

Joseph H. Holmes Basic Science Pioneer Award

In 1977, the Pioneer Award, which honored an individual who significantly contributed to the growth and development of diagnostic ultrasound, was established. This special award was renamed in 1982, to honor Joseph H. Holmes, MD, who died that year. Dr Holmes, the first person named as an AIUM pioneer, was an important figure to both the field of diagnostic ultrasound and the AIUM. His early efforts in ultrasound research, which included tissue characterization and ultrasound's diagnostic use in polycystic kidney disease and orthopedics, helped to advance the field of ultrasound and encourage others to conduct new research. Serving the AIUM in many capacities, Dr Holmes was president from 1968 to 1970, and was editor of the AIUM's official journal, which was then titled, the *Journal of Clinical Ultrasound*, for nearly 10 years. Each year the Joseph H. Holmes Pioneer Award honors at least 2 current or retired AIUM members for their work in clinical science or basic science.



Thomas R. Yellen-Nelson, PhD, FAAPM, FAIUM

Dr Yellen-Nelson, PhD is an Emeritus Professor in the Department of Radiology at the University of California, San Diego. Throughout his career he has been driven by a desire to understand and apply concepts from inter-disciplinary fields of science to solving problems, particularly at the intersection of basic science and medicine. While many of his research interests have been directed toward practical applications of science to solving clinical problems, he also has sought a deeper understanding of underlying phenomena across diverse fields.

Professor Yellen-Nelson's early work was directed toward automating methods for analysis of cardiac function, initially in the field of nuclear cardiology but extending throughout his career to the study of fractal cardiac physiology and multidimensional fetal echocardiography. His research has crossed all areas of medical imaging including nuclear, magnetic resonance imaging, mammography, computed tomography and ultrasound. Common themes of his research have been quantitative analysis and multidimensional imaging coupled with computer modeling of physiology.

A graduate of the University of California, Los Angeles, Professor Yellen-Nelson has degrees in mathematics, radiological and medical physics that provide a broad background for his research interests. He is board certified by the American Board of Radiology in Diagnostic Radiological Physics and Medical Nuclear Physics and the American Board of Health Physics in Radiological Physics plus being a registered mammography physicist, which have been essential in his role as Medical Director of Diagnostic Radiology Physics at the University of California, San Diego over the past 30 years.

Throughout his career, Professor Yellen-Nelson has greatly enjoyed and valued teaching and mentoring graduate students, residents, and fellows where he has been able to use his ability to communicate across disciplines in a clear and succinct fashion. He has been actively involved in the AIUM for many years, serving on the Board of Governors, Categorical Course Program Committee's, as associate editor of the *Journal of Ultrasound in Medicine*, chair of the Fetal Echocardiography Section, as a member of the Technical Standards and Bioeffects Committees, and representing the AIUM on the Digital Imaging and Communications in Medicine Standards Committee. He also has been involved with the American

Association of Physicists in Medicine (AAPM) and its task groups and the Radiological Society of North America, in addition to other professional societies. He has been recognized as a fellow of the AIUM and the AAPM for his contributions to medical physics.

Professor Yellen-Nelson's research has been the recipient of numerous grants and awards for his contributions. He has published more than 350 articles in medical and basic science journals, including the *Journal of Ultrasound in Medicine* and *Medical Physics*. Professor Yellen-Nelson's work on fetal imaging has been featured on the Discovery Channel and in museum exhibits. He also wrote and published *Three-Dimensional Ultrasound* in collaboration with colleagues summarizing their pioneering research in the field of multidimensional ultrasound imaging. His research in 3-dimensional (3D) ultrasound contributed to many of the capabilities now incorporated into clinical ultrasound imaging systems. A significant contribution was his development of multidimensional fetal cardiac imaging, which produced and demonstrated the first 4-dimensional (4D) images of the beating fetal heart. This pioneering research has served as the basis for the fetal cardiac imaging methods employed on current clinical scanners.

Throughout his research career, Professor Yellen-Nelson has developed innovative methods to enhance information and visualization of medical imaging methods. In addition to 3D/4D ultrasound, he also collaborated in the development of a dedicated volume breast computed tomographic (CT) scanner that produced high quality volumetric breast images at the same dose as conventional mammography. This work was further extended to the development of a dedicated volumetric breast ultrasound scanner that produces high quality images of the breast including sound speed, attenuation and temperature measurement suitable for monitoring hyperthermia treatment. His most recent work has been in collaboration with researchers at the University of California, San Francisco in optimizing diagnostic image quality while reducing the CT dose to patients in an international multicenter clinical project.

Throughout his career, Professor Yellen-Nelson has been driven by a passion to explore and learn and share that knowledge with others. He has been an invited lecturer, author, course organizer, dedicated scientist, and physicist who has worked to contribute to the medical imaging community and the patients we serve. The AIUM is honored by his support and desire to share in the growth of this exciting and vibrant field.

