

Einladung zu einem Vortrag

im Rahmen des Instituts-Dissertanten-Seminars (LV 860.036)

**„Image-Guided, Minimally-Invasive  
Interventions in the Brain and Heart“**

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Seminarraum des Zentrums

für Medizinische Physik und Biomedizinische Technik

Medizinische Universität Wien

AKH Wien, Ebene 4L

## **"Image-Guided, Minimally-Invasive Interventions in the Brain and Heart"**

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Surgical procedures often have the unfortunate side-effect of causing the patient significant trauma while accessing the target site. Indeed, in some cases the trauma inflicted on the patient during access to the target greatly exceeds that caused by performing the therapy. Over the years we have developed techniques that rely on pre-operative images, combined with data acquired during the procedure for performing minimally-invasive surgery on the brain and heart. This presentation will illustrate this work with respect to its application for both deep-brain stimulator implantation as well as intra-cardiac therapy. For Deep-brain therapy for Parkinson's tremor, we map a database of deep-brain electrophysiological responses to the patient's brain. Guided by these data and intra-operatively acquired electrophysiology measurements, the target region is approached with a stimulating electrode through a small burr-hole in the skull to select the final target. In the heart, many intra-cardiac interventions are currently performed after the chest has been opened, the patient placed on cardiopulmonary bypass, and the heart arrested. Our approach is to register intra-operative images to the patient, and use a navigation system that combines intra-operative ultrasound with virtual models of instrumentation that has been introduced into the chamber through the heart wall.

### **Biographical Information**



*Dr. Terry Peters is a Scientist in the Imaging Research Laboratories at the Robarts Research Institute (RRI), London, ON, Canada, and Professor in the Departments of Medical Imaging and Medical Biophysics at the University of Western Ontario, as well as a member of the Graduate Programs in Neurosciences and Biomedical Engineering. He is also an adjunct Professor at McGill University in Montreal. Dr. Peters received his graduate training at the University of Canterbury in New Zealand in Electrical Engineering, under the direction of Professor Richard Bates. His PhD work dealt with fundamental issues in Computed Tomography image reconstruction, and resulted in a seminal paper on the topic in 1971, just prior to the beginning of CT's commercial development and worldwide application. For the past 30 years, his research has built on this foundation, focusing on the application of computational hardware and software advances to medical imaging modalities in surgery and therapy. Starting in 1978 at the Montreal Neurological Institute (MNI), Dr. Peters' lab pioneered many of the image-guidance techniques and applications that are used for the surgical treatment of epilepsy and Parkinson's Disease. In 1997, Dr. Peters was recruited by the Robarts Research Institute at the University of Western Ontario, London Canada, to establish a focus of image-guided surgery and therapy within the*

*Robarts Imaging Research Laboratories. His lab has expanded over the past thirteen years to encompass image-guided procedures of the heart, brain and abdomen.*

*Dr. Peters has authored over 200 peer-reviewed papers and book chapters, a similar number of abstracts, and has delivered over 180 invited presentations. He is a Fellow of the Institute of Electrical and Electronics Engineers, the Canadian College of Physicists in Medicine; the American Association of Physicists in Medicine, the Australasian College of Physical Scientists and Engineers in Medicine, the MICCAI Society, and the Institute of Physics. He is an executive member of the board of the MICCAI society, as well as its treasurer. He has mentored over 75 trainees at the Masters, Doctoral and Postdoctoral levels.*

*For the past 25 years he has been funded by the Canadian Institutes for Health Research; the Natural Science and Engineering Research Council of Canada, the National Centres of Excellence Institute for Robotics and Intelligent Systems, the Heart and Stroke Foundation of Ontario, the Canadian Foundation for Innovation, the Ontario Innovation Trust, the Ontario Research and Development Challenge Fund, the Ontario Institute for Cancer Research, and the Ontario Research Fund, with grants totalling over \$25M.*