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Joseph M. Reinhardt

Josien P. W. Pluim

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Session Chairs

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Guido Gerig, University of Utah (USA)
- 2 Atlases and Population Studies
Anthony J. Maeder, CSIRO Information and Communication Technologies Centre (Australia)
- 3 Registration I: Applications
Colin Studholme, University of California, San Francisco (USA)
- 4 Neurological Applications
James C. Gee, University of Pennsylvania (USA)
- 5 Classification and Pattern Recognition
Punam K. Saha, The University of Iowa (USA)
- 6 Registration II: Methodology
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Introduction

These proceedings contain the papers presented at the Image Processing conference of the 2008 SPIE Medical Imaging Symposium, held 16–21 February at the Town and Country Hotel in San Diego, California. A total of 120 posters and 63 oral presentations were selected from 264 submissions. The high quality of the submissions made the paper selection process extremely difficult, and in the end we were limited by the available timeslots for oral presentations and space for poster presentations. The acceptance rate this year was 69%. The total number of submissions increased by 15% compared to 2007. Of the 183 accepted papers, 170 were presented at the meeting and are included in these proceedings.

The first day of the conference ended with the evening workshop entitled "DICOM Working Group 23 and Application Hosting: What They Mean for Research in Medical Image Analysis," organized and chaired by Dr. David Haynor, of the University of Washington. Dr. Haynor opened the workshop by describing how difficult it can be to bring a new research image processing application into a clinical radiology environment; the reading workstations are typically locked down so that no new software can be added, necessitating that a new computer be added to the reading room to deploy a new application. Four speakers from academia, industry, and government discussed different aspects of application hosting. Dr. Lawrence Tarbox, of Washington University in St. Louis, described the work done by DICOM Working Group 23 to define a standard application hosting framework that provides a "plug-in" interface so that new applications could be loaded into a workstation at runtime, and could run in a safe, protected environment. He described the development of the eXtensible Imaging Platform (XIP), an open-source environment for rapidly developing medical imaging applications. Dr. Gianluca Paladini, of Siemens Corporate Research, discussed the Siemens OpenXIP environment for rapid application development. OpenXIP provides easy access to image processing and display libraries such as ITK and VTK. Mr. Chris Wood, of Clario Medical Imaging, described a Clario application hosting environment, and discussed how researchers might work with Clario to distribute and support their image processing applications. Dr. Laurence Clarke, of the National Cancer Institute (NCI) at the NIH, discussed the NCI's interest in application hosting, portable plug-ins, and, more generally, open-source software. After the four speakers delivered their prepared remarks, there was an interesting panel discussion and question-and-answer session. Various practical considerations of using application hosting and plug-ins in a clinical environment, such as FDA approval, liability, and royalties were discussed. After the workshop, the five panelists and many audience members moved to a conference room for a hands-on session with the XIP environments.

Our keynote speaker this year was Dr. James Duncan, from Yale University. Dr. Duncan is well known in the medical imaging community for his work in many areas of medical image processing, and for his founding and leadership of the Image Processing and Analysis Group (IPAG) at Yale University. Dr. Duncan's keynote talk was entitled "Model-based biomedical image analysis." He described the challenges associated with accurately and reproducibly extracting useful quantitative information from medical images, including image acquisition limitations, the variability of normal human anatomy and physiology, and the presence of disease or other abnormal conditions. Dr. Duncan argued that robust and reproducible image analysis solutions combine both image-derived information and model-based information. He discussed research performed at IPAG to use shape, geometry, and biomechanical models to guide image analysis and to constrain the range of plausible solutions in the presence of uncertainty, and described key applications of these concepts in the areas of cardiac and neurological image analysis.

The image processing posters were displayed on Sunday and Monday this year. At the Monday night poster reception, one cum laude poster and three honorable mention posters were recognized as the winners of the student poster competition. The award-winning poster papers are marked in these proceedings.

Many people contributed time and energy toward making the conference a success. We would like to thank the members of the Image Processing Conference program committee for their efforts before and during the meeting in reviewing paper submissions, chairing sessions, and judging posters. We would also like to thank the staff at SPIE for their work in organizing the meeting and publishing the proceedings. And, of course, we are grateful to all of the authors, for they are the ones that produced and presented the exciting research that makes these proceedings possible.

Joseph M. Reinhardt
Josien P.W. Pluim

In Memoriam

Sam Dwyer

1932–2008

Inspirational planner for SPIE Medical Imaging symposia and chair of 15 conferences from 1983 to 1996

Sam Dwyer was a leading light in the swift growth of the field of medical imaging. At this 2008 Medical Imaging symposium, several colleagues expressed their appreciation of his professional achievements and the legacy of his contributions.

Andre Duerinckx recalls Sam's first big step into the limelight. "Sam chaired the Second International PACS meeting sponsored by SPIE in 1983. He stepped in when my professional direction shifted and I could not continue. Over the following years Sam became a leading force in the development of this new science and technology as the conferences developed and grew."

"He had an ability to predict important technology trends in medical imaging," says Steven Horii, a long-time SPIE Medical Imaging contributor and past conference chair.

Another past Medical Imaging conference chair with years of experience, Roger Schneider elaborates, "The growth of the initial conferences was phenomenal. They quickly expanded and outgrew several facilities. Topic areas increased. For example, we had been dealing with perception in sessions on image statistics. Sam first suggested that the field of perception theory and experiment was expanding so rapidly that it deserved its own conference. We also added conferences on image processing hardware, display, functional imaging, and special topics in ultrasound transducers."

"Sam was a true pioneer in our field," continues Schneider. "He was one of the first to envision the impact of digital technology on the storage, retrieval, communication, and

display of medical images, and one of the most active early explorers of the possibilities. He led the PACS conference into the merger with SPIE's image science conference to form the current Medical Imaging Symposium which many consider to be the premiere technical program on medical imaging in the world."

Murray Loew, another past conference chair, adds his observation, "Sam's academic, industrial, and clinical experience provided the perspective that enabled him to set priorities and give advice that helped many of us to make our own contributions. We all benefited greatly from his insights and his practical approach."

Schneider agrees. "Through all, Sam was an excellent partner and leader, calm, gentle yet persuasive, always congenially nudging everyone toward a better future. His ambitions were not for himself, but for the mutual enterprise. He was a very enthusiastic mentor and supporter of students and researchers new to the field without any concern for the possibility that their work might compete with his and was himself a superbly competent contributor."

An example of this is illustrated by John Strauss." Already well accomplished at the time of our first meeting, Sam made the time to take an eager but inexperienced student under his wing. I was not an 'assigned' grad student or research assistant from the University to which he had an obligation. I was a product manager from a vendor-partner. Over the years, from answering technical questions in an understandable way, to providing unassuming career guidance, as well as a sympathetic ear to the challenges of fatherhood or life's many challenges and struggles, Sam was always there for me."

"There are many things about Sam Dwyer that I recall with great fondness, like his always friendly and enthusiastic manner. His advice led me to my years of satisfying work on the ACR-NEMA Committee," adds Horii.

All agree that Sam had many other admirable traits. His wit and sense of humor were legendary, as one of Schneider's favorite memories illustrates. "At the opening of one conference Sam announced, from the podium, that it was the birthday of an important attendee. He said SPIE had requested that the Blue Angels do a flyover—but they already had something scheduled. As a substitute birthday recognition, Sam suggested we take our morning coffee break out on the terrace and watch the landscaping crew circle the flagpole on their riding lawnmowers."

Strauss describes the footprint left by Sam, "While Sam left a legacy through his professional accomplishments, perhaps more lasting is the heritage of leadership he has left behind. He felt it his obligation to pass on his knowledge and wisdom to the next generation, and I was blessed as a recipient. I have and will continue to honor Sam by sharing with those that come after me."

Sam Dwyer was a person of rare quality who will be sorely missed. His name has a permanent place in the annals of medical imaging, and his contributions continue in the flourishing growth of knowledge presented and discussed in the annual Medical Imaging conferences.