PROGRESS IN BIOMEDICAL OPTICS AND IMAGING
Vol. 19 No. 52

Medical Imaging 2018

Ultrasonic Imaging and Tomography

Neb Duric
Brett C. Byram
Editors

13–15 February 2018
Houston, Texas, United States

Sponsored by
SPIE

Cosponsored by
DECTRIS Ltd. (Switzerland)

Cooperating Organizations
AAPM—American Association of Physicists in Medicine (United States)
IFCARS—International Foundation for Computer Assisted Radiology and Surgery (Germany)
MIPS—Medical Image Perception Society (United States)
RSNA—Radiological Society of North America (United States)
WMIS—World Molecular Imaging Society

Published by
SPIE

Volume 10580

Proceedings of SPIE, 1605-7422, V. 10580

Medical Imaging 2018: Ultrasonic Imaging and Tomography, edited by Neb Duric,
Brett C. Byram, Proc. of SPIE Vol. 10580, 1058001 · © 2018 SPIE
CCC code: 1605-7422/18/$18 · doi: 10.1117/12.2323921

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:
Author(s), "Title of Paper," in *Medical Imaging 2018: Ultrasonic Imaging and Tomography*, edited by Neb Duric, Brett C. Byram, Proceedings of SPIE Vol. 10580 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 1605-7422
ISSN: 2410-9045 (electronic)

ISBN: 9781510616493
ISBN: 9781510616509 (electronic)

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE. DIGITAL LIBRARY
SPIEDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B … 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

ULTRASOUND TOMOGRAPHY I

ULTRASOUND TOMOGRAPHY II

PHOTOACOUSTICS I

QUANTITATIVE ULTRASOUND AND REGISTRATION

POSTER SESSION

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Conference Committee

Symposium Chairs

Leonard Berliner, Weill Cornell Medical College (United States) and New York Presbyterian - Brooklyn Methodist Hospital (United States)
Ronald M. Summers, National Institutes of Health (United States)

Conference Chairs

Neb Duric, Delphinus Medical Technologies (United States) and Barbara Ann Karmanos Cancer Institute (United States)
Brett C. Byram, Vanderbilt University (United States)

Conference Program Committee

Mark A. Anastasio, Washington University in St. Louis (United States)
Jeffrey C. Bamber, The Royal Marsden NHS Foundation Trust (United Kingdom)
Johan G. Bosch, Erasmus University Rotterdam (Netherlands)
Jan D'hooge, University of Leuven (Belgium)
Marvin M. Doyley, University of Rochester (United States)
Stanislav Y. Emelianov, The University of Texas at Austin (United States)
Mostafa Fatemi, Mayo Clinic College of Medicine (United States)
Aaron Fenster, Robarts Research Institute (Canada)
Jérémie Fromageau, The Institute of Cancer Research (United Kingdom)
James F. Greenleaf, Mayo Clinic (United States)
Emma J. Harris, The Institute of Cancer Research (United Kingdom)
Michael Jaeger, University Bern (Switzerland)
Jørgen Arendt Jensen, Technical University of Denmark (Denmark)
David H. Kim, Pohang University of Science and Technology (Korea, Republic of)
Roman G. Maev, University of Windsor (Canada)
Stephen A. McAleavey, University of Rochester (United States)
Mohammad Mehrmohammadi, Wayne State University (United States)
Svetoslav I. Nikolov, BK Medical (Denmark)
Olivier Roy, Barbara Ann Karmanos Cancer Institute (United States)
Nicole V. Ruiter, Karlsruher Institut für Technologie (Germany)
Kai E. Thomenius, Massachusetts Institute of Technology (United States)
François Varray, CREATIS (France)

Session Chairs

1 Perfusion and CEUS
Roberto Janniel Lavarello Montero, Pontificia Universidad Católica del Perú (Peru)

2 Signal Processing and B-Mode
Olivier Roy, Barbara Ann Karmanos Cancer Institute (United States)

3 Ultrasound Tomography I
Nicole V. Ruiter, Karlsruher Institut für Technologie (Germany)

4 Ultrasound Tomography II
Cuiping Li, Delphinus Medical Technologies, Inc. (United States)

5 Photoacoustics I
Mark A. Anastasio, Washington University in St. Louis (United States)
Mohammad Mehrmohammadi, Wayne State University (United States)

6 Keynote and Photoacoustics II
Richard Bouchard, The University of Texas M.D. Anderson Cancer Center (United States)

7 Ultrasound Tomography III
Brett C. Byram, Vanderbilt University (United States)

8 Quantitative Ultrasound and Registration
Gursharan Yash Singh Sandhu, Delphinus Medical Technologies, Inc. (United States)

2018 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:

The Medical Image Perception Society

2018 Recipients:

First Place: **Dynamic beam filtering for miscentered patients** (10573-29)
Andrew Mao, William Shyr, Grace J. Gang, J. Webster Stayman, Johns Hopkins Univ. (United States)

Second Place: **Tumor margin classification of head and neck cancer using hyperspectral imaging and convolutional neural networks** (10576-4)
Martin Halicek, Georgia Institute of Technology (United States) and Augusta Univ. (United States); James V. Little, Xu Wang, Emory Univ. School of Medicine (United States); Mihir Patel, Emory Univ. School of Medicine (United States) and The Winship Cancer Institute of Emory Univ. (United States); Christopher C. Griffith, Emory Univ. School of Medicine (United States); Amy Y. Chen, Emory Univ. School of Medicine (United States) and The Winship Cancer Institute of Emory Univ. (United States); Baowei Fei, Georgia Institute of Technology & Emory Univ. (United States) and The Winship Cancer Institute of Emory Univ. (United States)