

*Medical Imaging 2013*

---

**Advanced PACS-based Imaging  
Informatics and Therapeutic  
Applications**

**Maria Y. Law  
William W. Boonn**  
*Editors*

**12–14 February 2013  
Lake Buena Vista, Florida, United States**

*Sponsored by*  
SPIE

*Cosponsored by*  
Aeroflex Incorporated • CREOL – The College Of Optics and Photonics, University of Central Florida  
(United States) • DQE Instruments, Inc. (Canada) • Medtronic, Inc. • PIXELTEQ, Multispectral Sensing &  
Imaging

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

*Published by*  
SPIE

**Volume 8674**

Proceedings of SPIE, 1605-7422, V. 8674

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

Medical Imaging 2013: Advanced PACS-based Imaging Informatics and Therapeutic Applications,  
edited by Maria Y. Law, William W. Boonn, Proc. of SPIE Vol. 8674, 867401  
© 2013 SPIE · CCC code: 1605-7422/13/\$18 · doi: 10.1117/12.2025015

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 2013: Advanced PACS-based Imaging Informatics and Therapeutic Applications*, edited by Maria Y. Law, William W. Boonn, Proceedings of SPIE Vol. 8674 (SPIE, Bellingham, WA, 2013) Article CID Number.

ISSN: 1605-7422

ISBN: 9780819494481

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 © 2013, 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](http://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 1605-7422/13/\$18.00.

Printed in the United States of America.

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



[SPIEDigitalLibrary.org](http://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 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. Numbers in the index correspond to the last two digits of the six-digit CID Number.

# Contents

vii *Conference Committee*

---

## SESSION 1    **ADVANCED PACS-BASED RADIOLOGY WORKFLOW I**

---

- 8674 02    **An evaluation system for electronic retrospective analyses in radiation oncology: implemented exemplarily for pancreatic cancer** [8674-1]  
K. A. Kessel, Heidelberg Univ. Hospital (Germany); A. Jäger, Deutsches Krebsforschungszentrum (Germany); C. Bohn, CHILI GmbH (Germany); D. Habermehl, Heidelberg Univ. Hospital (Germany); L. Zhang, Deutsches Krebsforschungszentrum (Germany); U. Engelmann, CHILI GmbH (Germany); N. Bougatf, Heidelberg Univ. Hospital (Germany); R. Bendl, Deutsches Krebsforschungszentrum (Germany); J. Debus, S. E. Combs, Heidelberg Univ. Hospital (Germany)
- 8674 03    **A distributed plugin based architecture for medical image processing** [8674-2]  
J. C. León, A. Pinzón, C. Sánchez, E. Romero, Univ. Nacional (Colombia)
- 8674 04    **Robust inter-modality multi-atlas segmentation for PACS-based DTI quality control** [8674-3]  
A. J. Asman, C. B. Lauzon, B. A. Landman, Vanderbilt Univ (United States)
- 8674 05    **Integration of XNAT/PACS, DICOM, and research software for automated multi-modal image analysis** [8674-4]  
Y. Gao, S. S. Burns, C. B. Lauzon, Vanderbilt Univ. (United States); A. E. Fong, T. A. James, Blanchfield Army Community Hospital (United States); J. F. Lubar, Southeastern Biofeedback Institute, Inc. (United States); R. W. Thatcher, Applied Neuroscience, Inc. (United States); D. A. Twillie, M. D. Wirt, M. A. Zola, B. W. Logan, Blanchfield Army Community Hospital (United States); A. W. Anderson, B. A. Landman, Vanderbilt Univ. (United States)

---

## SESSION 2    **ADVANCED PACS-BASED RADIOLOGY WORKFLOW II**

---

- 8674 06    **Region-based volumetric medical image retrieval** [8674-5]  
A. Foncubierta-Rodríguez, HES-SO (Switzerland); H. Müller, A. Depeursinge, HES-SO (Switzerland) and Univ. Hospitals and Univ. of Geneva (Switzerland)
- 8674 07    **Computer-assisted identification and volumetric quantification of dynamic contrast enhancement in brain MRI: an interactive system** [8674-6]  
S. Wu, The Univ. of Pennsylvania (United States); N. G. Avgeropoulos, M.D. Anderson Cancer Ctr. Orlando (United States); D. J. Rippe, Florida Hospital Zephyrhills (United States)
- 8674 08    **How inaccurate is weight as a metric for patient size? Comparing patient weight to effective diameter for size-specific dose estimation** [8674-7]  
T. S. Cook, S. C. Chadalavada, W. W. Boonn, Hospital of the Univ. of Pennsylvania (United States)

- 8674 09 **A multimedia system for decision support in neurological classification of pain in spinal cord injury patients** [8674-8]  
S. K. Verma, The Univ. of Southern California (United States); S. Chun, VA Clinics (United States); B. J. Liu, The Univ. of Southern California (United States)
- 8674 0A **Integration of imaging informatics-based multiple sclerosis eFolder system for multi-site clinical trials utilizing IHE workflow profiles** [8674-9]  
K. Ma, N. Reddy, R. Deshpande, L. Amezcua, B. Liu, The Univ. of Southern California (United States)

---

### SESSION 3 MEDICAL IMAGE SHARING AND EXCHANGE

---

- 8674 0D **Image communication, storage and computing in e-science platform for translational biomedical imaging research** [8674-12]  
J. Zhang, Shanghai Institute of Technical Physics (China) and Shanghai Jiaotong Univ. (China); T. Wang, M. Wang, K. Zhang, Y. Yang, J. Sun, T. Ling, Shanghai Institute of Technical Physics (China); Q. Huang, L. Xu, Shanghai Jiaotong Univ. (China)
- 8674 0E **Transmission of DICOM studies using multi-series DICOM format** [8674-13]  
M. Ismail, Y. Ning, J. Philbin, Johns Hopkins Univ. (United States)
- 8674 0F **Integrating image management and analysis into OpenClinica using web services** [8674-14]  
T. M. Deserno, D. Haak, C. Samsel, J. Gehlen, K. Kabino, RWTH Aachen (Germany)
- 8674 0G **Recommending images of user interests from the biomedical literature** [8674-15]  
S. Clukey, The Univ. of Tennessee Knoxville (United States); S. Xu, Oak Ridge National Lab. (United States)

---

### SESSION 4 QUANTITATIVE ANALYSIS AND DIAGNOSTICS, KNOWLEDGE, SEARCH AND DATA MINING

---

- 8674 0H **Storage and breast region segmentation for a non-distributed approach to clinical scale content-based image retrieval in mammography** [8674-16]  
F. Marungo, P. Taylor, Univ. College London (United Kingdom)
- 8674 0I **Determining the relative importance of figures in journal articles to find representative images** [8674-17]  
H. Müller, HES-SO (Switzerland) and Univ. Hospitals and Univ. of Geneva (Switzerland); A. Foncubierta-Rodríguez, HES-SO (Switzerland); C. Lin, Fujian Medical Univ. (China); I. Eggel, HES-SO (Switzerland)
- 8674 0J **Separating compound figures in journal articles to allow for subfigure classification** [8674-18]  
A. Chhatkuli, HES-SO (Switzerland) and Univ. de Bourgogne (France); A. Foncubierta-Rodríguez, D. Markonis, HES-SO (Switzerland); F. Meriaudeau, Univ. de Bourgogne (France); H. Müller, HES-SO (Switzerland) and Univ. Hospitals and Univ. of Geneva (Switzerland)

- 8674 OK **Example-based segmentation for breast mass images** [8674-19]  
Q. Huang, Shenzhen Digital Home Key Technology Engineering Lab., Sun Yat-sen Univ. in Shenzhen (China); S. Xu, Oak Ridge National Lab. (United States); X. Luo, Shenzhen Digital Home Key Technology Engineering Lab., Sun Yat-sen Univ. in Shenzhen (China)
- 8674 OL **Text- and content-based biomedical image modality classification** [8674-21]  
D. You, M. M. Rahman, S. Antani, D. Demner-Fushman, G. R. Thoma, National Library of Medicine, National Institute of Health (United States)

---

## SESSION 5 THERAPEUTIC APPLICATIONS AND EXTENDING IMAGING INFORMATICS BEYOND RADIOLOGY

---

- 8674 OM **Extending the XNAT archive tool for image and analysis management in ophthalmology research** [8674-22]  
A. Wahle, K. Lee, Iowa Institute for Biomedical Imaging, The Univ. of Iowa (United States); A. T. Harding, The Univ. of Iowa (United States); M. K. Garvin, Iowa Institute for Biomedical Imaging, The Univ. of Iowa (United States) and U.S. Dept. of Veterans Affairs (United States); M. Niemeijer, M. Sonka, Iowa Institute for Biomedical Imaging, The Univ. of Iowa (United States); M. D. Abràmoff, Iowa Institute for Biomedical Imaging, The Univ. of Iowa (United States) and U.S. Dept. of Veterans Affairs (United States)
- 8674 ON **SuperRIVAM: software for the computation of the super-resolution of medical images and video** [8674-23]  
A. CamargoFernández-Baca, E. CamargoFernández-Baca, Research and Development at I+T (Peru)
- 8674 OO **Role of an imaging informatics-based DICOM-RT cancer registry in evaluating treatment parameters of IMRT for prostate cancer** [8674-24]  
R. Deshpande, A. Zhou, J. Zhang, The Univ. of Southern California (United States); J. DeMarco, Univ. of California, Los Angeles (United States); B. J. Liu, The Univ. of Southern California (United States)
- 8674 OP **Imaging informatics-based multimedia ePR system for data management and decision support in rehabilitation research** [8674-25]  
X. Wang, S. Verma, Y. Qin, J. Sterling, A. Zhou, J. Zhang, C. Martinez, N. Casebeer, H. Koh, C. Winstein, B. Liu, The Univ. of Southern California (United States)
- 8674 OQ **Training system for digital mammographic diagnoses of breast cancer** [8674-26]  
R. L. Thomaz, M. G. Nirschl Crozara, A. C. Patrocínio, Univ. Federal de Uberlândia (Brazil)

---

## SESSION 6 JOINT SESSION CONFERENCES 8671 AND 8674: KEYNOTE AND DIGITAL OPERATING ROOM AND KNOWLEDGE INTEGRATION IN THE OR

---

- 8674 OR **The digital operating room: towards intelligent infrastructures and processes** [8674-27]  
H. U. Lemke, Computer Assisted Radiology and Surgery (Germany) and Innovation Ctr. for Computer Assisted Surgery (Germany); L. Berliner, New York Methodist Hospital (United States)
- 8674 OS **In memory of three pioneers: Ledley (biomedical imaging), Greenfield (medical physics) and Kangaroo (PACS and informatics)** [8674-28]  
H. K. Huang, The Univ. of Southern California (United States)

## POSTER SESSION

---

- 8674 OT **Rapid deployment of a Monte Carlo simulation system using diskless remote boot in Linux in a PACS environment** [8674-31]  
Y.-J. Chang, Central Taiwan Univ. of Science and Technology (Taiwan); Y.-L. Liu, C.-T. Shih, National Tsing Hua Univ. (Taiwan); S.-J. Chang, Institute of Nuclear Energy Research (Taiwan); J. Wu, China Medical Univ. (Taiwan)
- 8674 OU **Developing an interactive and MIRC-compliant radiology teaching file system** [8674-34]  
M. dos Santos, A. Fujino, Univ. de São Paulo (Brazil)
- 8674 OV **Integration of PACS and CAD systems using DICOMDIR and open-source tools** [8674-32]  
J. Huang, A. Ling, R. M. Summers, J. Yao, National Institute of Health (United States)
- 8674 OW **An intelligent monitoring and management system for cross-enterprise biomedical data sharing platform (Cum Laude Poster Award)** [8674-29]  
T. Wang, Y. Yang, J. Zhang, Shanghai Institute of Technical Physics (China)
- 8674 OX **Teleradiology network system on cloud using the web medical image conference system with a new information security solution** [8674-33]  
H. Satoh, Tokyo Health Care Univ. (Japan); N. Niki, Univ. of Tokushima (Japan); K. Eguchi, Teikyo Univ. (Japan); H. Ohmatsu, M. Kusumoto, National Cancer Ctr. Hospital East (Japan); M. Kaneko, N. Moriyama, National Cancer Ctr. Hospital (Japan)
- 8674 OY **3D segmentation and image annotation for quantitative diagnosis in lung CT images with pulmonary lesions** [8674-30]  
S. Li, Shanghai Institute of Technical Physics (China); Y. Zhu, Shenzhen Institute of Advanced Technology (China); J. Sun, J. Zhang, Shanghai Institute of Technical Physics (China)

*Author Index*

# Conference Committee

## *Symposium Chairs*

**Nico Karssemeijer**, Radboud University Nijmegen Medical Center  
(Netherlands)  
**Ehsan Samei**, Duke University (United States)

## *Conference Chairs*

**Maria Y. Law**, Hong Kong Sanatorium and Hospital (Hong Kong, China)  
**William W. Boonn**, University of Pennsylvania Health System (United States)

## *Conference Program Committee*

**James Chen**, University of California, San Diego (United States)  
**Janice C. Honeyman-Buck**, University of Florida (United States)  
**Steven C. Horii**, University of Pennsylvania Health System  
(United States)  
**Woojin Kim**, University of Pennsylvania Health System (United States)  
**Brent J. Liu**, The University of Southern California (United States)  
**Heinz U. Lemke**, Computer Assisted Radiology and Surgery (Germany)  
**Khan M. Siddiqui**, Higi LLC (United States)  
**Eliot L. Siegel**, University of Maryland Medical Center (United States)  
**John B. Strauss**, Microsoft Corporation (United States)  
**Wyatt Tellis**, University of California, San Francisco (United States)  
**Jianguo Zhang**, Shanghai Institute of Technical Physics (China)  
**Stefan L. Zimmerman**, Johns Hopkins University (United States)

## *Session Chairs*

- 1 Advanced PACS-based Radiology Workflow I  
**Maria Y. Law**, Hong Kong Sanatorium and Hospital (Hong Kong, China)
- 2 Advanced PACS-based Radiology Workflow II  
**Steven C. Horii**, The University of Pennsylvania Health System  
(United States)
- 3 Medical Image Sharing and Exchange  
**Jianguo Zhang**, Shanghai Institute of Technical Physics (China)
- 4 Quantitative Analysis and Diagnostics, Knowledge, Search and Data Mining  
**Eliot L. Siegel**, University of Maryland Medical Center (United States)

- 5 Therapeutic Applications and Extending Imaging Informatics beyond Radiology  
**Heinz U. Lemke**, Computer Assisted Radiology and Surgery (United States)
- 6 Joint Session Conferences 8671 and 8674: Keynote and Digital Operating Room and Knowledge Integration in the OR  
**Frank Sauer**, Siemens Corporate Research (United States)  
**William W. Boonn**, The University of Pennsylvania Health System (United States)