Imaging Conference was held on 15 - 20 February, 2020 at Marriott Marquis Houston, Houston, Texas, United States. We maintained the high participation we saw last year, both in the number of abstracts submitted and in the conference attendees over previous years. Conference Chairs Barjor Gimi and Andrzej Krol welcomed Professor Zhi-Pei Liang, University of Illinois (USA), who delivered an outstanding, perceptive keynote address entitled "*Label-free molecular imaging with spins: a path to high resolution through learned subspaces*" that provided an overview of recent breakthroughs in overcoming the long-standing technical barriers for molecular MR spectroscopic imaging (MRSI)-based label-free molecular imaging using a new technology known as SPICE (SPectroscopic Imaging by exploiting spatiospectral CorrElation). Preliminary results presented an unmatched capability for simultaneous mapping of brain structures, function and metabolism using intrinsic spin signals from numerous molecules.

Next, the Conference Chairs welcomed Professor Axel Wismüller, University of Rochester Medical Ctr. (USA), who delivered an exceptional, insightful invited talk entitled "*Artificial Intelligence in radiology: from machine learning to clinical application*"
that provided an outlook on clinical deployment and quantitative evaluation of artificial intelligence solutions in radiology.

The diverse sessions included Keynote and Invited Talk, Bone and Skeletal Imaging, Segmentation, Registration and Decision-making, Cardiac Imaging and Nanoparticle Imaging, Deep Convolutional Neural Networks in Molecular, Structural, and Functional Imaging, Innovations in Image Processing, Neurological Imaging, Novel Imaging Techniques and Applications, Ocular and Optical Imaging, Vascular and Pulmonary Imaging.

We are grateful to the chairs of sessions: Nancy Ford, Ciprian Ionita, Vikram Kodibagkar, Armando Manduca, David Wilson, Axel Wismüller, and Baohong Yuan.

The poster session comprised vibrant discussions. A panel of judges selected "*Quantification of axillary lymphadenopathy from CT images of filovirus infections in non-human primates: sensitivity and evaluation of radiomics-based methods*" by Marcelo A. Castro et al. (National Institute of Allergy and Infectious Disease, NIH, USA) for the Cum Laude award.

The poster "*Integration of multi-task fMRI for cognitive study by structure-enforced collaborative regression*" by Yuntong Bai, et al. (Tulane University, USA), was selected as an Honorable Mention.

Jiwoong J. Jeong, (Emory University, United States) was selected as 1st finalist for the paper entitled "*Brain tumor segmentation using 3D Mask R-CNN for dynamic susceptibility contrast-enhanced perfusion imaging*" for Robert F. Wagner All-Conference Best Student Paper Awards.

Zeina Shboul, (Old Dominion University) was selected as 2nd finalist for the paper entitled "*Efficacy of radiomics and genomics in predicting TP53 mutations in diffuse lower grade glioma*" for Robert F. Wagner All-Conference Best Student Paper Awards.

Andrzej Krol
Barjor S. Gimi

2020 Medical Imaging Award Recipients

Robert F. Wagner Best Student Paper Award

Robert F. Wagner was an active scientist in the SPIE Medical Imaging meeting, starting with the first meeting in 1972 and continuing throughout his career. He ensured that the BRH, and subsequently the CDRH, was a sponsor for the early and subsequent Medical Imaging meetings, helping to launch and ensure the historical success of the meeting. The Robert F. Wagner All-Conference Best Student Paper Award (established 2014) is acknowledgment of his many important contributions to the Medical Imaging meeting and his many important advances to the field of medical imaging.

This award is co-sponsored by:

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2020 Recipients:

First Place: **Multi-body registration for fracture reduction in orthopaedic trauma surgery (11315-14)**
R. Han, A. Uneri, P. Wu, R. Vijayan, P. Vagdargi, M. Ketcha, N. Sheth, Johns Hopkins University (United States), S. Vogt, G. Kleinszig, Siemens Healthineers (Germany) G. M. Osgood, John Hopkins Hospital (United States), J. H. Siewerdsen, John Hopkins University (United States)

Second Place: **Phase contrast CT enabled three-material decomposition in spectral CT imaging** (11312-47)
Xu Ji, Ran Zhang, Ke Li, Guang-Hong Chen, University of Wisconsin School of Medicine and Public Health (United States)