Image-Guided Therapy in the Postgenomic Era

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Abstract

Successful mapping of the human genome is a significant scientific landmark. With it comes the realization that the era of molecular medicine is upon us. However, the current bottom up approach adopted by the research community falls short in translating scientific discovery into clinical relevance. On the other hand, for over a century, radiology has been predominately a clinically oriented discipline based primarily on morphologic information. The development of image guided therapy (IGT), started more than a decade ago, aims to improve the efficacy of minimally invasive procedures and to reduce morbidity by providing pre-operative and direct intra-operative image based information. IGT integrates multimodality imaging, robotics systems, and image post-processing and visualization but the principle of operation remains relying upon morphologic information. This talk presents a new approach that ties functional genomics and molecular imaging together, leading to a new way to design and implement image-guided therapy systems beyond incremental improvement of surgical procedures. The development of molecular IGT requires an interdisciplinary team of experts, including molecular and cellular biology, biochemistry, computational biology, bioinformatics, pathology, immunology, medical imaging, and systems engineering. We will describe the current system being developed at the Methodist Hospital of Houston.

Bio:
Professor Stephen Wong is Vice Chairman and chief of Medical Physics in the Department of Radiology as well as director of the Bioinformatics Program and senior member at the Methodist Hospital Research Institute, Methodist Hospital-Weill Cornell Medical College. His research focuses on molecular imaging and bioinformatics techniques for biomarker discovery, surgical planning, image-guided therapy, drug discovery, and clinical diagnosis. Dr. Wong published more than 200 peer-reviewed papers and holds seven patents in biomedical technology. He serves on several NIH and NSF panels, numerous journal editorial boards and conference program committees.

Before joining Methodist, Professor Wong founded two research centers at Harvard: the HCNR Center for Bioinformatics, Harvard Medical School and the Functional and Molecular Imaging Center, Brigham and Women's Hospital, HMS. He has over 20 years of R&D experience in

industry and academic medicine and directed research labs and product development departments in Philips Electronics, Charles Schwab, AT&T, and HP.   He has made original contributions to PACS and digital radiology, neuroinformatics, VLSI automation, and optoelectronics. He received a doctorate in Computer Science in 1991, masters in Computer Science and Engineering in 1989 from Lehigh University, PA, USA, and a bachelor of Electrical Engineering (Hons) in 1983 from the University of Western Australia, as well as executive education from Stanford, Columbia, and MIT Sloan School.