Front Matter: Volume 7262


Event: SPIE Medical Imaging, 2009, Lake Buena Vista (Orlando Area), Florida, United States
Medical Imaging 2009

Biomedical Applications in Molecular, Structural, and Functional Imaging

Xiaoping P. Hu
Anne V. Clough
Editors

8–10 February 2009
Lake Buena Vista, Florida, United States

Sponsored by
SPIE

Cooperating Organizations
AAPM—American Association of Physicists in Medicine (United States)
APS—American Physiological Society (United States)
CARS—Computer Assisted Radiology and Surgery (Germany)
IS&T—The Society for Imaging Science and Technology
MIPS—Medical Image Perception Society (United States)
RSNA—Radiological Society of North America (United States)
SIIM—Society for Imaging Informatics in Medicine (United States)
SMI—The Society for Molecular Imaging
The DICOM Standards Committee (United States)

Published by
SPIE

Volume 7262


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

ISSN 1605-7422
ISBN 9780819475138

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 © 2009, 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 1605-7422/09/$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the 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 and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent 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 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. Numbers in the index correspond to the last two digits of the six-digit CID number.
Contents

xv  Conference Committee
xvii In Memoriam: Robert F. Wagner (1938-2008)

SESSION 1  MR BRAIN IMAGING

7262 02  Improved T1 mapping by motion correction and template based B1 correction in 3T MRI brain studies [7262-01]
M. A. Castro, J. Yao, C. Lee, National Institutes of Health (United States); Y. Pang, National Institutes of Health (United States) and Philips Healthcare (United States); E. Baker, J. Butman, D. Thomasson, National Institutes of Health (United States)

7262 03  Using CSF as an internal quality assurance tool in diffusion tensor imaging studies of brain tumor [7262-02]
J. Wang, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Y. Shen, Old Dominion Univ. (United States); J. DeGroot, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Y. Shen, J. Li, Old Dominion Univ. (United States)

7262 04  Approximating high angular resolution apparent diffusion coefficient profiles using spherical harmonics under biGaussian assumption [7262-03]
N. Cao, X. Liang, Q. Zhuang, J. Zhang, Univ. of Kentucky (United States)

7262 05  Acupuncture induce the different modulation patterns of the default mode network: an fMRI study [7262-04]
P. Liu, Northeastern Univ. (China); W. Qin, J. Tian, Institute of Automation (China) and Xidian Univ. (China); Y. Zhang, Xidian Univ. (China)

7262 06  A computational framework for exploratory data analysis in biomedical imaging [7262-05]
A. Wismueller, Univ. of Rochester (United States)

SESSION 2  KEYNOTE AND NEUROIMAGING

7262 08  An MRI-based attenuation correction method for combined PET/MRI applications [7262-07]
B. Fei, X. Yang, H. Wang, Emory Univ. (United States) and Case Western Reserve Univ. (United States)

7262 09  Hyperpolarized 129Xe magnetic resonance imaging of a rat model of transient ischemic stroke [7262-08]
R. P. Walvick, Univ. of Massachusetts Medical School (United States) and Worcester Polytechnic Institute (United States); B. Bastan, A. Reno, J. Mansour, Y. Sun, X. Zhou, M. Mazzanti, M. Fisher, Univ. of Massachusetts Medical School (United States) and Worcester Polytechnic Institute (United States); C. H. Sotak, Univ. of Massachusetts Medical School (United States) and Worcester Polytechnic Institute (United States); M. S. Albert, Univ. of Massachusetts (United States)
MR elastography of hydrocephalus [7262-09]
A. J. Pattison, Dartmouth College (United States); S. S. Lollis, Dartmouth-Hitchcock Medical Ctr. (United States); P. R. Perriñez, Dartmouth College (United States); J. B. Weaver, K. D. Paulsen, Dartmouth College (United States) and Dartmouth-Hitchcock Medical Ctr. (United States)

SESSION 3 LUNG

Fast murine airway segmentation and reconstruction in micro-CT images [7262-10]
X. Artaechevarria, A. Muñoz-Barrutia, Univ. de Navarra (Spain); B. van Ginneken, Image Sciences Institute (Netherlands); C. Ortiz-de-Solórzano, Univ. de Navarra (Spain)

Local tissue-weight-based nonrigid registration of lung images with application to regional ventilation [7262-11]
Y. Yin, E. A. Hoffman, C.-L. Lin, The Univ. of Iowa (United States)

Registration-based regional lung mechanical analysis: retrospectively reconstructed dynamic imaging versus static breath-hold image acquisition [7262-12]
K. Ding, K. Cao, G. E. Christensen, E. A. Hoffman, J. M. Reinhardt, The Univ. of Iowa (United States)

SESSION 4 BLOOD FLOW

Simulation-based validation and arrival-time correction for Patlak analyses of perfusion-CT scans [7262-15]
J. Bredno, Philips Research (United States) and Univ. of California, San Francisco (United States); J. Hom, Univ. of California, San Francisco (United States); T. Schneider, Univ. of California, San Francisco (United States) and Philips Healthcare (United States); M. Wintermark, Univ. of California, San Francisco (United States)

Measurement of cerebral blood volume using angiographic C-arm systems [7262-16]
M. Zellerhoff, Y. Deuerling-Zheng, Siemens AG (Germany); C. M. Strother, A. Ahmed, K. Pulfer, Univ. of Wisconsin Hospitals and Clinics (United States); T. Redel, Siemens AG (Germany); K. Royalty, Siemens Medical Solutions (United States); J. Grinde, D. Consigny, Univ. of Wisconsin Hospitals and Clinics (United States)

Image-based modeling of the hemodynamics in cerebral arterial trees [7262-17]
F. Mut, S. Wright, George Mason Univ. (United States); C. Putman, Inova Fairfax Hospital (United States); G. Ascoli, J. Cebral, George Mason Univ. (United States)

Quantification of stenosis in coronary artery via CTA using fuzzy distance transform [7262-19]
Y. Xu, The Univ. of Iowa (United States) and Tsinghua Univ. (China); P. K. Saha, The Univ. of Iowa (United States); G. Hu, Tsinghua Univ. (China); G. Liang, The Univ. of Iowa (United States); Y. Yang, Georgia Institute of Technology (United States); J. Geng, Tsinghua Univ. (China)

Reproducibility of aortic pulsatility measurements from ECG-gated abdominal CTA in patients with abdominal aortic aneurysms [7262-20]
A. Manduca, J. G. Fletcher, R. J. Wentz, R. C. Shields, T. J. Vrtiska, H. Siddiki, T. Nielson, Mayo Clinic College of Medicine (United States)
SESSION 5  TISSUE MICROSTRUCTURE AND FUNCTION

7262 0M Role of trabecular microfractures in failure of human vertebrae estimated by the finite element method [7262-21]
I. N. Sidorenko, Max-Planck-Institut für Extraterrestrische Physik (Germany); J. Bauer, Technische Univ. München (Germany); R. Monetti, Max-Planck-Institut für Extraterrestrische Physik (Germany); D. Mueller, E. J. Rummeny, Technische Univ. München (Germany); F. Eckstein, Paracelsus Medizinische Privatuniversität (Austria); M. Matsuura, E.-M. Lochmueller, Ludwig-Maximilians-Universität München (Germany); P. K. Zysset, Vienna Univ. of Technology (Austria); C. W. Raeth, Max-Planck-Institut für Extraterrestrische Physik (Germany)

7262 0N Assessment of the human trabecular bone structure using Minkowski functionals [7262-22]
R. Monetti, Max-Planck-Institut für Extraterrestrische Physik (Germany); J. Bauer, Technische Univ. München (Germany) and Max-Planck-Institut für Extraterrestrische Physik (Germany); I. Sidorenko, Max-Planck-Institut für Extraterrestrische Physik (Germany); D. Müller, E. Rummeny, Technische Univ. München (Germany); M. Matsuura, Ludwig-Maximilians-Universität München (Germany); F. Eckstein, Paracelsus Medizinische Privatuniversität (Austria); E.-M. Lochmueller, Ludwig-Maximilians-Universität München (Germany); P. Zysset, Vienna Univ. of Technology (Austria); C. Räth, Max-Planck-Institut für Extraterrestrische Physik (Germany)

7262 0O Fast 3D registration of multimodality tibial images with significant structural mismatch [7262-23]
C. S. Rajapakse, M. J. Wald, J. Magland, Univ. of Pennsylvania School of Medicine (United States); X. H. Zhang, X. S. Liu, X. E. Guo, Columbia Univ. (United States); F. W. Wehrli, Univ. of Pennsylvania School of Medicine (United States)

7262 0P Stochastic modeling of tissue microstructure for high-frequency ultrasound imaging simulations [7262-24]
M. I. Daoud, J. C. Lacefield, The Univ. of Western Ontario (Canada) and Robarts Research Institute (Canada)

7262 0Q Tissue mixture-based inner bladder wall segmentation with applications in MRI-based virtual cystoscopy [7262-93]
S. Wang, M. Wagshul, Z. Liang, Stony Brook Univ. (United States)

SESSION 6  OPTICAL IMAGING

7262 0R Bioluminescence tomography based on Bayesian approach [7262-26]
J. Feng, K. Jia, Beijing Univ. of Technology (China); J. Tian, Institute of Automation (China) and Xidian Univ. (China); G. Yan, C. Qin, Institute of Automation (China)

7262 0S Non-rigid alignment of multi-channel fluorescence microscopy images of live cells for improved classification of subcellular particle motion [7262-27]
I.-H. Kim, R. Elis, K. Rohr, Univ. of Heidelberg (Germany)

7262 0T Meshless local Petrov-Galerkin method for bioluminescent photon propagation in the biological tissue [7262-28]
C. Qin, Institute of Automation (China); J. Tian, Institute of Automation (China) and Xidian Univ. (China); X. Yang, K. Liu, Institute of Automation (China); J. Feng, Institute of Automation (China) and Beijing Univ. of Technology (China); M. Xu, Institute of Automation (China)
Automated segmentation of the optic disc margin in 3-D optical coherence tomography images using a graph-theoretic approach [7262-29]
Z. Hu, M. Niemeijer, K. Lee, M. D. Abràmoff, M. Sonka, M. K. Garvin, The Univ. of Iowa (United States)

Multimodal three-dimensional imaging with isometric high resolution using optical projection tomography [7262-30]
Q. Miao, Univ. of Washington (United States); J. R. Rahn, R. C. Bryant, C. A. Lancaster, A. Tourovskaia, T. Neumann, Univ. of Washington (United States) and VisionGate, Inc. (United States); E. J. Seibel, Univ. of Washington (United States); A. C. Nelson, Univ. of Washington (United States) and VisionGate, Inc. (United States)

Cryo-imaging of fluorescently labeled single cells in a mouse [7262-31]
G. J. Steyer, D. Roy, Case Western Reserve Univ. (United States); O. Salvado, Commonwealth Scientific and Industrial Research Organisation (Australia); M. E. Stone, D. L. Wilson, Case Western Reserve Univ. (United States)

SESSION 7 SMALL ANIMAL IMAGING

Imaging radiation pneumonitis in a rat model of a radiological terrorism incident [7262-32]
R. Molthen, Medical College of Wisconsin (United States), Zablocki VA Medical Ctr. (United States), and Marquette Univ. (United States); Q. Wu, Medical College of Wisconsin (United States); G. Krenz, Medical College of Wisconsin (United States), Zablocki VA Medical Ctr. (United States), and Marquette Univ. (United States); M. Medhora, E. Jacobs, J. E. Moulder, Medical College of Wisconsin (United States)

Automated registration and quantification of biophotonic mouse images using a whole body atlas [7262-88]
M. Soria, Univ. of South Florida (United States); S. Eschrich, Moffitt Cancer Ctr. (United States); D. Goldgof, Univ. of South Florida (United States)

3D registration of micro PET-CT for measurable correlates of dyspeptic symptoms in mice [7262-34]
J. Camp, K. Simpson, M. R. Bardsley, L. N. Popko, D. L. Young, B. J. Kemp, V. Lowe, T. Ordog, R. Robb, Mayo Clinic (United States)

MicroPET/CT colonoscopy in long-lived Min mouse using NM404 [7262-35]
M. B. Christensen, R. B. Halberg, M. M. Schutten, J. P. Weichert, Univ. of Wisconsin, Madison (United States)

Choline molecular imaging with small-animal PET for monitoring tumor cellular response to photodynamic therapy of cancer [7262-36]
B. Fei, Emory Univ. (United States) and Case Western Reserve Univ. (United States); H. Wang, Case Western Reserve Univ. (United States) and Emory Univ. (United States); C. Wu, J. Meyers, L.-Y. Xue, G. MacLennan, M. Schluchter, Case Western Reserve Univ. (United States)
SESSION 8  IMAGE-BASED MODELING

Gene expression based mouse brain parcellation using Markov random field regularized non-negative matrix factorization [7262-37]
S. D. Pathak, Microsoft Imaging R&D (United States) and Univ. of Washington (United States); D. R. Haynor, Univ. of Washington (United States); C. L. Thompson, E. Lein, M. J. Hawrylycz, Allen Institute for Brain Science (United States)

Registration of in vivo MR to histology of rodent brains using blockface imaging [7262-38]
M. Uberti, Y. Liu, H. Dou, R. L. Mosley, H. E. Gendelman, M. Boska, Univ. of Nebraska Medical Ctr. (United States)

Efficient cross-modality cardiac four-dimensional active appearance model construction [7262-39]

Toward modeling of regional myocardial ischemia and infarction: generation of realistic coronary arterial tree for the heart model of the XCAT phantom [7262-40]
G. S. K. Fung, Johns Hopkins Univ. (United States); W. P. Segars, Duke Univ. (United States); A. I. Veress, Univ. of Washington (United States); G. T. Gullberg, Lawrence Berkeley National Lab. (United States); B. M. W. Tsui, Johns Hopkins Univ. (United States)

A linking framework for pixel classification based retinal vessel segmentation [7262-41]
M. Niemeijer, The Univ. of Iowa (United States); B. van Ginneken, Univ. Medical Ctr. Utrecht (Netherlands); M. D. Abràmoff, The Univ. of Iowa (United States)

Shape analysis of corpus callosum in autism subtype using planar conformal mapping [7262-42]
Q. He, Y. Duan, Univ. of Missouri, Columbia (United States); X. Yin, X. Gu, SUNY at Stony Brook (United States); K. Karsch, J. Miles, Univ. of Missouri, Columbia (United States)

Quantification of inter-subject variability in human brain: a validation framework for probabilistic maps [7262-43]
A. M. Tahmasebi, P. Abolmaesumi, C. Wild, I. S. Johnsrude, Queen’s Univ. (Canada)

SESSION 9  MECHANICS I

Correlation of breast image alignment using biomechanical modelling [7262-44]
A. Lee, V. Rajagopal, P. Bier, P. M. F. Nielsen, M. P. Nash, The Univ. of Auckland (New Zealand)

A real-time method for breast cancer diagnosis using optical flow [7262-45]
H. Karimi, Univ. of Western Ontario (Canada); A. Fenster, A. Samani, Univ. of Western Ontario (Canada) and Robarts Research Institute (Canada)

Accurate optical flow field estimation using mechanical properties of soft tissues [7262-46]
H. Mehrabian, H. Karimi, Univ. of Western Ontario (Canada); A. Samani, Univ. of Western Ontario (Canada) and Robarts Research Institute (Canada)
Dynamic characterization for tumor- and deformation-induced thermal contrasts on breast surface: a simulation study [7262-47]
L. Jiang, The George Washington Univ. (United States); W. Zhan, Univ. of California, San Francisco (United States); M. H. Loew, The George Washington Univ. (United States)

Quantification and validation of soft tissue deformation [7262-48]
T. H. Mosbech, B. K. Erbsøll, Danmarks Tekniske Univ. (Denmark); L. B. Christensen, Danish Meat Association (Denmark)

Assessing the feasibility for a poroelastic reconstruction algorithm in MR elastography [7262-49]
P. R. Perríñez, F. E. Kennedy, Dartmouth College (United States); J. B. Weaver, K. D. Paulsen, Dartmouth College (United States) and Dartmouth-Hitchcock Medical Ctr. (United States)

SESSION 10 MECHANICS II

Computational biomechanics and experimental validation of vessel deformation based on 4D-CT imaging of the porcine aorta [7262-50]
D. Hazer, Univ. of Karlsruhe (Germany) and Carnegie Mellon Univ. (United States); E. A. Finol, Carnegie Mellon Univ. (United States); M. Kostrzewa, Univ. Hospital Heidelberg (Germany); M. Kopaigorenko, Univ. of Karlsruhe (Germany); G.-M. Richter, Univ. Hospital Heidelberg (Germany); R. Dillmann, Univ. of Karlsruhe (Germany)

Image-based analysis of blood flow modification in stented aneurysms [7262-51]
J. Cebral, F. Mut, S. Appanaboyina, R. Löhner, George Mason Univ. (United States); C. Miranda, E. Scrivano, P. Lylyk, ENERI Clinical Institute (Argentina); C. Putman, Inova Fairfax Hospital (United States)

Angiographic analysis of animal model aneurysms treated with novel polyurethane asymmetric vascular stent (P-AVS): feasibility study [7262-52]
C. N. Ionita, A. Dohatcu, A. Sinelnikov, J. Sherman, C. Keleshis, A. M. Paciorek, K. R. Hoffmann, D. R. Bednarek, S. Rudin, SUNY at Buffalo (United States)

Radial basis function strain estimator [7262-53]
M. M. Doyley, Univ. of Rochester (United States); D. Manegold, M. Q. Phan, Dartmouth College (United States)

A novel cardiac MR chamber volume model for mechanical dyssynchrony assessment [7262-54]
T. Song, M. Fung, GE Healthcare (United States); J. A. Stainsby, GE Healthcare (Canada); M. N. Hood, V. B. Ho, Uniformed Services Univ. of the Health Sciences (United States) and National Naval Medical Ctr. (United States)

SESSION 11 CLINICAL APPLICATIONS

Predicting human decisions in socioeconomic interaction using real-time functional magnetic resonance imaging (rtfMRI) [7262-55]
M. Hollmann, T. Mönch, C. Müller, J. Bernarding, Univ. of Magdeburg (Germany)
Early detection of foot ulcers through asymmetry analysis [7262-56]
N. Kaabouch, Y. Chen, W.-C. Hu, J. Anderson, F. Ames, Univ. of North Dakota (United States); R. Paulson, Altru Wound Clinic (United States)

Hip fracture risk estimation based on principal component analysis of QCT atlas: a preliminary study [7262-57]
W. Li, J. Kornak, Univ. of California, San Francisco (United States); T. Harris, National Institute of Health (United States); Y. Lu, Univ. of California, San Francisco (United States); X. Cheng, Beijing Ji Shui Tan Hospital (China); T. Lang, Univ. of California, San Francisco (United States)

Visualization and enhancement patterns of radiofrequency ablation lesions with iodine contrast-enhanced cardiac C-arm CT [7262-58]
E. Girard-Hughes, A. Al-Ahmad, Stanford Univ. (United States); T. Moore, Siemens Medical Solutions USA, Inc. (United States); G. Lauritsch, J. Boese, Siemens AG, Healthcare Sector (Germany); R. Fahrig, Stanford Univ. (United States)

Alzheimer's disease detection using 11C-PiB with improved partial volume effect correction [7262-59]
P. Raniga, Australian e-Health Research Ctr. (Australia) and The Univ. of Sydney (Australia); P. Bourgeat, J. Fripp, O. Acosta, Australian e-Health Research Ctr. (Australia); S. Ourselin, Australian e-Health Research Ctr. (Australia) and Univ. College London (United Kingdom); C. Rowe, Medicine Univ. of Melbourne (Australia); V. L. Villemagne, Medicine Univ. of Melbourne (Australia) and Univ. of Melbourne (Australia); O. Salvado, Australian e-Health Research Ctr. (Australia)

Clinical applications of image-based airway computational fluid dynamics: assessment of inhalation medication and endobronchial devices [7262-60]
J. W. De Backer, W. G. Vos, Univ. Hospital Antwerp (Belgium) and Univ. of Antwerp (Belgium); P. Germonpré, R. Salgado, P. M. Parizel, W. De Backer, Univ. Hospital Antwerp (Belgium)

Mapping brain development during childhood, adolescence and young adulthood [7262-61]
X. Guo, Beijing Normal Univ. (China); Z. Jin, 306th Hospital of Chinese P.L.A. (China); K. Chen, Banner Alzheimer's Institute (United States); D. Peng, L. Yao, Beijing Normal Univ. (China)

Automatic selection of arterial input function using tri-exponential models [7262-62]
J. Yao, J. Chen, M. Castro, D. Thomasson, National Institutes of Health (United States)

Combination of DTI and fMRI reveals the white matter changes correlating with the decline of default-mode network activity in Alzheimer's disease [7262-63]
X. Wu, Q. Di, L. Yao, X. Zhao, Beijing Normal Univ. (China)

Variational Bayesian framework for estimating parameters of integrated E/MEG and fMRI model [7262-64]
A. Babajani-Feremi, S. Bowyer, J. Moran, K. Elisevich, Henry Ford Hospital (United States); H. Soltanian-Zadeh, Henry Ford Hospital (United States) and Univ. of Tehran (Iran, Islamic Republic of)
Face processing pattern under top-down perception: a functional MRI study [7262-65]
J. Li, J. Liang, Xidian Univ. (China); J. Tian, Institute of Automation (China) and Xidian Univ. (China); J. Liu, Beijing Jiaotong Univ. (China); J. Zhao, Xidian Univ. (China); H. Zhang, Institute of Automation (China); G. Shi, Xidian Univ. (China)

Multi-area integrated E/MEG and fMRI modeling [7262-66]
A. Babajani-Feremi, S. Bowyer, J. Moran, K. Elisevich, K. Podell, Henry Ford Hospital (United States); H. Soltanian-Zadeh, Henry Ford Hospital (United States) and Univ. of Tehran (Iran, Islamic Republic of)

Effective connectivity analysis of default mode network based on the Bayesian network learning approach [7262-67]
R. Li, Beijing Normal Univ. (China); K. Chen, Banner Alzheimer’s Institute (United States); N. Zhang, Beijing Normal Univ. (China); A. S. Fleisher, Banner Alzheimer’s Institute (United States); L. Yao, X. Wu, Beijing Normal Univ. (China)

Functional network connectivity analysis based on partial correlation in Alzheimer’s disease [7262-68]
N. Zhang, Beijing Normal Univ. (China); X. Guan, Y. Zhang, J. Li, H. Chen, Beijing Tiantan Hospital (China); K. Chen, A. Fleisher, Banner Alzheimer’s Institute (United States); L. Yao, X. Wu, Beijing Normal Univ. (China)

Adverse effects of template-based warping on spatial fMRI analysis [7262-69]
B. Ng, R. Abugharbieh, M. J. Mckeown, The Univ. of British Columbia (Canada)

Data-driven measures of functional connectivity [7262-70]
T. Lei, J. Dell, R. Magee, T. P. L. Roberts, Children’s Hospital of Philadelphia (United States) and Univ. of Pennsylvania (United States)

Combinational method for focal brain activation detection using MEG signal [7262-71]
M. Rajabioun, Univ. of Tehran (Iran, Islamic Republic of); A. Babajani-Feremi, Henry Ford Hospital (United States); H. Soltanian-Zadeh, Univ. of Tehran (Iran, Islamic Republic of) and Henry Ford Hospital (United States)

Hybrid input function estimation using a single-input-multiple-output (SIMO) approach [7262-72]
Y. Su, K. I. Shoghi, Washington Univ. in St. Louis (United States)

RV-coefficient and its significance test in mapping brain functional connectivity [7262-73]
H. Zhang, Institute of Automation (China); J. Tian, Institute of Automation (China) and Xidian Univ. (China); J. Li, J. Zhao, Xidian Univ. (China)

Source counting in MEG neuroimaging [7262-74]
T. Lei, J. Dell, R. Magee, T. P. L. Roberts, Children’s Hospital of Philadelphia (United States) and Univ. of Pennsylvania (United States)

Computational fluid dynamics and phase-contrast magnetic resonance of normal cerebral arteries [7262-75]
J. Cebral, F. Mut, George Mason Univ. (United States); C. Putman, Inova Fairfax Hospital (United States); M. Alley, R. Bammer, Stanford Univ. Medical School (United States); F. Calamante, Brain Research Institute (Australia)
7262 25 Micro-CT analysis of myocardial blood supply in young and adult rats [7262-33]
H. M. Schaefer, P. E. Beighley, D. R. Eaker, A. J. Vercnocke, E. L. Ritman, Mayo Clinic College of Medicine (United States)

7262 26 Myocardial deformation from tagged MRI in hypertrophic cardiomyopathy using an efficient registration strategy [7262-76]
G. Piella, Ctr. for Computational Imaging and Simulation Technologies in Biomedicine, Univ. Pompeu Fabra (Spain) and Networking Ctr. on Biomedical Research (Spain); M. De Craene, Networking Ctr. on Biomedical Research (Spain) and Ctr. for Computational Imaging and Simulation Technologies in Biomedicine, Univ. Pompeu Fabra (Spain); E. Oubel, Ctr. for Computational Imaging and Simulation Technologies in Biomedicine, Univ. Pompeu Fabra (Spain) and Networking Ctr. on Biomedical Research (Spain); I. Larrabide, Networking Ctr. on Biomedical Research (Spain) and Ctr. for Computational Imaging and Simulation Technologies in Biomedicine, Univ. Pompeu Fabra (Spain) and Networking Ctr. on Biomedical Research (Spain); A. F. Frangi, Ctr. for Computational Imaging and Simulation Technologies in Biomedicine, Univ. Pompeu Fabra (Spain) and Networking Ctr. on Biomedical Research (Spain)

7262 27 Systolic and diastolic assessment by 3D-ASM segmentation of gated-SPECT studies: a comparison with MRI [7262-77]
C. Tobon-Gomez, Ctr. for Computational Imaging and Simulation Technologies in Biomedicine, Univ. Pompeu Fabra (Spain), Networking Ctr. on Biomedical Research (Spain), and CETIR Sant Jordi (Spain); B. H. Bijnen, ICREA (Spain), Ctr. for Computational Imaging and Simulation Technologies in Biomedicine, Univ. Pompeu Fabra (Spain), and Networking Ctr. on Biomedical Research (Spain); M. Huguet, CETIR Sant Jordi (Spain) and Networking Ctr. on Biomedical Research (Spain); F. Sukno, Networking Ctr. on Biomedical Research (Spain) and Ctr. for Computational Imaging and Simulation Technologies in Biomedicine, Univ. Pompeu Fabra (Spain) and Networking Ctr. on Biomedical Research (Spain)

7262 28 Identification of left pulmonary vein ostia using centerline tracking [7262-78]
M. E. Rettmann, D. R. Holmes III, D. L. Packer, R. A. Robb, Mayo Clinic (United States)

7262 29 Novel echocardiographic prediction of non-response to cardiac resynchronization therapy [7262-79]
R. Chan, Philips Research (United States); F. Tournoux, A. C. Tournoux, V. Nandigam, Massachusetts General Hospital (United States); R. Manzke, S. Dalal, Philips Research (United States); J. Solis-Martin, D. McCarty, J. N. Ruskin, M. H. Picard, A. E. Weyman, J. P. Singh, Massachusetts General Hospital (United States)

POSTER SESSION: OPTICAL IMAGING

7262 2A Development of a targeted CT contrast agent: assessment of cellular interactions using novel integrated optical labels (Cum Laude Poster Award) [7262-80]
7262 2B  **Study of four regularization methods for the inverse problem in bioluminescence tomography** [7262-81]
X. He, Xidian Univ. (China) and Northwest Univ. (China); J. Tian, Xidian Univ. (China) and Institute of Automation (China); Y. Wu, Y. Hou, N. Ren, K. Peng, Xidian Univ. (China)

7262 2C  **Three-dimensional localization of in vivo bioluminescent source based on multispectral imaging** [7262-82]
J. Feng, K. Jia, Beijing Univ. of Technology (China); J. Tian, Institute of Automation (China) and Xidian Univ. (China); G. Yan, S. Zhu, Institute of Automation (China)

7262 2D  **3-D segmentation of the rim and cup in spectral-domain optical coherence tomography volumes of the optic nerve head** [7262-83]
K. Lee, The Univ. of Iowa (United States); M. Niemeijer, The Univ. of Iowa (United States) and The Univ. of Iowa Health Care (United States); M. K. Garvin, The Univ. of Iowa (United States); Y. H. Kwon, The Univ. of Iowa Health Care (United States); M. Sonka, The Univ. of Iowa (United States) and The Univ. of Iowa Health Care (United States); M. D. Abramoff, The Univ. of Iowa (United States), The Univ. of Iowa Health Care (United States), and Veterans’ Administration MC (United States)

7262 2E  **A hybrid P1-DP0 diffusion theory for optical imaging** [7262-84]
K. Liu, J. Tian, C. Qin, D. Liu, X. Yang, M. Xu, Institute of Automation (China)

7262 2F  **Calibration of CCD-based redox imaging for biological tissues** [7262-85]
H. N. Xu, B. Wu, S. Nioka, B. Chance, L. Z. Li, The Univ. of Pennsylvania Health System (United States)

7262 2G  **Improvement of a snapshot spectroscopic retinal multi-aperture imaging camera** [7262-86]
P. Lemaillet, The Catholic Univ. of America (United States); A. Lompado, Polaris Sensor Technologies (United States); J. C. Ramella-Roman, The Catholic Univ. of America (United States)

7262 2H  **Robust image modeling technique with a bioluminescence image segmentation application** [7262-87]
J. Zhong, Beijing Jiaotong Univ. (China) and Institute of Automation (China); R. Wang, Beijing Jiaotong Univ. (China); J. Tian, Institute of Automation (China)

7262 2I  **A posteriori correction for source decay in 3D bioluminescent source localization using multiview measured data** [7262-89]
L. Sun, P. Wang, Beijing Univ. of Technology (China); J. Tian, D. Liu, R. Wang, Institute of Automation (China)

**POSTER SESSION: METHODOLOGY**

7262 2J  **Association between lung function and airway wall density** [7262-14]

7262 2K  **Micro-CT analysis of sea sponge pore architecture as a model of a cell-populated synthetic tissue scaffold** [7262-25]
A. S. Plath, T. L. Kline, D. R. Eaker, P. E. Beighley, A. J. Vercnocke, E. L. Ritman, Mayo Clinic College of Medicine (United States)
<table>
<thead>
<tr>
<th>ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2L</td>
<td>Microwave imaging utilizing a soft prior constraint</td>
<td>A. H. Golnabi, P. M. Meaney, S. D. Geimer, M. W. Fanning, K. D. Paulsen, Dartmouth College (United States)</td>
</tr>
<tr>
<td>2M</td>
<td>Registration of multimodality medical image using ordinary Procrustes analysis and maximum likelihood framework</td>
<td>W. Cho, J. Park, S. Kim, M. Lee, Chonnam National Univ. (Korea, Republic of); S. Park, Mokpo National Univ. (Korea, Republic of); J. Lim, G. Lee, H. P. Le, S. Kim, Chonnam National Univ. (Korea, Republic of); C. Jeong, Honam Univ. (Korea, Republic of)</td>
</tr>
<tr>
<td>2N</td>
<td>Molecules 3D Delaunay triangulation: a spectral study</td>
<td>J. Giard, B. Macq, Univ. Catholique de Louvain (Belgium)</td>
</tr>
<tr>
<td>2O</td>
<td>Automated labeling of anatomic segments of the colon in CT colonography</td>
<td>P. J. Glynn, R. M. Summers, National Institutes of Health (United States)</td>
</tr>
<tr>
<td>2P</td>
<td>The analysis of nanoparticle magnetization vibration using magnetic spectroscopy</td>
<td>J. B. Weaver, Dartmouth-Hitchcock Medical Ctr. (United States) and Dartmouth College (United States); A. M. Rauwerdink, E. W. Hansen, Dartmouth College (United States)</td>
</tr>
<tr>
<td>2Q</td>
<td>An application of the complex general linear model to analysis of fMRI single subjects multiple stimuli input data</td>
<td>D. Rio, R. Rawlings, National Institutes of Health (United States); L. Woltz, Synergy Research Inc. (United States); J. Gilman, D. Hommer, National Institutes of Health (United States)</td>
</tr>
<tr>
<td>2R</td>
<td>Automated liver segmentation using a normalized probabilistic atlas</td>
<td>M. G. Linguraru, Z. Li, F. Shah, S. Chin, R. M. Summers, National Institutes of Health (United States)</td>
</tr>
<tr>
<td>2S</td>
<td>Model-based reconstruction for undersampled dynamic contrast-enhanced MRI</td>
<td>B. K. Felsted, The Univ. of Utah (United States) and Utah Ctr. for Advanced Imaging Research (United States); R. T. Whitaker, The Univ. of Utah (United States); M. Schabel, E. V. R. DiBella, Utah Ctr. for Advanced Imaging Research (United States)</td>
</tr>
<tr>
<td>2T</td>
<td>Registration of parametric dynamic F-18-FDG PET/CT breast images with parametric dynamic Gd-DTPA breast images</td>
<td>A. Magri, Syracuse Univ. (United States); A. Krol, SUNY Upstate Medical Univ. (United States) and Syracuse Univ. (United States); E. Lipson, Syracuse Univ. (United States) and SUNY Upstate Medical Univ. (United States); J. Mandel, Syracuse Univ. (United States); W. McGraw, CNY PET, LLC (United States); W. Lee, G. Tillapaugh-Fay, D. Feiglin, SUNY Upstate Medical Univ. (United States)</td>
</tr>
<tr>
<td>2V</td>
<td>Enhanced volume rendering techniques for high-resolution color cryo-imaging data</td>
<td>M. Careghesha, M. Qutaish, D. Roy, G. Steyer, Case Western Reserve Univ. (United States); H. Bartsch, Visage Imaging Inc. (United States); D. L. Wilson, Case Western Reserve Univ. (United States)</td>
</tr>
</tbody>
</table>

**Author Index**
Conference Committee

Symposium Chairs

Armando Manduca, Mayo Clinic College of Medicine (United States)
Kevin R. Cleary, Georgetown University Medical Center (United States)

Conference Chairs

Xiaoping P. Hu, Emory University (United States)
Anne V. Clough, Marquette University (United States)

Program Committee

Amir A. Amini, University of Louisville (United States)
Juan R. Cebral, George Mason University (United States)
Andreas H. Hielscher, Columbia University (United States)
Eric A. Hoffman, The University of Iowa Hospitals and Clinics (United States)
Armando Manduca, Mayo Clinic College of Medicine (United States)
Robert C. Molthen, Medical College of Wisconsin (United States)
Erik L. Ritman, Mayo Clinic College of Medicine (United States)
Ronald M. Summers, National Institutes of Health (United States)
Merryn H. Tawhai, The University of Auckland (New Zealand)
John B. Weaver, Dartmouth-Hitchcock Medical Center (United States)
Felix W. Wehrli, University of Pennsylvania (United States)
Axel Wismueller, University of Rochester (United States)

Session Chairs

1. MR Brain Imaging
   Armando Manduca, Mayo Clinic College of Medicine (United States)

2. Keynote and Neuroimaging
   Xiaoping P. Hu, Emory University (United States)

3. Lung
   Merryn H. Tawhai, The University of Auckland (New Zealand)

4. Blood Flow
   Juan R. Cebral, George Mason University (United States)
5 Tissue Microstructure and Function
Felix W. Wehrli, University of Pennsylvania (United States)

6 Optical Imaging
Boudewijn P. F. Lelieveldt, Leids Universitair Medisch Centrum (Netherlands)

7 Small Animal Imaging
Robert C. Molthen, Medical College of Wisconsin (United States)

8 Image-based Modeling
Axel Wismueller, University of Rochester (United States)

9 Mechanics I
John B. Weaver, Dartmouth-Hitchcock Medical Center (United States)

10 Mechanics II
Erik L. Ritman, Mayo Clinic College of Medicine (United States)

11 Clinical Applications
Ronald M. Summers, National Institutes of Health (United States)
In Memoriam

Robert F. Wagner
1938–2008

A founding scientist and prolific contributor to modern medical imaging science and SPIE

Robert F. “Bob” Wagner was a tremendous innovator in the field of medical imaging and image assessment methodologies. He was a key figure in the creation of the SPIE Medical Imaging symposium. A SPIE Fellow since 1988, Bob was active on the program committee of the Physics of Medical Imaging conference at the Medical Imaging symposium, and author of numerous technical papers published by SPIE.

“The medical imaging community has lost one of its founding fathers and most highly regarded members,” said Kyle Myers, director of the Division of Imaging and Applied Mathematics at the Center for Devices and Radiological Health (CDRH), U.S. Food and Drug Administration (FDA). “Bob’s career was dedicated to the development of consensus measurement methods for the assessment of medical imaging systems, quantitative medical imaging and tissue characterization, and computer-aided diagnosis. He earned an international reputation in these areas and applied his expertise to a wide range of regulatory issues central to the FDA’s mission. He enlightened the scientific community within the agency as well as the international scientific community through the many invited presentations and tutorials he gave in and outside of the FDA, his numerous publications, his many professional society activities, and his assistance in regulatory decision making.”

At this 2009 Medical Imaging symposium, a joint keynote session hosted by the CAD and Image Perception conferences honored Bob’s many contributions from the early 1970s to the present through a series of presentations by some of his closest collaborators.
David Brown (CDRH/FDA) recalled Bob’s early years in the field, relating that after graduate and post-graduate work on the physics of nuclear interactions with radiation, Bob was hired by the Bureau of Radiological Health [a precursor to CDRH] to assess the dose reduction potential of radiographic intensifying screens made with phosphors developed in the color TV industry. Within three months he published a review of the relevant imaging literature from the medical, defense, consumer, and scientific communities, together with a charter for a laboratory program. Soon after, Bob introduced digital noise analysis to radiography, and showed that the new technology offered a 1.6- to 2.5-fold exposure reduction without compromising imaging performance. He then launched a program of inter-laboratory comparison of measurements on radiographic film samples that were circulated among fifteen commercial, government, and academic laboratories worldwide. In the process, he became the prime mover for work toward consensus methodology for quantitative imaging performance measurements.

Mike Insana (Univ. of Illinois at Urbana-Champaign) shared memories of his years as Bob’s post-doctoral student, working with Bob on the statistical characterization of ultrasound images. He described Bob as an exemplary mentor who shared his passion and joy for science.

Myers agreed, "Bob’s greatest legacy may be the many young scientists he nurtured, who either worked directly under his tutelage at the FDA or otherwise benefitted from his unfailing patience and unselfish ease of availability."

Harry Barrett (Univ. of Arizona) began his presentation by relating noise-equivalent quanta (NEQ)—a concept central to Bob’s unified approach to objective image performance assessment—to historical information-theoretic methods for evaluation of imaging systems. Barrett went on to describe the many ways in which NEQ was extended to address problems beyond the simple signal-known-exactly, background-known-exactly (SEK/BKE) task.

Ken Hanson (Los Alamos National Lab.) described his years of collaboration with Bob. He said they worked together, first in the area of noise characterization of radiographic and CT images and later on the evaluation of images confounded by artifacts. In this latter work, Bob and Ken pioneered the application of a decision theoretic approach to the assessment of image reconstruction algorithms, demonstrating that the common mean-square-error metric did not predict visual task performance as measured by detectability.

Bob’s contemporary work, as described by Myers, "involved the consideration of the random effects associated with multiple readers of medical images and the logical extension of this work to the problem of the evaluation of multiple competing classifiers in statistical pattern recognition. Bob tackled problems of increasing complexity over the course of his career, relying throughout on the application of a unified, decision theoretic framework. In the process he brought about consensus on the importance of a task-based approach to the objective assessment of imaging systems."

During more than forty years of professional life, Bob Wagner made numerous contributions to the field of medical imaging that significantly impacted academia, industry, and the FDA. His brilliant mind, incredible intuition, passion for science, sense of humor, charm, and warm friendship will be greatly missed.