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Image Perception, Observer Performance, and Technology Assessment

Berkman Sahiner
David J. Manning
Editors

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Introduction

As part of the symposium of SPIE Medical Imaging 2008, the Image Perception, Observer Performance, and Technology Assessment Conference was held February 19 through 21, 2008, in San Diego, California.

The conference opened with the annual Harold L. Kundel Honorary Lecture and the keynote speaker this year was Arthur E. Burgess, Ph.D., from Harvard Medical School. Before his lecture, Elizabeth A. Krupinski, Ph.D., University of Arizona, presented Dr. Burgess with a plaque that recognized his outstanding contributions to the field of medical image perception. Dr. Burgess' keynote speech was entitled "An unexpected research career: How a short project became long". The speech contained an excellent mix of scientific discussion from Dr. Burgess' research career and personal anecdotes. Dr. Burgess advised younger researchers to keep laboratory notebooks, record the research process on paper, not on a computer, because as the years pass computer media changes and one may not be able to access old data using current computers. He stressed that he could not have prepared his keynote speech without his laboratory notebooks, and he proved so by graphing data collected more than 20 years ago. His outstanding speech indeed demonstrated how important those notes are, and how relevant many of those research topics are today.

There were 30 contributed oral presentations organized in six sessions: Eye movement; technology assessment; ROC and its variants; image perception and quality; image display; and model observers. The poster session had 23 posters covering essentially all topics discussed at the conference. The Cum Laude Award for Best Poster went to Craig K. Abbey, Arian Teymoorian, Univ. of California/Santa Barbara; Xiaolin Da, Cedars Sinai Medical Center; Binh Pham, Univ. of California/Santa Barbara; James Whiting, Cedars Sinai Health System; and Miguel Eckstein, Univ. of California/Santa Barbara; for their paper entitled "Perceptual assessment of multiple stent deployment." The Honorable Mention Poster Award went to Damien Litchfield, Linden Ball, Lancaster University; Tim Donovan, David Manning, University of Cumbria; and Trevor Crawford, Lancaster University; for their paper entitled "Learning from others: effects of viewing another person's eye movements while searching for chest nodules."

The workshop for the conference was entitled “Recent Developments in ROC Analysis,” and it was moderated by Kevin Berbaum, Ph.D., Univ. of Iowa and Berkman Sahiner, Ph.D., Univ. of Michigan. Five experts gave 10-minute presentations and then joined in a panel discussion. The panelists were Stephen L. Hillis, Ph.D., Univ. of Iowa; Brandon Gallas, Ph.D., US Food and Drug Administration; Philip F. Judy, Ph.D., Harvard Medical School and Brigham and Women's Hospital; Dev P. Chakraborty, Ph.D., Univ. of Pittsburgh; and Darrin C. Edwards, Ph.D., Univ. of Chicago. The panelists brought fresh perspectives from their individual areas to

the question of how medical imaging techniques can best be evaluated using Receiver Operating Characteristic-type of analysis. Discussion touched on a wide range of topics from how to best analyze or interpret multiple-reader, multiple-case data to new methods for free-response data analysis and how to conduct multi-class ROC analysis. The workshop was successful in highlighting the developments that have taken place since the early days of application of signal detection theory to evaluate diagnostic performance in radiology. There was particular emphasis on the importance of data collected from human subjects in image perception research, and scientists were encouraged to share their findings in collaborative ventures to improve our understanding of the topic. With increased emphasis on performance evaluation for medical imaging techniques, this area will likely be the focus of growing interest in the near future.

We are grateful to the conference program committee for their important contributions in all aspects of conference planning and organization, and for providing suggestions for future conferences. We would also like to thank the SPIE staff for their excellent work in organizing the symposium. The preparation for the 2009 Image Perception, Observer Performance, and Technology Assessment Conference is now under way. As always, on behalf of the conference program committee, we would like to encourage attendants to contact us with ideas for improving this conference. We are committed to organizing a conference that is educational, stimulating, and a friendly forum for scientific exchange and debate.

Berkman Sahiner
David Manning

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.