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Biomedical Applications in Molecular, Structural, and Functional Imaging

Barjor Gimi
Andrzej Krol
Editors

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2019 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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2019 Recipients:

First Place: **Volume-of-interest imaging using multiple aperture devices** (10984-74)
Wenying Wang, Grace J. Gang, Jeffrey H. Siewerdsen, Joseph W. Stayman, Johns Hopkins University (United States)

Second Place: **Surgical aid visualization system for glioblastoma tumor identification based on deep learning and in-vivo hyperspectral images of human patients** (10951-35)
Himar Fabelo, The University of Texas at Dallas (USA) and Universidad of Las Palmas de Gran Canaria (Spain); Martin Halicek, The University of Texas at Dallas (United States) and Georgia Institute of Technology & Emory University School of Medicine (United States); Samuel Ortega, Universidad de Las Palmas de Gran Canaria (Spain); Adam Szolna, Jesus Morera, Hospital Universidad de Gran Canaria Doctor Negrin (Spain); Roberto Sarmiento, Universidad of Las Palmas de Gran Canaria (Spain); Gustavo M. Callicó, Universidad de Las Palmas de Gran Canaria (Spain); Baowei Fei, The University of Texas at Dallas (United States) and The University of Texas Southwestern Medical Center (United States)

Introduction

The 2019 SPIE "Biomedical Applications in Molecular, Structural and Functional Imaging" Conference was held on 19 - 21 February, 2019 at Town and Country Resort, San Diego, California, 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 Christopher Filippi, North Shore-Long Island Jewish Medical System and Columbia University (USA), who delivered an outstanding, insightful keynote address entitled "*The dawning of AI in radiology: a brave new world*" that provided a brief review of machine learning and deep learning techniques in artificial intelligence (AI), as applied in diagnostic radiology, with the focus on the translation of AI into diagnostic radiology from clinical workflow to its implementation in routine clinical practice to informed diagnosis, treatment management, and prognostication. Specific, ongoing work in the automated detection of hemorrhage on non-contrast head CT, prediction of genetic variability of brain tumors, detection of breast cancer and risk factors for breast cancer, and detection of knee ligament injury was profiled among other clinical applications. Both machine learning and deep learning techniques are transforming how radiologists make intelligent decisions from the quantitative diagnostic images that will require that radiologists become data scientists and data managers in the future.

The diverse sessions included Keynote, Bone Imaging, Cardiovascular Imaging, Innovations in Image Processing, MRI and fMRI, Neurological Imaging, Novel Imaging Techniques and Applications, Optical, Pulmonary and Vascular Imaging.

We are grateful to the chairs of sessions: Ciprian Ionita, Vikram Kodibagkar, Armando Manduca, Nicholas Tustison, Axel Wismüller, and Baohong Yuan.

The poster session comprised vibrant discussions. A panel of judges selected "*Machine-learning based classification of glioblastoma using dynamic susceptibility enhanced MR image*" by Jiwoong Jason Jeong et al. (Emory University, USA) for the Cum Laude award.

The poster "*Brain MRI classification based on machine learning framework with auto-context mode*" by Yang Lei et al. (Emory University, USA), was selected as an Honorable Mention.

Gabrielle M. Colvert (University of California San Diego) was selected as 1st finalist for the paper entitled "*Novel measurement of LV twist using 4DCT: quantifying accuracy as a function of image noise*" for Robert F. Wagner All-Conference Best Student Paper Awards.

Joseph Bullock (Durham University) was selected as 2nd finalist for the paper entitled "*XNet: a convolutional neural network (CNN) implementation for medical x-ray image segmentation suitable for small datasets*" for Robert F. Wagner All-Conference Best Student Paper Awards.

Andrzej Krol
Barjor Gimi