

*Medical Imaging 2010*

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# **Visualization, Image-Guided Procedures, and Modeling**

**Kenneth H. Wong**  
**Michael I. Miga**  
*Editors*

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K. H. Wong, Georgetown Univ. (United States) and Virginia Tech National Capital Region  
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- 7625 21 **A rapid method for compensating registration error between tracker and endoscope in  
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- 7625 22 **A system for advanced real-time visualization and monitoring of MR-guided thermal  
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States); D. Yankelevitz, Weill-Cornell Medical Ctr. (United States); F. Banovac,  
K. Cleary, Georgetown Univ. Medical Ctr. (United States)
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M. Matinfar, G. Narayanasamy, L. Gutierrez, R. Chan, A. Jain, Philips Research North  
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- 7625 26 **Exploring the clinical validity of predicted TRE in navigation** [7625-77]  
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- 7625 29 **Real time planning, guidance, and validation of surgical acts using 3D segmentations, augmented reality projections and surgical tools video tracking** [7625-80]  
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M. Matinfar, S. Iyer, Johns Hopkins Univ. (United States); E. Ford, J. Wong, Johns Hopkins Medical Institute (United States); P. Kazanzides, Johns Hopkins Univ. (United States)
- 7625 2B **Correction of prostate misalignment in radiation therapy using US-CT registration** [7625-82]  
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- 7625 2C **Computer-assisted targeted therapy (CATT) for prostate radiotherapy planning by fusion of CT and MRI** [7625-83]  
J. Chappelow, Rutgers Univ. (United States); S. Both, Hospital of the Univ. of Pennsylvania (United States); S. Viswanath, Rutgers Univ. (United States); S. Hahn, M. Feldman, M. Rosen, J. Tomaszewski, N. Vapiwala, Hospital of the Univ. of Pennsylvania (United States); P. Patel, A. Madabhushi, Rutgers Univ. (United States)
- 7625 2D **Shape-correlated deformation statistics for respiratory motion prediction in 4D lung** [7625-84]  
X. Liu, I. Oguz, S. M. Pizer, The Univ. of North Carolina at Chapel Hill (United States); G. S. Mageras, Memorial Sloan-Kettering Cancer Ctr. (United States)

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- 7625 2F **Modeling tumor/polyp/lesion structure in 3D for computer-aided diagnosis in colonoscopy** [7625-88]  
C.-I. Chen, Univ. of California, Santa Barbara (United States); D. Sargent, STI Medical Systems (United States); Y.-F. Wang, Univ. of California, Santa Barbara (United States)
- 7625 2G **Generation of smooth and accurate surface models for surgical planning and simulation** [7625-89]  
T. Moench, M. Neugebauer, Otto-von-Guericke-Univ. Magdeburg (Germany); P. Hahn, Dornheim Medical Images (Germany); B. Preim, Otto-von-Guericke-Univ. Magdeburg (Germany) and Dornheim Medical Images (Germany)
- 7625 2H **Multi-contact model for FEM-based surgical simulation** [7625-90]  
H. Y. Choi, W. Ahn, D. Y. Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of)
- 7625 2I **3D TEE registration with MR for cardiac interventional applications** [7625-91]  
J. Woo, Cedars-Sinai Medical Ctr. (United States); V. Parthasarathy, D. Sandeep, A. Jain, Philips Research North America (United States)

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- 7625 2J **Realistic colon simulation in CT colonography using mesh skinning** [7625-92]  
J. Yao, A. S. Chowdhury, R. M. Summers, National Institutes of Health (United States)
- 7625 2K **Ground truth and CT image model simulation for pathophysiological human airway system** [7625-93]  
M. Ortner, C. Fetita, TELECOM SudParis (France); P.-Y. Brillet, Univ. Paris 13 (France);  
F. Prêteux, TELECOM SudParis (France); P. Grenier, Univ. Paris 6 (France)
- 7625 2L **Endoscope-magnetic tracker calibration via trust region optimization** [7625-94]  
D. Sargent, STI Medical Systems (United States)

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- 7625 2M **A GPU based high-definition ultrasound digital scan conversion algorithm** [7625-95]  
M. Zhao, CHISON Medical Imaging Co., Ltd. (China), Fudan Univ. (China), and Institute of  
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- 7625 2N **Precisely shaped acoustic ablation of tumors utilizing steerable needle and 3D ultrasound  
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States); R. J. Webster III, Vanderbilt Univ. (United States)
- 7625 2O **A probabilistic framework for ultrasound image decomposition** [7625-97]  
I. V. Solovey, O. V. Michailovich, R. S. Xu, Univ. of Waterloo (Canada)
- 7625 2P **Dynamic tracking of tendon elongation in ultrasound imaging** [7625-98]  
M. Karimpoor, H. Screen, D. Morrissey, Queen Mary Univ. of London (United Kingdom)

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- 7625 2Q **Mechanically assisted 3D prostate ultrasound imaging and biopsy needle-guidance  
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J. Bax, Robarts Research Institute (Canada) and Univ. of Western Ontario (Canada);  
J. Williams, D. Cool, L. Gardi, J. Montreuil, Robarts Research Institute (Canada); V. Karnik,  
Robarts Research Institute (Canada) and Univ. of Western Ontario (Canada); S. Sherebrin,  
Robarts Research Institute (Canada); C. Romagnoli, A. Fenster, Robarts Research Institute  
(Canada) and Univ. of Western Ontario (Canada)
- 7625 2R **Multi-parametric MRI-pathologic correlation of prostate cancer using tracked biopsies**  
[7625-100]  
S. Xu, Philips Research North America (United States); B. Turkbey, National Institutes of Health  
(United States); J. Kruecker, P. Yan, Philips Research North America (United States); J. Locklin,  
P. Pinto, P. Choyke, B. Wood, National Institutes of Health (United States)

- 7625 2S **A multi-threaded mosaicking algorithm for fast image composition of fluorescence bladder images** [7625-101]  
A. Behrens, M. Bommers, T. Stehle, S. Gross, S. Leonhardt, T. Aach, RWTH Aachen Univ. (Germany)
- 7625 2T **Automatic segmentation of seeds and fluoroscope tracking (FTRAC) fiducial in prostate brachytherapy x-ray images** [7625-102]  
N. Kuo, J. Lee, A. Deguet, D. Song, Johns Hopkins Univ. (United States); E. C. Burdette, Acoustic Medsystems, Inc. (United States); J. Prince, Johns Hopkins Univ. (United States)
- 7625 2U **Trans-rectal interventional MRI: initial prostate biopsy experience** [7625-103]  
B. M. Greenwood, M. R. Behluli, Invivo Corp. (United States); J. F. Feller, S. T. May, Desert Medical Imaging (United States); R. Princenthal, Rolling Oaks MRI (United States); A. Winkel, Invivo-Germany (Germany); D. B. Kaminsky, Palm Springs Pathology Services (United States)
- 7625 2V **MRI-GUIDED prostate motion tracking by means of multislice-to-volume registration** [7625-104]  
H. Tadayyon, S. Vikal, S. Gill, A. Lasso, G. Fichtinger, Queen's Univ. (Canada)

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- 7625 2W **Planning of vessel grafts for reconstructive surgery in congenital heart diseases** [7625-105]  
U. Rietdorf, German Cancer Research Ctr. (Germany); E. Riesenkampff, Deutsches Herzzentrum Berlin (Germany); T. Schwarz, German Cancer Research Ctr. (Germany); T. Kuehne, Deutsches Herzzentrum Berlin (Germany); H.-P. Meinzer, German Cancer Research Ctr. (Germany); I. Wolf, German Cancer Research Ctr. (Germany) and Institut für Medizinische Informatik (Germany)
- 7625 2X **A robotic assistant system for cardiac interventions under MRI guidance** [7625-106]  
M. Li, D. Mazilu, B. J. Wood, K. A. Horvath, A. Kapoor, National Institutes of Health (United States)
- 7625 2Y **Integration of trans-esophageal echocardiography with magnetic tracking technology for cardiac interventions** [7625-107]  
J. T. Moore, Robarts Research Institute, The Univ. of Western Ontario (Canada); A. D. Wiles, Robarts Research Institute, The Univ. of Western Ontario (Canada) and Northern Digital Inc. (Canada); C. Wedlake, Robarts Research Institute, The Univ. of Western Ontario (Canada); D. Bainbridge, London Health Sciences (Canada) and Lawson Health Research Institute (Canada); B. Kiaii, London Health Sciences (Canada), Lawson Health Research Institute (Canada), and Canadian Surgical Technologies and Advanced Robotics (Canada); A. L. Trejos, R. Patel, Canadian Surgical Technologies and Advanced Robotics (Canada) and The Univ. of Western Ontario (Canada); T. M. Peters, Robarts Research Institute, The Univ. of Western Ontario (Canada) and Canadian Surgical Technologies and Advanced Robotics (Canada)
- 7625 2Z **2D/3D registration using only single-view fluoroscopy to guide cardiac ablation procedures: a feasibility study** [7625-108]  
P. Fallavollita, Queen's Univ. (Canada)
- 7625 30 **Segmentation of carotid arteries by graph-cuts using centerline models** [7625-109]  
M. A. Gülsün, H. Tek, Siemens Corporate Research (United States)

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- 7625 31 **An evaluative tool for preoperative planning of brain tumor resection** [7625-110]  
A. M. Coffey, I. Garg, M. I. Miga, Vanderbilt Univ. (United States); R. C. Thompson, Vanderbilt Univ. Medical Ctr. (United States)
- 7625 32 **Computer-aided planning for endovascular treatment of intracranial aneurysms (CAPETA)** [7625-111]  
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- 7625 34 **Evaluating a visualization of uncertainty in probabilistic tractography** [7625-113]  
A. von Kapri, T. Rick, RWTH Aachen Univ. (Germany) and JARA-SIM, Jülich-Aachen Research Alliance (Germany); S. Caspers, Institute of Neuroscience and Medicine (Germany) and JARA-BRAIN, Jülich-Aachen Research Alliance (Germany); S. B. Eickhoff, Institute of Neuroscience and Medicine (Germany), JARA-BRAIN, Jülich-Aachen Research Alliance (Germany), and RWTH Aachen Univ. (Germany); K. Zilles, Institute of Neuroscience and Medicine (Germany), JARA-BRAIN, Jülich-Aachen Research Alliance (Germany), and Heinrich-Heine-Univ. (Germany); T. Kuhlen, RWTH Aachen Univ. (Germany) and JARA-SIM, Jülich-Aachen Research Alliance (Germany)
- 7625 35 **Graphical user interfaces for simulation of brain deformation in image-guided neurosurgery (Cum Laude Poster Award)** [7625-114]  
X. Fan, S. Ji, P. Valdes, Dartmouth College (United States); D. W. Roberts, A. Hartov, Dartmouth College (United States) and Dartmouth Hitchcock Medical Ctr. (United States); K. D. Paulsen, Dartmouth College (United States), Dartmouth Medical School (United States), and Dartmouth Hitchcock Medical Ctr. (United States)
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- 7625 3B **A new method of morphological comparison for bony reconstructive surgery: maxillary reconstruction using scapular tip bone** [7625-120]  
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## Introduction

Welcome to the 2010 edition of the SPIE Visualization, Image-Guided Procedures, and Modeling conference proceedings. The conference continues to be a premier venue for our field, where one can see the latest advances, as well as catch up with long-time friends. The conference is also an ideal venue for students to gain an understanding of the research community and interact with both peers and mentors. This year we received approximately 150 abstract submissions, resulting in 55 oral presentations and 70 posters. The number of submissions has remained strong in the face of economic downturns and new challenges for research funding, which is very encouraging for our field.

As technical challenges in our field are understood and overcome, researchers turn to new and exciting areas of investigation. Two of these areas, motion compensation and quantitative imaging, were addressed in our keynote lecture by Professor Paul Kinahan from The University of Washington Medical Center. Professor Kinahan reminded us that although we have made great strides in the treatment of some diseases, other diseases such as lung cancer have seen much less progress. The challenge to our community is to use the power of our newest innovations to tackle these difficult clinical problems.

We were saddened this year by the passing of Dr. Robert Susil, a pioneering researcher in the field of MRI-guided prostate interventions and a close friend to many of us. His optimism and dedication will be greatly missed, but the continuing progress in this field is a fitting tribute to his life and work.

This year we welcomed two new members to the committee: Gabor Fichtinger from Queen's University and Bob Webster from Vanderbilt University. David Holmes from The Mayo Clinic will be stepping up as a conference chair for 2011; Mike Miga is completing his "tour" as conference chair this year. We are grateful to all our committee members for their help in reviewing abstracts, evaluating student papers, and judging posters.

It would not be possible to run this conference without the first-rate support of the SPIE staff members, including the office staff, management, and the editors. They make our job easier, ensure that deadlines are met, and allow us to focus on the technical content. Finally, we would like to thank all the attendees who come to give talks, present posters, and participate in the meeting. We look forward to seeing you next year in Orlando and for many years to come as we continue to collectively develop this technology toward the ultimate goal of improved patient care.

**Kenneth H. Wong**  
**Michael I. Miga**

