PROGRESS IN BIOMEDICAL OPTICS AND IMAGING
Vol. 16 No. 45

Medical Imaging 2015

Biomedical Applications in Molecular, Structural, and Functional Imaging

Barjor Gimi
Robert C. Molthen
Editors

24–26 February 2015
Orlando, Florida, United States

Sponsored by
SPIE

Cosponsored by
ALIO Industries (United States)
Alpinion Medical Systems (United States)
Modus Medical Devices Inc. (Canada)
Bruker (United States)

Cooperating Organizations
AAPM—American Association of Physicists in Medicine (United States) • APS—American Physiological Society (United States) • CARS—Computer Assisted Radiology and Surgery (Germany) • Medical Image Perception Society (United States) • Radiological Society of North America (United States) • Society for Imaging Informatics in Medicine (United States) World Molecular Imaging Society • The DICOM Standards Committee

Volume 9417

Proceedings of SPIE, 1605-7422, V. 9417

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Medical Imaging 2015: Biomedical Applications in Molecular, Structural, and Functional Imaging,
edited by Barjor Gimi, Robert C. Molthen, Proc. of SPIE Vol. 9417, 941701
© 2015 SPIE · CCC code: 1605-7422/15/$18 · doi: 10.1117/12.2193783

The papers included 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. The papers published in these proceedings 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 this book:
Author(s), "Title of Paper," in *Medical Imaging 2015: Biomedical Applications in Molecular, Structural, and Functional Imaging*, edited by Barjor Gimi, Robert C. Molthen, Proceedings of SPIE Vol. 9417 (SPIE, Bellingham, WA, 2015) Article CID Number.

ISSN: 1605-7422
ISBN: 9781628415070

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

Copyright © 2015, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is $18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 1605-7422/15/$18.00.

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, with papers published first online and then in print. Papers are published as they are submitted and meet publication criteria. A unique citation identifier (CID) number is assigned to each article at the time of the first 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, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four 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. The complete citation is used on the first page, and an abbreviated version on subsequent pages.

Contents

ix *Authors*

xiii *Conference Committee*

xv *Introduction*

xvii *2015 Medical Imaging Award Recipients*

SESSION 1 NOVEL IMAGING TECHNIQUES AND APPLICATIONS

9417 02 **Developing hyperpolarized silicon particles for advanced biomedical imaging applications** [9417-1]

9417 03 **Development of a diaphragmatic motion-based elastography framework for assessment of liver stiffness** [9417-2]

9417 04 **Voxel-level reproducibility assessment of modality independent elastography in a pre-clinical murine model** [9417-3]

9417 06 **A hand-held EPR scanner for transcutaneous oximetry** [9417-5]

SESSION 2 INNOVATIONS IN IMAGE PROCESSING

9417 07 **Multi-atlas segmentation for abdominal organs with Gaussian mixture models** [9417-6]

9417 08 **Quantification of esophageal wall thickness in CT using atlas-based segmentation technique** [9417-7]

9417 09 **Fully automatic algorithm for segmenting full human diaphragm in non-contrast CT Images** [9417-8]

9417 0A **Progress toward automatic classification of human brown adipose tissue using biomedical imaging** [9417-9]

SESSION 3 NOVEL MR TECHNIQUES AND APPLICATIONS

9417 0B **A Bloch-McConnell simulator with pharmacokinetic modeling to explore accuracy and reproducibility in the measurement of hyperpolarized pyruvate** [9417-10]

9417 0C **Fat-water MRI is sensitive to local adipose tissue inflammatory changes in a diet-induced obesity mouse model at 15T** [9417-11]

9417 0D **Susceptibility weighted imaging of stroke brain in response to normobaric oxygen (NBO) therapy** [9417-12]

9417 0E **Quantification of *in vivo* pH-weighted amide proton transfer (APT) MRI in acute ischemic stroke** [9417-13]

9417 0F **A rapid Look-Locker imaging sequence for quantitative tissue oximetry** [9417-14]

SESSION 4 KEYNOTE AND NEUROLOGICAL IMAGING

9417 0G **The rapid imaging renaissance: sparser samples, denser dimensions, and glimmerings of a grand unified tomography (Keynote Paper)** [9417-15]

9417 0I **Predicting stroke outcome using DCE-CT measured blood velocity** [9417-17]

9417 0J **Marker-less multi-frame motion tracking and compensation in PET-brain imaging** [9417-18]

SESSION 5 FMRI

9417 0K **Towards an automated selection of spontaneous co-activity maps in functional magnetic resonance imaging** [9417-19]

9417 0L **Cortical activities of single-trial P300 amplitudes modulated by memory load using simultaneous EEG-fMRI** [9417-20]

9417 0M **Nonlinear functional connectivity network recovery in the human brain with mutual connectivity analysis (MCA): convergent cross-mapping and non-metric clustering** [9417-21]

9417 0N **Comparing consistency of R2* and T2*-weighted BOLD analysis of resting state fetal fMRI** [9417-22]

9417 0O **Robust motion correction and outlier rejection of *in vivo* functional MR images of the fetal brain and placenta during maternal hyperoxia** [9417-23]

SESSION 6 OPTICAL

9417 0P **Segmentation of microcystic macular edema in Cirrus OCT scans with an exploratory longitudinal study** [9417-24]

9417 0Q **Estimation of tissue optical parameters with hyperspectral imaging and spectral unmixing** [9417-25]

9417 0S **An automatic labeling bifurcation method for intracoronary optical coherence tomography images** [9417-27]

9417 0T **Optical coherence tomography (OCT) of a murine model of chronic kidney disease** [9417-28]

9417 0U **MicroCT and optical coherence tomography imagistic assessment of the dental roots adhesive** [9417-29]

SESSION 7 FLUIDS AND CARDIOVASCULAR

9417 0V **Initial testing of a 3D printed perfusion phantom using digital subtraction angiography** [9417-30]

9417 0W **Angiographic analysis for phantom simulations of endovascular aneurysm treatments with a new fully retrievable asymmetric flow diverter** [9417-31]

9417 0X **Improved factor analysis of dynamic PET images to estimate arterial input function and tissue curves** [9417-78]

9417 0Y **Dynamic myocardial perfusion in a porcine balloon-induced ischemia model using a prototype spectral detector CT** [9417-33]

9417 0Z **Low dose dynamic myocardial CT perfusion using advanced iterative reconstruction** [9417-34]

SESSION 8 CANCER IMAGING

9417 10 **A pilot study of the prognostic significance of metabolic tumor size measurements in PET/CT imaging of lymphomas** [9417-104]

9417 11 **Very low-dose adult whole-body tumor imaging with F-18 FDG PET/CT** [9417-36]

9417 12 **Improved characterization of molecular phenotypes in breast lesions using ^{18}F-FDG PET image homogeneity** [9417-37]

9417 13 **Fluorescence imaging to study cancer burden on lymph nodes** [9417-110]

9417 14 **MRI assessment of changes in tumor oxygenation post hypoxia-targeted therapy** [9417-39]

9417 15 **Evaluation of a targeted nanobubble ultrasound contrast agent for potential tumor imaging** [9417-40]

SESSION 9 LUNG

9417 16 **Principal component analysis of the CT density histogram to generate parametric response maps of COPD** [9417-41]

9417 17 **Automated pulmonary lobar ventilation measurements using volume-matched thoracic CT and MRI (Second Place RFW All Conference Best Student Paper Award)** [9417-42]

9417 18 **3D cine magnetic resonance imaging of rat lung ARDS using gradient-modulated SWIFT with retrospective respiratory gating** [9417-43]

9417 19 **Texture analysis of automatic graph cuts segmentations for detection of lung cancer recurrence after stereotactic radiotherapy** [9417-44]

9417 1A **Fourier-based linear systems description of free-breathing pulmonary magnetic resonance imaging** [9417-45]

SESSION 10 BONE

9417 1B **Validation of CBCT for the computation of textural biomarkers** [9417-46]

9417 1C **Validation of TMJ osteoarthritis synthetic defect database via non-rigid registration** [9417-47]

9417 1D **Micro-computed tomography (CT) based assessment of dental regenerative therapy in the canine mandible model** [9417-48]

9417 1E **Characterizing trabecular bone structure for assessing vertebral fracture risk on volumetric quantitative computed tomography** [9417-49]

9417 1F **Volumetric characterization of human patellar cartilage matrix on phase contrast x-ray computed tomography** [9417-50]

9417 1G **Real time early detection imaging system of failed wounds and heterotopic ossification using unique Raman signatures** [9417-51]

POSTER SESSION

9417 1H **Simplified correction of B_1 inhomogeneity for chemical exchange saturation transfer (CEST) MRI measurement with surface transceiver coil** [9417-52]

9417 1I **Imaging tooth enamel using zero echo time (ZTE) magnetic resonance imaging** [9417-53]

9417 1J **Rapid MR spectroscopic imaging of lactate using compressed sensing** [9417-54]

9417 1K **A Laplacian-based SNR measure: shear stiffness estimation in MR elastography** [9417-55]

9417 1L **Interaction of multiple networks modulated by the working memory training based on real-time fMRI** [9417-56]

9417 1M **Functional connectivity analysis in resting state fMRI with echo-state networks and non-metric clustering for network structure recovery** [9417-57]

9417 1N **Investigating the use of mutual information and non-metric clustering for functional connectivity analysis on resting-state functional MRI** [9417-58]

9417 1O **Decoding the subjective rotation direction of the spinning dancer from fMRI data** [9417-59]

9417 1P **Structural development of human brain white matter from mid-fetal to perinatal stage** [9417-60]

9417 1Q **A non-linear regression method for CT brain perfusion analysis** [9417-61]

9417 1R **Early postnatal myelin content estimate of white matter via T1w/T2w ratio** [9417-62]

9417 1S **Subcortical shape and volume abnormalities in an elderly HIV+ cohort** [9417-63]

9417 1T **Integrating histology and MRI in the first digital brain of common squirrel monkey, Saimiri sciureus** [9417-64]

9417 1U **A novel approach to motion correction for ASL images based on brain contours** [9417-65]

9417 1V **Resting fMRI measures are associated with cognitive deficits in schizophrenia assessed by the MATRICS consensus cognitive battery** [9417-66]

9417 1X **Fiber based in-vivo imaging of epithelial FAD fluorescence: experiments and simulations** [9417-68]

9417 1Z **Digital speckle pattern interferometry based anomaly detection in breast mimicking phantoms: a pilot study** [9417-70]

9417 20 **Fourier transform infrared (FT-IR) spectroscopy and imaging of the nucleus to characterize DNA contributions in different phases of the cell cycle** [9417-72]

9417 21 **Semi-automated 2D Bruch's membrane shape analysis in papilledema using spectral-domain optical coherence tomography** [9417-73]

9417 22 **Development of color micro optical-CT: evaluation using phantom and biological samples** [9417-74]

9417 23 **Coherent noise remover for optical projection tomography** [9417-75]

9417 24 **Signal enhancement in optical projection tomography via virtual high dynamic range imaging of single exposure** [9417-76]

9417 25 **Towards myocardial contraction force image reconstruction for heart disease assessment and intervention planning** [9417-77]

9417 26 **Treatment planning for image-guided neuro-vascular interventions using patient-specific 3D printed phantoms (Cum Laude Poster Award)** [9417-79]

9417 27 **Aneurysm flow characteristics in realistic carotid artery aneurysm models induced by proximal virtual stenotic plaques: a computational hemodynamics study** [9417-81]

9417 28 **A reconstruction method of intra-ventricular blood flow using color flow ultrasound: a simulation study** [9417-82]

9417 29 **Consistent and reproducible positioning in longitudinal imaging for phenotyping genetically modified swine** [9417-83]

9417 2A **Mid-callosal plane determination using preferred directions from diffusion tensor images** [9417-84]

9417 2B **Feature transformation of neural activity with sparse and low-rank decomposition** [9417-85]

9417 2C **Toward content-based image retrieval with deep convolutional neural networks** [9417-86]

9417 2D **Effects of frame rate and image resolution on pulse rate measured using multiple camera imaging photoplethysmography** [9417-87]

9417 2F **Tooth segmentation system with intelligent editing for cephalometric analysis** [9417-89]

9417 2G **Non-invasive pulmonary blood flow analysis and blood pressure mapping derived from 4D flow MRI** [9417-90]

9417 2H **Effect of sample size on multi-parametric prediction of tissue outcome in acute ischemic stroke using a random forest classifier** [9417-91]

9417 2I **Automated pipeline to analyze non-contact infrared images of the paraventricular nucleus specific leptin receptor knock-out mouse model** [9417-92]

9417 2J **MR image analytics to characterize upper airway architecture in children with OSAS** [9417-93]

9417 2K **A new application of electrical impedance spectroscopy for measuring glucose metabolism: a phantom study** [9417-94]

9417 2N **Investigating the geometry of pig airways using computed tomography** [9417-98]

9417 2O **Three-dimensional segmentation of pulmonary artery volume from thoracic computed tomography imaging** [9417-99]

9417 2P **Microstructure analysis of the pulmonary acinus using a synchrotron radiation CT** [9417-101]

9417 2Q **Building a bone µ-CT images atlas for micro-architecture recognition** [9417-102]

9417 2R **Bone vascularization and bone micro-architecture characterizations according to the µCT resolution** [9417-103]

9417 2U **Endoscopic Cerenkov luminescence imaging: *in vivo* small animal tumor model validation** [9417-109]

9417 2V **Size-based emphysema cluster analysis on low attenuation area in 3D volumetric CT: comparison with pulmonary functional test** [9417-111]

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four 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.

Abidin, Anas Z., 0M, 1E, 1F, 1M, 1N
Abramson, Richard G., 03, 07
Agarwal, Shubhangi, 14, 1J
Ahmad, Rizwan, 06
Ahn, Chi Young, 28
Al-Louzi, Omar, 0P
Amouriq, Y., 2Q, 2R
Anderson, Adam, 1T
Anderson, Erik, 0T
Andescavage, Nickie, 0O
Andreana, S., 1D
Andrews, Peter M., 0T
Appenzeller, Simone, 2A
Arens, Raanan, 2J
Armspach, Jean-Paul, 0K
Arranz, Alicia, 23
Autrusseau, F., 2Q, 2R
Avison, Malcom J., 0A
Axel, Leon, 0G
Azad, Md Khurshidul, 2N
Azad, Yoo-Jin, 2G
Baier, Robert, 0W
Bankson, James A., 02, 0B
Bao, Chengpeng, 2U
Bala Nivetha, K., 1X
Baucom, Rebeccah B., 07
Bauer, Jan S., 1E
Baum, Thomas, 1E
Bednarek, Daniel R., 0V, 0W, 1D, 26
Benavides, Erika, 1B
Ben-Eliezer, Noam, 0G
Bennink, Edwin, 0I, 1Q
Benvenuto, James, 2B
Bertoldo, Alessandra, 1U
Bezerra, Hiram G., 0Y, 0Z
Bhagalia, Roshni, 12
Bhargava, Maneesh, 18
Bhargava, Rohit, 20
Bhattacharya, Pratip, 02
Bhattacharyya, Rajan, 2B
Blackford, Ethan B., 2D
Blank, Aharon, 06
Blazejewska, Anna I., 0N
Block, Tobias, 0G
Bluemke, Emma, 17, 2O
Bodenstedt, Sebastian, 2G
Boffano, Carlo, 1U
Botsivali, Maria, 10
Boutchko, Rostyslav, 0X
Brogi, Edi, 12
Bruzzone, Maria Grazia, 1U
Budin, Francois, 1C, 1R
Burke, Ryan P., 07
Busovaca, Edgar, 1S
Buss, Claudia, 1R
Bustillo, Juan, 1V
Calabresi, Peter A., 0P
Calhoun, Vince D., 1V
Cao, Kunlin, 12
Capaldi, D. P. I., 16, 1A
Carass, Aaron, 0P
Carson, Daniel, 02
Castellaro, Marco, 1U
Castro, Marcelo A., 27
Caucutt, Jason, 0N
Cebral, Juan R., 27
Cevidanes, Lucia, 1B, 1C
Chalak, Lina, 1P
Chandarana, Hersh, 0G
Chatziioannou, Sofia, 10
Checefsky, Walter A., 1E, 1F
Chen, Georgia Zhuo, 0Q
Chen, Shoupu, 2F
Chen, Y, 0T
Cherel, Marie, 1R
Chien, Aichi, 27
Choi, Jung-il, 28
Cloos, Martijn, 0G
Coan, Paola, 1F
Cone, Roger, 2I
Constantinou, Pamela, 02
Costa, André L., 2A
Crauste, E., 2R
Cunningham, Ian A., 16, 1A, 2O
Dankbaar, Jan Willem, 0I
de Jong, Hugo W. A. M., 0I, 1Q
Delles, Michael, 2G
Dhanantwari, Amar, 0Y, 0Z
Dhurjaty, Sreeram, 2K
Diaz Martinez, Myriam, 2I
Diemoz, Paul C., 1F
Dighe, Manjiri, 0N
Dilger, Samantha K. N., 29
Dillmann, Rüdiger, 2G
Ding, Mingyue, 15
Dong, Di, 23, 24
Drangova, Maria, 25
D'Souza, Adora M., 0M, 1M, 1N

D'Souza, Alisha V., 13
Du, Yuhui, 1V
Duma, Virgil-Florin, 0U
Dziak, R., 1D
Eck, Brendan L., 0Y, 0Z
Elliott, Jonathan T., 13
Entringer, Sonja, 1R
Eon, Rehman S., 1K
Esmaeili-Firidouni, Pardis, 1S
Estepp, Justin R., 2D
Evangelou, Iordanis E., 0O
Fabbri, Daniel, 2C
Fahmi, Rachid, 0Y, 0Z
Fares, Anas, 0Y
Fei, Baowei, 0Q
Feiglin, David, 11
Feng, Li, 0G
Fenster, Aaron, 17, 2O
Fiehler, Jens, 2H
Flint, Katelyn M., 04
Flood, Ann Barry, 1I
Forkert, Nils Daniel, 2H
Foucher, Jack, 0K
Freuchet, E., 2Q
Fujita, H., 22
Fuqua, Christopher, 0Z
Gaede, Stewart, 09
Ganesan, A. R., 1Z
Gao, Yurui, 1T
Garvin, Mona K., 21
Garwood, Michael, 18
Gatenby, Christopher, 0N
Geethanath, Sairam, 1J
Georgakopoulos, Alexandros, 10
Ghamari-Langroudi, Masoud, 2I
Gifford, Aliya, 0A, 2I
Gilmore, John, 1R
Gimi, Barjor, 1I
Giumelli, B., 2R
Glasser, Matthew F., 1R
Goldberg, Ezequiel, 27
Gomes, Liliane, 1C
Gore, John C., 0C
Gorenstein, David, 02
Grisan, Enrico, 1U
Gruen, Marnie L., 0C
Grundfest, Warren, 1G
Guédon, Jp., 2Q, 2R
Gullberg, Grant T., 0X
Gunn, Jason R., 13
Guo, F., 17
Guo, Hengchang, 0T
Guo, Yingkun, 0D, 0E, 1H
Gutierrez, Marco A., 0S
Gyacskov, Igor, 2O
Haasbeek, Cornelis J. A., 19
Haddad, Seyyed M. H., 25
Hammond, Emily, 29
Hasty, Alyssa H., 0C
He, Hao, 1V
Henry, Brian, 2N
Hobbs, Susan K., 0M, 1E, 1F, 1M, 1N
Holton, Sarah E., 20
Horsch, Alexander D., 0I
Hu, Jingzhe, 02
Hu, Zhenhua, 2U
Huang, Hao, 1P
Huber, Markus B., 1F
Huynh, Khang T., 1K
Igarashi, Takahiro, 0D, 0E, 1H
Ingbar, David H., 18
Inge, Landon J., 14
Ionita, Ciprian N., 0V, 0W, 1D, 26
Itoh, H., 2P
Jackson, Greg, 1P
Jagust, William, 0X
Jain, A., 1D
Jang, Jaeseong, 28
Janve, Vaibhav, 1T
Jeon, Kiwan, 28
Jeon, Tina, 1P
Jiang, Tianzi, 1V
Jimenez, Carlos, 0W, 26
Johnsen, Allison M., 03
Johnson, K., 0J
Jones, Thomas R., 1V
Joshi, Shantanu H., 1S
Judisch, Alexandra, 29
Kallergi, Maria, 10
Kaneko, C., 22
Kang, Min Kyu, 08
Karami, Elham, 09
Kardon, Randy H., 21
Kauczor, Hans-Ulrich, 2G
Kawata, Y., 2P
Khobragade, Parag, 0V, 1D
Kim, Namkug, 2V
King, M. A., 0J
Kingston, A., 2Q
Kligerman, Seth, 08
Kmiec, Maciej M., 1I
Knoll, Florian, 0G
Kobayashi, Naoharu, 18
Kodibagkar, Vikram D., 0F, 14, 1J
Krol, Andrzej, 11
Kupersmith, Mark J., 21
Kuppusamy, Periannan, 06
Lake, David S., 1K
Landman, Bennett A., 07, 1T, 2C
Lang, Andrew, 0P
Larson, Steven M., 12
Lavalley, Cathy, 11
Lee, Changhoon, 28
Lee, Christopher P., 07
Lee, Kevin, 1R
Lee, Minho, 2V
Lee, Sang Min, 2V
Lee, Ting-Yim, 09
Lei, Jianxun, 18
Leistritz, Lutz, 0M

Lemos, Pedro A., 0S
Levi, Jacob, 0Y
Ley, Sebastian, 2G
Li, Chunfang, 15
Licskai, Christopher, 2O
Limperopoulos, Catherine, 0O
Lindenmaier, Tamas J., 2O
Lindsay, C., 0J
Lisi, Michele, 11
Liu, Haijuan, 15
Liu, Hong, 2K
Liu, Shuwei, 1P
Liu, Xia, 2U
Liu, Yang, 1O
Lotufo, Roberto A., 2A
Lu, Guolan, 0Q
Lu, Wei, 08
Macedo, Maysa M. G., 0S
Manduca, Armando, 1K
Manescu, Adrian, 0U
Mansy, Hansen A., 2N
Marron, Steve, 1B
Matsumoto, Monica M. S., 2J
Mattonen, Sarah A., 19
McCormack, D. G., 16
McGrath, Mary, 11
Mckown, Susan, 0N
McMurray, Brandon, 2N
Mellinghoff, Ingo K., 12
Menychtas, Dimitrios, 10
Mielniczuk, Lisa, 2O
Miga, Michael I., 03, 04
Millin, Rachel, 2B
Millward, Niki Zacharias, 02
Minami, K., 2P
Mishra, Virendra, 1P
Mitra, Debasis, 0X
Mokin, M., 26
Morgan, John, 29
Mukherjee, J. M., 0J
Mura, Marco, 2O
Murata, C., 22
Nagarajan, Mahesh B., 0M, 1E, 1F, 1M, 1N
Nakano, Y., 2P
Naveed, Muhammad, 11
Negrutiu, Meda Lavinia, 0U
Nemani, Venkata K., 1I
Nguyen, Tung, 1C
Ni, Kang-Yu, 2B
Nica, Luminita, 0U
Niki, N., 2P
Oh, Sang Young, 2V
O'Hara, R., 26
Ohmatsu, H., 2P
Olivier, P., 0J
Ong, Henry H., 0C
Oosterbroek, Jaap, 0I, 1Q
Otazo, Ricardo, 0G
Ouyang, Austin, 1P
Palma, David A., 19
Pan, Hui, 0X
Paniagua, Beatriz, 1B, 1C
Papour, Asael, 1G
Parraga, Grace, 16, 17, 1A, 2O
Parvathaneni, Prasanna, 1T
Peloc, Nora L., 27
Pera, Juliette, 1C
Pike, D., 16
Pilet, P., 2R
Plassard, Andrew J., 2C
Podoleanu, Adrian Gh., 0U
Pogue, Brian W., 13
Politis, Nikolaos, 10
Poulose, Benjamin K., 07
Prasanth, K. V., 20
Prince, Jerry L., 0P
Putman, Christopher M., 27
Qin, Xulei, 0Q
Qiu, Yuchen, 2K
Rajchl, M., 17
Rasmussen, Jerod, 1R
Recur, B., 2Q
Rengier, Fabian, 2G
Ripoll, Jorge, 23
Rittner, Letícia, 2A
Rollins, Nancy, 1P
Roquet, Daniel, 0K
Royston, Thomas, 2N
Rudin, Stephen, 0V, 0W, 1D, 26
Ruellas, Antonio Carlos, 1B
Russ, M., 26
Rychert, Kevin M., 1I
Saidha, Shiv, 0P
Sakai, H., 2P
Samani, Abbas, 09, 25
Samkoe, Kimberley S., 13
Sandler, Richard H., 2N
Schilling, Kurt G., 1T
Senan, Suresh, 19
Seo, Jin Keun, 28
Seo, Joon Beom, 2V
Serag, Ahmed, 0O
Seshamani, Sharmishtaa, 0N
Setlur Nagesh, S. V., 0W, 1D, 26
Shao, L., 0J
Sheikh, Khadija, 2O
Shen, Chunxu, 15
Shen, Jiahui, 1L
Shi, Liangliang, 23, 24
Sibony, Patrick A., 21
Siddiqui, Adnan, 0W, 26
Sieren, Jessica C., 29
Sin, Sanghun, 2J
Sinescu, Cosmin, 0U
Sivarajan, Muraleedharan, 1P
Sklan, Judah E. S., 2C
Snyder, Kenneth, 0V, 0W
Sodickson, Daniel K., 0G
Song, SuTao, 1O
Song, Tianming, 2U

Song, X., 0J
Sood, Anil, 02
Sood, Anup, 12
Sourty, Marion, 0K
Stafsudd, Oscar, 1G
Stoyles, Nicholas, 29
Studholme, Colin, 0N
Styner, Martin, 1C, 1R
Sui, Jing, 1V
Sujatha, N., 1X, 1Z
Sun, Peizhen, 1T
Sun, Phillip Zhe, 0D, 0E, 1H
Sunkara, S. K., 1D
Sunkara, S., 1D
Svenningsen, S., 17, 1A
Swartz, Harold M., 1I
Swingle, Emily K., 0P
Takimura, Celso K., 0S
Tan, Maxine, 2K
Tarroni, Giacomo, 1U
Taylor, Zach, 1G
Teramoto, A., 22
Thompson, Paul M., 1S
Thoraval, Laurent, 0K
Tian, Jie, 23, 24, 2U
Tichauer, Kenneth M., 13
Tiwari, Saumya, 20
Tokumoto, Y., 2P
Tong, Yubing, 2J
Torigian, Drew A., 2J
Towse, Theodore F., 0A
Tsai, Halley, 1E
Twig, Ygal, 06
Udayakumar, K., 1Z
Udupa, Jayaram K., 2J
Umetani, K., 2P
Unterhinninghofen, Roland, 2G
Utecht, Lynn, 18
Valcour, Victor, 1S
Van Essen, David C., 1R
Velthuis, Birgitta K., 0I, 1Q
Vembar, Mani, 0Y, 0Z
Vidya Shankar, Rohini, 0F, 14, 1J
Viergever, Max A., 0I, 1Q
von Tengg-Kobligk, Hendrik, 2G
Wack, David, 0V
Wade, Benjamin S. C., 1S
Wadhwa, Pathik D., 1R
Walker, Christopher M., 0B
Walker, Ronald C., 0A
Wang, Dongsheng, 0Q
Wang, Hsing-Wen, 0T
Wang, Jiahui, 08
Wang, Jui-Kai, 21
Wang, Jun, 23, 24
Wang, Kun, 2U
Wang, Xixi, 0M, 1E, 1M, 1N
Wang, Yalin, 1S
Ward, Aaron D., 19
Webb, Corey D., 0C
Weis, Jared A., 03, 04
Weiss, P., 2R
Welch, E. Brian, 0A, 0C, 2I
White, James A., 25
Whiting, Nicholas, 02
Wile, Geoffrey E., 03
Williams, Benjamin B., 1I
Wilson, David L., 0Y, 0Z
Wismüller, Axel, 0M, 1E, 1F, 1M, 1N
Wolford, Larry, 1B
Wolfson, Helen, 06
Wood, Rachel P., 0V, 0W
Wu, Hao, 0Y
Wu, Kaizhi, 15
Wu, Renhua, 1H
Xiao, Gang, 1H
Xu, Zhoubing, 07
Yang, Xin, 24
Yang, Xueqian, 0L
Yang, Yujie, 23, 24
Yankeelov, Thomas E., 03, 04
Yao, Li, 0L, 1L
Ying, Leslie, 0V
Yoganand, Aradhana, 0W
You, Wonsang, 0O
Yu, Qiaowen, 1P
Yu, Qingbao, 1V
Yuan, J., 17
Zaldarriaga Consing, Kirsten, 1R
Zha, N., 16
Zhang, Gaoyan, 1L
Zhang, JiaCai, 1O
Zhang, Qiushi, 0L
Zhao, Xiaojie, 0L, 1L
Zheng, Bin, 2K
Zhou, Iris Yuewen, 0D, 0E, 1H
Zhou, Qibing, 15
Zhu, Chaozhe, 0L, 1L
Zhu, Gang, 1I
Zong, Xinying, 20

Conference Committee

Symposium Chairs

David Manning, Lancaster University (United Kingdom)
Steven C. Horii, The University of Pennsylvania Health System (United States)

Conference Chairs

Barjor Gimi, Geisel School of Medicine at Dartmouth (United States)
Robert C. Molthen, GE Healthcare (United States), Marquette University (United States), and Medical College of Wisconsin (United States)

Conference Program Committee

Amir A. Amini, University of Louisville (United States)
Thorsten M. Buzug, Universität zu Lübeck (Germany)
Juan R. Cebral, George Mason University (United States)
Yu Chen, University of Maryland, College Park (United States)
Anne V. Clough, Marquette University (United States)
Alejandro F. Frangi, The University of Sheffield (United Kingdom)
Andreas H. Hielscher, Columbia University (United States)
Xiaoping P. Hu, Emory University (United States)
Xavier Intes, Rensselaer Polytechnic Institute (United States)
Vikram Kodibagkar, Arizona State University (United States)
Andrzej Krol, SUNY Upstate Medical University (United States)
John F. LaDisa, Marquette University (United States)
Armando Manduca, Mayo Clinic College of Medicine (United States)
Merryn Tawhai, The University of Auckland (New Zealand)
Nicholas J. Tustison, University of Virginia (United States)
John B. Weaver, Dartmouth Hitchcock Medical Center (United States)
Axel Wismüller, University of Rochester Medical Center (United States)
Baohong Yuan, The University of Texas at Arlington (United States)

Session Chairs

1 Novel Imaging Techniques and Applications
John B. Weaver, Dartmouth Hitchcock Medical Center (United States)
Barjor Gimi, Geisel School of Medicine at Dartmouth (United States)

2 Innovations in Image Processing
Armando Manduca, Mayo Clinic College of Medicine (United States)
Robert C. Molthen, GE Healthcare (United States), Marquette University (United States), and Medical College of Wisconsin (United States)

3 Novel MR Techniques and Applications
Barjor Gimi, Geisel School of Medicine at Dartmouth (United States)
Vikram D. Kodibagkar, Arizona State University (United States)

4 Keynote and Neurological Imaging
Barjor Gimi, Geisel School of Medicine at Dartmouth (United States)
Axel Wismüller, University of Rochester Medical Center (United States)

5 fMRI
Barjor Gimi, Geisel School of Medicine at Dartmouth (United States)
Axel Wismüller, University of Rochester Medical Center (United States)

6 Optical
Yu Chen, University of Maryland, College Park (United States)
Baohong Yuan, The University of Texas at Arlington (United States)

7 Fluids and Cardiovascular
Armando Manduca, Mayo Clinic College of Medicine (United States)
Robert C. Molthen, GE Healthcare (United States), Marquette University (United States), and Medical College of Wisconsin (United States)

8 Cancer Imaging
Vikram D. Kodibagkar, Arizona State University (United States)
Baohong Yuan, The University of Texas at Arlington (United States)

9 Lung
Robert C. Molthen, GE Healthcare (United States), Marquette University (United States), and Medical College of Wisconsin (United States)

10 Bone
Axel Wismüller, University of Rochester Medical Center (United States)
Robert C. Molthen, GE Healthcare (United States), Marquette University (United States), and Medical College of Wisconsin (United States)

Introduction

The Biomedical Applications in Molecular, Structural, and Functional Imaging conference held at Renaissance Orlando at SeaWorld in Orlando, Florida was a tremendous success. There was a tremendous boost in the number of abstracts submitted and conference attendees over previous years. Chairs Barjor Gimi and Robert Molthen welcomed Daniel Sodickson from New York University, who delivered a visionary and inspiring talk on the renaissance in rapid imaging. The talk highlighted developments in hardware, image acquisition, and reconstruction that spanned multiple modalities and convincingly presented why the medical imaging field was poised for a quantum leap in the area of rapid imaging.

The diverse sessions included Novel Imaging Techniques and Applications; Innovations in Image Processing; Novel MR Techniques and Applications; Neurological Imaging; fMRI; Optical; Fluids and Cardiovascular; Cancer Imaging; Lung; and Bone, along with pleasant lunches and productive coffee breaks. The poster session was lively with numerous posters presenting very high-quality work. The judges selected *Treatment planning for image-guided neuro-vascular interventions using patient-specific 3D printed phantoms* by Megan K. Russ from The University at Buffalo for the poster prize, with honorable mentions for *Simplified correction of B_1 inhomogeneity for chemical exchange saturation transfer (CEST) MRI measurement with surface transceiver coil* by Phillip Zhe Sun of Massachusetts General Hospital, *Investigating the use of mutual information and non-metric clustering for functional connectivity analysis on resting-state functional MRI* by XiXi Wang of University of Rochester Medical Center, and *Automated pipeline to analyze non-contact infrared images of the paraventricular nucleus specific leptin receptor knock-out mouse model* by Myriam Diaz Martinez of Vanderbilt University Medical Center.

Barjor Gimi
Robert C. Molthen

2015 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 cosponsored by:

The Medical Image Perception Society

2015 Recipients:

First Place: **Automatic discrimination of color retinal images using the bag of words approach** (9414-54)
I. Sadek, D. Sidibé, F. Meriaudeau, Univ. of Burgundy (France)

Second Place: **Automated pulmonary lobar ventilation measurements using volume-matched thoracic CT and MRI** (9417-42)
F. Guo, S. Svenningsen, E. Bluemke, M. Rajchl, J. Yuan, A. Fenster, G. Parraga, The Univ. of Western Ontario (Canada)

Conference Awards

2015 Recipients:

Cum Laude Poster Award: **Treatment planning for image-guided neuro-vascular interventions using patient-specific 3D printed phantoms** [9417-79]
Megan K. Russ, Ryan P. O'Hara, Swetadri Vasan Setlur Nagesh, Maxim Mokin, Carlos Jimenez, Adnan H. Siddiqui, Daniel R. Bednarek, Stephen Rudin, Ciprian N. Ionita, Univ. at Buffalo (United States)