

## MEDICAL ULTRASOUND IMAGING AND DISTRIBUTED DIAGNOSIS AND HOME HEALTHCARE

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Ultrasound imaging has become one of the most frequently used medical imaging modalities, currently accounting for almost 25% of all imaging examinations performed around the world. Due to its advantages of real-time imaging without ionizing radiation and being small and inexpensive, it has become an imaging modality of choice in an expanding list of clinical applications, including cardiology, obstetrics and gynecology, general abdominal imaging, and vascular imaging.

To enable this widespread use, there have been significant technological advances in improving the image quality of ultrasound imaging and introducing new diagnostic capabilities. Recent progress and future trends will be presented in this talk, including panoramic imaging, real-time strain (elasticity) imaging, 3D and 4D imaging, ultrasound molecular imaging, and programmable ultrasound machines and their applications.

It is increasingly clear that the current healthcare system is not sustainable. The healthcare delivery in the future needs to be provided more in a distributed, patient-centered manner. The goal of Distributed Diagnosis and Home Healthcare ( $D_2H_2$ ) is to improve quality of care and patient wellness and outcome by transforming the delivery of healthcare from a central, hospital-based system to one that is more distributed and home-based.  $D_2H_2$  will benefit patients, particularly those with chronic disease, e.g., diabetes, arthritis and high blood pressure. Our vision on future healthcare and the  $D_2H_2$  system as a future healthcare delivery system will be presented.

**Dr. Yongmin Kim** received the B.S. degree in electronics engineering from Seoul National University, Seoul, Korea, in 1975, and the M.S. and Ph.D. degrees in electrical engineering from the University of Wisconsin (Madison), in 1979 and 1982, respectively.

Currently, he is the W. Hunter and Dorothy L. Simpson Endowed Chair in Bioengineering at the University of Washington in Seattle. He is also the director of both the Image Computing Systems Laboratory at the University of Washington and several University of Washington Image Computing Library (UWICL) Consortia.

His research interests include high-performance computer architecture, algorithms and systems for multimedia, image processing and computer graphics, medical imaging, picture archiving and communications system (PACS), distributed diagnosis and home healthcare, E-Medicine, and modeling and simulation. Dr. Kim and his research group have made 81 inventions that have led to 75 patents, and have transferred the invented technologies to industry with 22 licenses.

He has served on the Board of Directors and the Technical Advisory Board of several companies. He is the President-Elect of the IEEE EMBS and will be the IEEE/EMBS President in 2005 and 2006. Dr. Kim is a Fellow of the IEEE and a Fellow of the American Institute for Medical and Biological Engineering.

He has been a member of the Editorial Board of Proceedings of the IEEE, the IEEE Transactions on Biomedical Engineering, the IEEE Transactions on Information Technology in Biomedicine, the IEEE Press series, and the Annual Reviews of Biomedical Engineering. He was the editor of the Handbook of Medical Imaging and has been a contributing author to many other books. He has more than 390 research publications, and he is the editor of 11 Conference Proceedings. He was awarded the 1988 Early Career Achievement Award of the IEEE Engineering in Medicine and Biology Society for his contributions to medical imaging and the 2003 Ho-Am Prize in Engineering.

Dr. Kim has been an IEEE/Engineering in Medicine and Biology Society (EMBS) distinguished lecturer since 1991, and his presentation is being jointly sponsored by the Center for Imaging Science and IEEE/EMBS.