

MIE SPECIAL SEMINAR

Tuesday November 10, 2009, 11am

Room:

406 Egan

Speaker:

Nobuhiko Hata, Ph.D., Associate Professor
Technical Director, Image Guided Therapy Program
Director, Surgical Navigation and Robotics Laboratory
Department of Radiology, Brigham and Women's Hospital
<http://www.snrlab.org>

Title:

"Role of Image Processing, Navigation and Robots in MRI-guided Intervention"

Abstract:

This work describes an integrated system for planning and performing surgical procedures with robotic assistance under Magnetic Resonance Imaging-guidance. The physician interacts with a planning interface in order to specify the set of desired needle trajectories, based on anatomical structures and lesions observed in the patient's MR images. Direct control of real-time imaging aids visualization of the needle as it is manually inserted through the guide. Free open-source software 3D Slicer is an indispensable tool to enable the clinical application of the robot under multi-disciplinary and multi-institutional collaboration. I also present an advanced form of image-guided robotic surgery where imaging is used not only as an observation tool, but as feed back sensor in robot control. The robot in the MRI scanner is servo controlled by navigator echo-based motion tracking using MR imaging and synchronized to motion of moving organs. This new method, and its supporting technology, will have impact on variety of image-guided therapies such as focused ultrasound therapy of moving organs and device tracking with dynamic MRI in cardiac interventions. Lastly, I will present our long-term clinical goal at Brigham and Women's Hospital to perform therapies in high-field closed-bore MRI scanners where miniature capsule endoscope performs both diagnosis and treatment controlled and visualized by MRI.

Bio:

Nobuhiko Hata was born in Kobe, Japan. He received the B.E. degree in precision machinery engineering in 1993 from School of Engineering, The University of Tokyo, Tokyo, Japan, and the M.E. and the Doctor of Engineering degrees in precision machinery engineering in 1995 and 1998 respectively, both from Graduate School of Engineering, The University of Tokyo, Tokyo, Japan. He is currently an Associate Professor of Radiology, Harvard Medical School and Technical Director of Image Guided Therapy Program, Brigham and Women's Hospital. He started his career at Brigham and Women's Hospital initially as a research fellow in 1995, then became Instructor of Radiology in 2000 and Assistant Professor of Radiology in 2005, all at Department of Radiology. In 2008, He founded a research group called Surgical Navigation and Robotics Laboratory, under Image Guided Therapy Program. In the Image Guided Therapy Program and Surgical Navigation and Robotics Laboratory, he continues to work on medical image processing and robotics in image-guided surgery. His major achievements include neurosurgical navigation combined with ultrasound imaging, surgical robot for magnetic resonance imager, and motion-adaptable surgical robot for image-guided therapy. More importantly, he developed key technology in many "the first" therapy in MRI-guided therapy; MR-guided prostate biopsy, MR-guided laser ablation therapy of brain tumor, and MR-guided microwave ablation therapy of liver tumor. In total, he has co-authored 49 original articles and have been involved in 11 federal and non-federal grants during the course of his research career.

For any additional information please contact [Prof. Dinos Mavroidis](#).