

Medical Imaging 2007

Physiology, Function, and Structure from Medical Images

Armando Manduca
Xiaoping P. Hu
Editors

18–20 February 2007
San Diego, California, USA

Sponsored and Published by
SPIE—The International Society for Optical Engineering

Cooperating Organizations

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

Volume 6511
Part One of Two Parts



The International Society
for Optical Engineering

Proceedings of SPIE—The International Society for Optical Engineering, 9780819466297, v. 6511

SPIE is an international technical society dedicated to advancing engineering and scientific applications of optical, photonic, imaging, electronic, and optoelectronic technologies.

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 2007: Physiology, Function, and Structure from Medical Images*, edited by Armando Manduca, Xiaoping P. Hu, Proceedings of SPIE Vol. 6511 (SPIE, Bellingham, WA, 2007) Article CID Number.

ISSN 1605-7422
ISBN 9780819466297

Published by
SPIE—The International Society for Optical Engineering
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone 1 360/676-3290 (Pacific Time) · Fax 1 360/647-1445
<http://www.spie.org>

Copyright © 2007, The 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 <http://www.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 1605-7422/07/\$18.00.

Printed in the United States of America.

Contents

Part One

xiii	Conference Committee
xv	Introduction

SESSION 1 SMALL ANIMAL IMAGING

651102	In vivo small animal imaging for early assessment of therapeutic efficacy of photodynamic therapy for prostate cancer [6511-01] B. Fei, H. Wang, X. Chen, J. Meyers, J. Mulvihill, D. Feyes, N. Edgehouse, J. L. Duerk, T. G. Pretlow, N. L. Oleinick, Case Western Reserve Univ., Univ. Hospitals of Cleveland (USA) and Case Comprehensive Cancer Ctr. (USA)
651103	In vivo-CT system with respiratory and cardiac gating using synchrotron radiation [6511-02] T. Sera, RIKEN-The Institute of Physical and Chemical Research (Japan) and Japan Synchrotron Radiation Research Institute (Japan); H. Yokota, K. Fujisaki, K. Fukasaku, RIKEN-The Institute of Physical and Chemical Research (Japan); K. Uesugi, N. Yagi, Japan Synchrotron Radiation Research Institute (Japan); R. Himeno, RIKEN-The Institute of Physical and Chemical Research (Japan)
651104	Computer-based analysis of microvascular alterations in a mouse model for Alzheimer's disease [6511-03] S. Heinzer, R. Müller, Univ. and ETH Zürich (Switzerland); M. Stamparoni, R. Abela, Swiss Light Source, Paul Scherrer Institut (Switzerland); E. P. Meyer, A. Ulmann-Schuler, Univ. of Zürich (Switzerland); T. Krucker, Novartis Institutes for BioMedical Research (USA)
651105	Three-dimensional murine airway segmentation in micro-CT images [6511-04] L. Shi, J. Thiesse, G. McLennan, E. A. Hoffman, J. M. Reinhardt, Univ. of Iowa (USA)
651106	Automated segmentation of the ex vivo mouse brain [6511-05] E. H. Scheenstra, J. Dijkstra, R. C. G. van de Ven, L. van der Weerd, J. H. C. Reiber, Leiden Univ. Medical Ctr. (Netherlands)

Pagination: 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. 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.

SESSION 2 OPTICAL IMAGING

- 65110A **Modulated imaging: a novel method for quantifying tissue chromophores in evolving cerebral ischemia** [6511-09]
D. Abookasis, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA); M. S. Mathews, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA) and Univ. of California, Irvine, Medical Ctr. (USA); C. Lay, R. D. Frostig, Univ. of California, Irvine (USA); B. J. Tromberg, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA) and Univ. of California, Irvine (USA)

SESSION 3 IMAGE ANALYSIS I

- 65110B **Retinal oxygen saturation evaluation by multi-spectral fundus imaging** [6511-10]
B. Khoobehi, Louisiana State Univ. Health Sciences Ctr. (USA) and Tulane Univ. (USA); J. Ning, E. Puissegur, K. Bordeaux, Tulane Univ. (USA); M. Balasubramanian, Louisiana State Univ. (USA); J. Beach, Univ. of Iceland (Iceland)
- 65110C **Quantifying mucosal blood volume fraction from multispectral images of the colon** [6511-11]
E. Claridge, D. Hidović-Rowe, P. Taniere, T. Ismail, The Univ. of Birmingham (United Kingdom)
- 65110D **Discrete color-based Euclidean-invariant signatures for feature tracking in a DIET breast cancer screening system** [6511-12]
R. G. Brown, C. E. Hann, J. G. Chase, Univ. of Canterbury (New Zealand); L. A. Ray, Eastman Kodak Co. (USA)
- 65110E **Estimating number of fiber directions per voxel for ICA DTI tractography** [6511-13]
C.-W. Wong, M. Singh, Univ. of Southern California (USA)
- 65110F **Neural mass model parameter identification for MEG/EEG** [6511-14]
J. Kybic, Czech Technical Univ. (Czech Republic); O. Faugeras, M. Clerc, T. Papadopoulo, Odyssee Lab.-ENPC/ENS/INRIA (France)

SESSION 4 IMAGE ANALYSIS II

- 65110G **Automated hierarchical partitioning of anatomical trees** [6511-15]
R. Wiemker, T. Bülow, R. Opfer, Philips Research Europe (Germany)
- 65110H **Clinical applications of three-dimensional tortuosity metrics** [6511-16]
G. Dougherty, California State Univ. Channel Islands (USA); M. J. Johnson, Kuwait Univ. (Kuwait)
- 65110J **Analysis of trabecular bone architectural changes induced by osteoarthritis in rabbit femur using 3D active shape model and digital topology** [6511-18]
P. K. Saha, Univ. of Iowa (USA); C. S. Rajapakse, Univ. of Pennsylvania (USA); D. S. Williams, L. Duong, A. Coimbra, Merck Research Labs. (USA)
- 65110K **Benchmarking nonrigid techniques for hepato-pulmonary motion mapping** [6511-19]
N. Subramanian, R. V. Tranquebar, S. Rajagopalan, GE Global Research (India)

- 65110L **Quantification of glomerular filtration rate by measurement of gadobutrol clearance from the extracellular fluid volume: comparison of a TurboFLASH and a TrueFISP approach** [6511-20]
A. Boss, P. Martirosian, F. Artunc, T. Risler, C. D. Claussen, H.-P. Schlemmer, F. Schick, Eberhard Karls Univ., Tübingen (Germany)

SESSION 5 VIRTUAL ENDOSCOPY I: VIRTUAL BRONCHOSCOPY AND RELATED METHODS

- 65110M **A model of respiratory airway motion for real-time tracking of an ultrathin bronchoscope** [6511-21]
T. D. Soper, D. R. Haynor, R. W. Glenney, E. J. Seibel, Univ. of Washington (USA)
- 65110N **A method for bronchoscope tracking using position sensor without fiducial markers** [6511-22]
D. Deguchi, K. Ishitani, T. Kitasaka, K. Mori, Y. Suenaga, Nagoya Univ. (Japan);
H. Takabatake, Minami-sanjo Hospital (Japan); M. Mori, Sapporo-Kosei General Hospital (Japan); H. Natori, Keiwakai Nishioka Hospital (Japan)
- 65110O **Method for continuous guidance of endoscopy** [6511-23]
S. A. Merritt, L. Rai, J. D. Gibbs, K.-C. Yu, W. E. Higgins, The Pennsylvania State Univ. (USA)
- 65110P **Airway wall thickness assessment: a new functionality in virtual bronchoscopy investigation** [6511-24]
A. Saragaglia, C. Fetita, GET/INT (France); P. Y. Brillet, Hôpital Avicenne (France); F. Prêteux, GET/INT (France); P. A. Grenier, Hôpital Pitié Salpêtrière (France) and Univ. Paris 6 (France)
- 65110Q **3D adaptive model-based segmentation of human vessels** [6511-88]
S. Wörz, K. Rohr, Univ. of Heidelberg, IPMB (Germany) and DKFZ Heidelberg (Germany)

SESSION 6 VIRTUAL ENDOSCOPY II: CT COLONOGRAPHY

- 65110R **Colonoscopy simulation** [6511-26]
W. Hong, J. Wang, F. Qiu, A. Kaufman, Stony Brook Univ. (USA); J. Anderson, Medical Ctr., Stony Brook Univ. (USA)
- 65110S **Colonic wall thickness using level sets for CT virtual colonoscopy visual assessment and polyp detection** [6511-27]
R. L. Van Uiter, R. M. Summers, National Institutes of Health (USA)
- 65110T **Slice-based guided navigation for colonography** [6511-28]
S. Sudarsky, B. Geiger, Siemens Corporate Research, Inc. (USA)
- 65110U **Using the teniae coli as a registration tool in CT colonography** [6511-29]
P. Jabour, A. Huang, R. M. Summers, National Institutes of Health (USA)
- 65110V **Gain by mixture-based image segmentation for virtual colonoscopy with colonic material tagging** [6511-30]
L. Li, Stony Brook Univ., SUNY. (USA) and College of Staten Island, CUNY (USA); S. Wang, Z. Wang, J. Wang, Stony Brook Univ., SUNY (USA); H. Lu, Fourth Military Medical Univ. (China); Z. Liang, Stony Brook Univ., SUNY (USA)

- 65110W **Electronic stool subtraction using quadratic regression, morphological operations, and distance transforms** [6511-31]
M. Carston, A. Manduca, C. D. Johnson, Mayo Clinic College of Medicine (USA)

SESSION 7 LUNG IMAGING

- 65110X **In vivo quantification of human lung dose response relationship** [6511-32]
W. O'Dell, P. Wang, H. Liu, D. Fuller, M. C. Schell, P. Okunieff, Univ. of Rochester (USA)
- 65110Y **Surface based cardiac and respiratory motion extraction for pulmonary structures from multi-phase CT** [6511-33]
J. von Berg, H. Barschdorf, T. Blaffert, S. Kabus, C. Lorenz, Philips Research Europe (Germany)
- 65110Z **The effect of lung orientation on functional imaging of blood flow** [6511-34]
K. S. Burrowes, M. H. Tawhai, Univ. of Auckland (New Zealand)
- 651110 **Automated detection of mucus plugs within bronchial tree in MSCT images** [6511-35]
B. L. Odry, Siemens Corporate Research, Inc. (USA) and Univ. de Technologie de Compiègne (France); D. Guiliguan, Univ. de Technologie de Compiègne (France); A. P. Kiraly, C. L. Novak, Siemens Corporate Research, Inc. (USA); D. P. Naidich, New York Univ. Medical Ctr. (USA); J.-F. Lerallut, Univ. de Technologie de Compiègne (France)
- 651111 **Novel method and applications for labeling and identifying lymph nodes** [6511-36]
A. P. Kiraly, Siemens Corporate Research (USA); D. P. Naidich, New York Univ. Medical Ctr. (USA); L. Guendel, Siemens Medical Solutions (Germany); L. Zhang, C. L. Novak, Siemens Corporate Research (USA)

SESSION 8 MRI BRAIN ANALYSIS

- 651112 **Partial correlation mapping of brain functional connectivity with resting state fMRI** [6511-37]
Z. Zhen, J. Tian, W. Qin, H. Zhang, Institute of Automation (China)
- 651113 **A novel approach to analyzing fMRI and SNP data via parallel independent component analysis** [6511-38]
J. Liu, The MIND Institute (USA); G. Pearson, The Institute of Living (USA); V. Calhoun, The MIND Institute (USA), The Institute of Living (USA), and Univ. of New Mexico (USA); A. Windemuth, Genomas, Inc. (USA)
- 651114 **Real-time fMRI-based activation analysis and stimulus control** [6511-39]
T. Moench, M. Hollmann, J. Bernarding, Otto-von-Guericke-Univ. Magdeburg (Germany)
- 651115 **Detection of fine-scale activity patterns by integration of information in local regions** [6511-40]
Z. Zhen, J. Tian, W. Qin, H. Zhang, Institute of Automation (China)
- 651116 **Dimensionality estimation for group fMRI data reduction at multiple levels** [6511-41]
S. Chen, National Institute on Drug Abuse, NIH (USA) and National Tsing-Hua Univ. (Taiwan); T. J. Ross, National Institute on Drug Abuse, NIH (USA); K.-S. Chuang, National Tsing-Hua Univ. (Taiwan); E. A. Stein, Y. Yang, W. Zhan, National Institute on Drug Abuse, NIH (USA)

SESSION 9 MECHANICAL PROPERTIES AND ELASTOGRAPHY

- 651117 **Rapid 3D isotropic cartilage assessment with VIPR MRI** [6511-42]
W. F. Block, J. Klaers, Y. Jung, E. Brodsky, R. Kijowski, Univ. of Wisconsin, Madison (USA)
- 651118 **Diffusion tensor imaging of the lower leg musculature during exercise** [6511-43]
F. Schick, G. Steidle, Univ. of Tuebingen (Germany)
- 651119 **Time reversal principles for wave optimization in multiple driver magnetic resonance elastography** [6511-62]
Y. K. Mariappan, A. Manduca, R. L. Ehman, Mayo Clinic College of Medicine (USA)
- 65111A **The effects of interstitial tissue pressure on the measured shear modulus in vivo** [6511-45]
J. B. Weaver, Dartmouth Medical School, Dartmouth-Hitchcock Medical Ctr. (USA) and Dartmouth College (USA); P. R. Perrinez, Dartmouth College (USA); J. A. Bergeron, Dartmouth-Hitchcock Medical Ctr. (USA); F. E. Kennedy, H. Wang, Dartmouth College (USA); S. S. Lollis, Dartmouth-Hitchcock Medical Ctr. (USA); M. M. Doyley, Dartmouth Medical School, Dartmouth-Hitchcock Medical Ctr. (USA) and Dartmouth College (USA); P. J. Hoopes, Dartmouth-Hitchcock Medical Ctr. (USA); K. D. Paulsen, Dartmouth Medical School, Dartmouth-Hitchcock Medical Ctr. (USA), Dartmouth College (USA), and Norris Cotton Cancer Ctr. (USA)
- 65111B **3D finite element solution to the dynamic poroelasticity problem for use in MR elastography** [6511-46]
P. R. Perrinez, S. P. Marra, F. E. Kennedy, Dartmouth College (USA); K. D. Paulsen, Dartmouth College (USA) and Norris Cotton Cancer Ctr. (USA)
- 65111C **An elastography framework for use in dermoscopy** [6511-47]
M. I. Miga, Vanderbilt Univ. (USA) and Vanderbilt Univ. Medical Ctr. (USA); J. J. Ou, Vanderbilt Univ. (USA); D. L. Ellis, Vanderbilt Univ. Medical Ctr. (USA)

Part Two

SESSION 10 VESSEL IMAGING AND DYNAMICS

- 65111D **Longitudinal vascular imaging using a novel nano-encapsulated CT and MR contrast agent** [6511-48]
J. Zheng, J. D. Hoisak, C. Allen, Univ. of Toronto (Canada); D. A. Jaffray, Univ. of Toronto (Canada) and Princess Margaret Hospital (Canada)
- 65111E **Qualitative comparison of intra-aneurysmal flow structures determined from conventional and virtual angiograms** [6511-49]
J. R. Cebral, George Mason Univ. (USA); A. Radaelli, A. Frangi, Pompeu Fabra Univ. (Spain); C. M. Putman, Inova Fairfax Hospital (USA)
- 65111F **Combined clinical and computational information in complex cerebral aneurysms: application to mirror cerebral aneurysms** [6511-50]
A. G. Radaelli, Pompeu Fabra Univ. (Spain); T. Sola Martínez, E. Vivas Díaz, Hospital General de Catalunya (Spain); X. Mellado, Pompeu Fabra Univ. (Spain); M. A. Castro, George Mason Univ. (USA); C. M. Putman, Inova Fairfax Hospital (USA); L. Guimaraens, Hospital General de Catalunya (Spain); J. R. Cebral, George Mason Univ. (USA); A. F. Frangi, Pompeu Fabra Univ. (Spain)

- 65111G **Semi-automatic aortic aneurysm analysis** [6511-51]
O. Bodur, L. Grady, Siemens Corporate Research (USA); A. Stillman, Emory Univ. Hospital (USA); R. Setser, Cleveland Clinic Foundation (USA); G. Funka-Lea, T. O'Donnell, Siemens Corporate Research (USA)
- 65111H **3D visualization of strain in abdominal aortic aneurysms based on navigated ultrasound imaging** [6511-52]
R. Brekken, J. H. Kaspersen, G. A. Tangen, SINTEF Health Research (Norway); T. Dahl, St. Olav's Hospital, Univ. Hospital of Trondheim (Norway) and Norwegian Univ. of Science and Technology (Norway); T. A. N. Hernes, SINTEF Health Research (Norway) and Norwegian Univ. of Science and Technology (Norway); H. O. Myhre, St. Olav's Hospital, Univ. Hospital of Trondheim (Norway) and Norwegian Univ. of Science and Technology (Norway)

SESSION 11 CARDIAC AND AORTIC IMAGING

- 65111I **Automatic segmentation and co-registration of gated CT angiography datasets: measuring abdominal aortic pulsatility** [6511-53]
R. Wentz, A. Manduca, J. G. Fletcher, H. Siddiki, R. C. Shields, T. Vrtiska, G. Spencer, A. N. Primak, J. Zhang, T. Nielson, C. McCollough, L. Yu, Mayo Clinic College of Medicine (USA)
- 65111J **Patient specific coronary territory maps** [6511-54]
P. Beliveau, École Polytechnique Montréal (Canada) and Siemens Corporate Research (USA); R. Setser, Cleveland Clinic Foundation (USA); F. Cheriet, École Polytechnique Montréal (Canada); T. O'Donnell, Siemens Corporate Research (USA)
- 65111K **A statistical shape model of the heart and its application to model-based segmentation** [6511-55]
S. Ordas, E. Oubel, Pompeu Fabra Univ. (Spain); R. Leta, F. Carreras, Hospital Santa Creu i Sant Pau (Spain); A. F. Frangi, Pompeu Fabra Univ. (Spain)
- 65111L **Structure and function relationship of human heart from DENSE MRI** [6511-56]
A. N. Moghaddam, California Institute of Technology (USA) and David Geffen School of Medicine at Univ. of California, Los Angeles (USA); M. Gharib, California Institute of Technology (USA)
- 65111M **Four-dimensional functional analysis of left and right ventricles using MR images and active appearance models** [6511-57]
H. Zhang, M. T. Thomas, N. E. Walker, A. H. Stolpen, A. Wahle, T. D. Scholz, M. Sonka, The Univ. of Iowa (USA)
- 65111N **Novel methods for parameter-based analysis of myocardial tissue in MR images** [6511-58]
A. Hennemuth, S. Behrens, C. Kuehnel, MeVis Research GmbH (Germany); S. Oeltze, Otto-von-Guericke-Univ. Magdeburg (Germany); O. Konrad, H.-O. Peitgen, MeVis Research GmbH (Germany)

POSTER SESSION

- 65111O **Virtual hybrid bronchoscopy using PET/CT data sets** [6511-25]
K.-H. Englmeier, Institute of Medical Informatics (Germany); M. D. Seemann, Technical Univ. of Munich (Germany)

- 65111P **A comparison of lung motion measured using implanted electromagnetic transponders and motion algorithmically predicted using external surrogates as an alternative to respiratory correlated CT imaging** [6511-59]
K. M. Lechleiter, D. A. Low, A. Chaudhari, W. Lu, J. P. Hubenschmidt, Washington Univ. School of Medicine (USA); M. L. Mayse, Washington Univ. School of Medicine (USA) and Calypso Medical Technologies, Inc. (USA); S. C. Dimmer, Calypso Medical Technologies, Inc. (USA); J. D. Bradley, P. J. Parikh, Washington Univ. School of Medicine (USA)
- 65111Q **Nonlinear histogram binning for quantitative analysis of lung tissue fibrosis in high-resolution CT data** [6511-60]
V. A. Zavaletta, Mayo Clinic College of Medicine (USA); B. J. Bartholmai, Mayo Clinic College of Medicine (USA) and Mayo Clinic (USA); R. A. Robb, Mayo Clinic College of Medicine (USA)
- 65111R **Quantification of airway morphometry: the effect of CT acquisition and reconstruction parameters** [6511-61]
J. K. Leader, B. Zheng, F. C. Sciurba, Univ. of Pittsburgh (USA); H. O. Coxson, Vancouver General Hospital (Canada); C. R. Fuhrman, J. M. McMurray, S. C. Park, G. S. Maitz, D. Gur, Univ. of Pittsburgh (USA)
- 65111S **A phase unwrapping method for large-motion phase data in MR elastography** [6511-63]
H. Wang, Dartmouth College (USA); J. B. Weaver, M. M. Doyley, Dartmouth College (USA) and Dartmouth-Hitchcock Medical Ctr. (USA); F. E. Kennedy, Dartmouth College (USA); K. D. Paulsen, Dartmouth College (USA) and Norris Cotton Cancer Ctr. (USA)
- 65111T **Reproducibility of MRE shear modulus estimates** [6511-64]
J. B. Weaver, Dartmouth Medical School, Dartmouth-Hitchcock Medical Ctr. (USA), Dartmouth College (USA), and Norris Cotton Cancer Ctr. (USA); T. B. Miller, M. D. Doyley, H. Wang, P. R. Perrinez, Dartmouth College (USA); Y. Y. Cheung, Dartmouth Medical College, Dartmouth-Hitchcock Medical Ctr. (USA); F. E. Kennedy, Dartmouth College (USA); K. D. Paulsen, Dartmouth Medical School, Dartmouth-Hitchcock Medical Ctr. (USA), Dartmouth College (USA), and Norris Cotton Cancer Ctr. (USA)
- 65111V **Boundary element methods in elastography: a first explorative study** [6511-66]
H.-U. Berger, C. E. Hann, J. G. Chase, R. L. Broughton, E. Van Houten, Univ. of Canterbury (New Zealand)
- 65111W **Damping models in elastography** [6511-67]
M. D. J. McGarry, H.-U. Berger, E. E. W. Van Houten, Univ. of Canterbury (New Zealand)
- 65111X **An evaluation of 3D modality independent elastography robustness to boundary condition noise** [6511-69]
J. J. Ou, R. E. Ong, M. I. Miga, Vanderbilt Univ. (USA)
- 65111Y **Molecular and structural analysis of viscoelastic properties** [6511-71]
R. D. Yapp, S. Kalyanam, M. F. Insana, Univ. of Illinois at Urbana-Champaign/Beckman Institute for Advanced Science and Technology (USA)
- 65111Z **Bolus tracking by cone-beam reconstruction and reprojection** [6511-72]
Z. Chen, Northeastern Univ. (China); R. Ning, Univ. of Rochester (USA)
- 651120 **Spatio-temporal patterns of ERP based on combined ICA-LORETA analysis** [6511-73]
J. Zhang, T. Guo, Y. Xu, X. Zhao, L. Yao, Beijing Normal Univ. (China)

- 651121 **Spatiotemporal analysis of single-trial EEG of emotional pictures based on independent component analysis and source location** [6511-74]
J. Liu, J. Tian, Institute of Automation (China)
- 651122 **The functional connectivity of semantic task changes in the recovery from stroke aphasia** [6511-75]
J. Lu, Beijing Normal Univ. (China) and Xuanwu Hospital, Capital Medical Univ. (China); X. Wu, L. Yao, Beijing Normal Univ. (China); K.-C. Li, Xuanwu Hospital, Capital Medical Univ. (China); H. Shu, Q. Dong, Beijing Normal Univ. (China)
- 651123 **Adaptive selection of fMRI spatial data in canonical correlation method** [6511-76]
V. Taimouri, Univ. of Tehran (Iran); G.-A. Hossein-Zadeh, Univ. of Tehran (Iran) and Institute for Studies in Theoretical Physics and Mathematics (Iran)
- 651124 **Retrospective processing of DTI tractography to compensate for partial volume effects** [6511-77]
D. Hwang, A. Shetty, A. Rajagopalan, M. Singh, Univ. of Southern California (USA)
- 651126 **A comparison between EEG source localization and fMRI during the processing of emotional visual stimuli** [6511-79]
J. Hu, Institute of Automation (China); J. Tian, Institute of Automation (China) and Graduate Univ. of the Chinese Academy of Science (China); X. Pan, Beijing Normal Univ. (China); J. Liu, Institute of Automation (China)
- 651127 **Investigation of effective connectivity in the motor cortex of fMRI data using Granger causality model** [6511-80]
X. Wu, N. Tang, K. Yin, X. Wu, X. Wen, L. Yao, X. Zhao, Beijing Normal Univ. (China)
- 651128 **Optimization of a single-shot EPI sequence for diffusion imaging of the human spinal cord** [6511-81]
C. Rossi, Eberhard Karls Univ. Tübingen (Germany), CNR-INFM, Univ. degli Studi di Roma, La Sapienza (Italy), and Enrico Fermi Ctr. (Italy); A. Boss, G. Steidle, P. Martirosian, U. Klose, Eberhard Karls Univ. Tübingen (Germany); S. Capuani, CNR-INFM, Univ. degli Studi di Roma, La Sapienza (Italy) and Enrico Fermi Ctr. (Italy); B. Maraviglia, Enrico Fermi Ctr. (Italy), Univ. degli Studi di Roma, La Sapienza (Italy), and IRCCS Santa Lucia Foundation, Rome (Italy); C. D. Claussen, F. Schick, Eberhard Karls Univ. Tübingen (Germany)
- 65112A **Analysis of intracranial aneurysm wall motion and its effects on hemodynamic patterns** [6511-83]
E. Oubel, M. De Craene, Pompeu Fabra Univ. (Spain); C. M. Putman, Inova Fairfax Hospital (USA); J. R. Cebral, George Mason Univ. (USA); A. F. Frangi, Pompeu Fabra Univ. (Spain)
- 65112B **Hemodynamic patterns of anterior communicating artery aneurysms: a possible association with rupture (Cum Laude Poster Award)** [6511-84]
M. A. Castro, George Mason Univ. (USA); C. M. Putman, Inova Fairfax Hospital (USA) and George Washington Univ. (USA); J. R. Cebral, George Mason Univ. (USA)
- 65112C **Hemodynamics before and after bleb formation in cerebral aneurysms** [6511-85]
J. R. Cebral, George Mason Univ. (USA); A. Radaelli, A. Frangi, Pompeu Fabra Univ. (Spain); C. M. Putman, Inova Fairfax Hospital (USA)

- 65112D **Patient-specific modeling of intracranial aneurysmal stenting** [6511-86]
S. Appanaboyina, F. Mut, R. Löhner, George Mason Univ. (USA); C. M. Putman, Inova Fairfax Hospital (USA); J. R. Cebral, George Mason Univ. (USA)
- 65112F **Linear programming approach to optimize 3D data obtained from multiple view angiograms (Honorable Mention Poster Award)** [6511-89]
P. B. Noël, J. Xu, K. R. Hoffmann, V. Singh, S. Schafer, A. M. Walczak, Univ. at Buffalo, SUNY (USA)
- 65112G **Comparative study of diverse model building strategies for 3D-ASM segmentation of dynamic gated SPECT data** [6511-90]
C. Tobon-Gomez, C. Butakoff, S. Ordas, Pompeu Fabra Univ. (Spain); S. Aguade, Hospital Vall d'Hebron (Spain); A. F. Frangi, Pompeu Fabra Univ. (Spain)
- 65112H **Estimation of 3D myocardial motion from tagged MRI using LDDMM** [6511-91]
V. Kotamraju, Simon Fraser Univ. (Canada); E. McVeigh, National Institutes of Health (USA); M. F. Beg, Simon Fraser Univ. (Canada)
- 65112I **Analysis of kernel method for surface curvature estimation** [6511-92]
S. R. Campbell, R. M. Summers, National Institutes of Health (USA)
- 65112J **A new electronic colon cleansing method for virtual colonoscopy** [6511-93]
L. Li, College of Staten Island, CUNY (USA) and Stony Brook Univ., SUNY (USA); S. Wang, J. Wang, D. Eremina, Stony Brook Univ., SUNY (USA); X. Wei, New York City College of Technology (USA); Z. Liang, Stony Brook Univ., SUNY (USA)
- 65112K **Magnetic resonance microwave absorption imaging: initial experimental results in phantoms (Honorable Mention Poster Award)** [6511-94]
B. Xie, J. Weaver, P. Meaney, K. Paulsen, Dartmouth College (USA)
- 65112L **Optical tomography for breast cancer imaging using a two-layer tissue model to include chest-wall effects** [6511-95]
M. Das, Univ. of Massachusetts Medical School (USA); Q. Zhu, Univ. of Connecticut (USA)
- 65112M **Comparison of the depth of an optic nerve head obtained using stereo retinal images and HRT** [6511-96]
T. Nakagawa, Graduate School of Medicine, Gifu Univ. (Japan); Y. Hayashi, Graduate School of Medicine, Gifu Univ. (Japan) and TAK Co., Ltd. (Japan); Y. Hatanaka, Gifu National College of Technology (Japan); A. Aoyama, T. Hara, Graduate School of Medicine, Gifu Univ. (Japan); M. Kakogawa, TAK Co., Ltd. (Japan); H. Fujita, T. Yamamoto, Graduate School of Medicine, Gifu Univ. (Japan)
- 65112N **Accuracy limits for efficiently determining shape and size of low-density lipoprotein macromolecules from cryogenic transmission electron microscope images** [6511-97]
W. L. Collier, Capstone Visual Product Development (USA); L. M. Martin, Univ. of Rhode Island (USA); R. van Antwerpen, Virginia Commonwealth Univ. (USA)

- 651120 **Determination of the chemical composition of human renal stones with MDCT: influence of the surrounding media** [6511-98]
R. Grosjean, Univ. Henri Poincaré Nancy I, INSERM, CHU Nancy (France); B. Sauer, Univ. Henri Poincaré Nancy I, INSERM, CHU NANCY (France) and CHU Nancy (France); R. Guerra, Univ. Henri Poincaré Nancy I, INSERM, CHU Nancy (France) and Siemens Medical Solutions (France); I. Kermarrec, CHU Dijon (France); Y. Ponvianne, D. Winninger, Univ. Henri Poincaré Nancy I, INSERM, CHU Nancy (France); M. Daudon, Hôpitaux Necker-Enfants Malades (France); A. Blum, CHU Nancy (France); J. Felblinger, Univ. Henri Poincaré Nancy I, INSERM, CHU Nancy (France); J. Hubert, Univ. Henri Poincaré Nancy I, INSERM, CHU Nancy (France) and CHU Nancy (France)

Author Index

Conference Committee

Symposium Chairs

Elizabeth A. Krupinski, The University of Arizona (USA)

Milan Sonka, The University of Iowa (USA)

Amir A. Amini, University of Louisville (USA)

Conference Chairs

Armando Manduca, Mayo Clinic (USA) and Mayo Clinic College of
Medicine (USA)

Xiaoping P. Hu, Emory University (USA)

Program Committee

Amir A. Amini, University of Louisville (USA)

Juan R. Cebral, George Mason University (USA)

Anne V. Clough, Marquette University (USA)

Alexander Hartov, Dartmouth College (USA)

Andreas H. Hielscher, Columbia University (USA)

William E. Higgins, The Pennsylvania State University (USA)

Eric A. Hoffman, University of Iowa Hospitals and Clinics (USA)

Erik L. Ritman, Mayo Clinic (USA)

Ronald M. Summers, National Institutes of Health (USA)

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

Felix W. Wehrli, University of Pennsylvania (USA)

Session Chairs

- 1 Small Animal Imaging

Erik L. Ritman, Mayo Clinic (USA)

- 2 Optical Imaging

Brian W. Pogue, Dartmouth College (USA)

- 3 Image Analysis I

Anne V. Clough, Marquette University (USA)

- 4 Image Analysis II

Armando Manduca, Mayo Clinic (USA) and Mayo Clinic College of
Medicine (USA)

- 5 Virtual Endoscopy I: Virtual Bronchoscopy and Related Methods

William E. Higgins, The Pennsylvania State University (USA)

- 6 Virtual Endoscopy II: CT Colonography
William E. Higgins, The Pennsylvania State University (USA)
 - 7 Lung Imaging
Armando Manduca, Mayo Clinic (USA) and Mayo Clinic College of Medicine (USA)
 - 8 MRI Brain Analysis
Yihong Yang, National Institute on Drug Abuse, NIH (USA)
 - 9 Mechanical Properties and Elastography
John B. Weaver, Dartmouth Medical School, Dartmouth-Hitchcock Medical Center (USA) and Dartmouth College (USA)
 - 10 Vessel Imaging and Dynamics
Juan R. Cebral, George Mason University (USA)
 - 11 Cardiac and Aortic Imaging
Amir A. Amini, University of Louisville (USA)
- Poster Session
Alexander Hartov, Dartmouth College (USA)
Juan R. Cebral, George Mason University (USA)

Introduction

These proceedings comprise the papers presented at the Physiology, Function and Structure from Medical Images Conference of the 2007 SPIE Medical Imaging Symposium held February 17–22 in the Town and Country Hotel in San Diego, California. The recent growth in interest generated by this conference continues. This year, the Physiology, Function, and Structure conference received 105 submissions. Of these, 57 were chosen for oral presentations and 40 for poster presentations from Sun Feb. 18 through Tues Feb. 20. The high quality of the submissions and their large number made the selection process extremely difficult.

This year's keynote address was given by Dr. Rebecca Richards-Kortum, Stanley C. Moore Professor and Chair of the Bioengineering Department at Rice University. The talk was entitled "In vivo optical molecular imaging for early cancer detection". The workshop on Sunday evening, organized by Xiaoping Hu of Emory University and Armando Manduca of the Mayo Clinic, was on "Molecular Imaging", and featured invited talks by Drs. Jeff Bulte (Johns Hopkins), David Vera (UC San Diego), Joseph Culver (Washington Univ.), and Erik Ritman (Mayo Clinic).

We wish to thank the members of the program committee for their dedication and hard work before and during the conference, which made it such a success this year. The conference is underwritten and facilitated by SPIE, and we are grateful to their professional staff for the smooth organization and logistical support, which they provided before, during, and after the meeting, and for the friendly working atmosphere that is a hallmark of the Medical Imaging Symposium, of which this conference is a part. We especially wish to acknowledge SPIE staff, who work tirelessly to coordinate this conference with the others at the symposium and who solve so many problems that naturally arise in a meeting of this size. Finally, we express our sincere thanks to all the authors who labored long and hard to produce the papers in this book.

**Armando Manduca
Xiaoping Hu**

