

# Sondertermin

Am Montag, dem 21. Juli 2008, um 16:15 Uhr hält

**Prof. Sylvain Martel**  
**Polytechnique Montréal**

einen Vortrag mit dem Titel

## **MRI-based Medical Nanorobotic Platform for the Control of Magnetic Nanoparticles and Flagellated Bacteria for Target Interventions in Human Capillaries**

**Der Vortrag findet im OFFIS, Escherweg 2, Konferenzraum F02 statt.**

### **Abstract:**

Medical nanorobotics exploits nanometer-scale components and phenomena with robotics to provide new medical diagnostic and interventional tools. Here, the architecture and main specifications of a novel medical interventional platform based on nanorobotics and nanomedicine, and suited to target regions inaccessible to catheterization are described. The robotic platform uses magnetic resonance imaging (MRI) for feeding back information to a controller responsible for the real-time control and navigation along pre-planned paths in the blood vessels of untethered magnetic carriers, nanorobots, and/or magnetotactic bacteria (MTB) loaded with sensory or therapeutic agents acting like a wireless robotic arm, manipulator, or other extensions necessary to perform specific remote tasks. Unlike known magnetic targeting methods, the present platform allows us to reach locations deep in the human body while enhancing targeting efficacy using real-time navigational or trajectory control. I will describe several versions of the platform upgraded through additional software and hardware modules allowing enhanced targeting efficacy and operations in very difficult locations such as tumoral lesions only accessible through complex microvasculature networks.

### **CV:**

Sylvain Martel received the Ph.D. degree in Electrical Engineering from McGill University, Institute of Biomedical Engineering, Montréal, Canada, in 1997. Following postdoctoral studies at the Massachusetts Institute of Technology (MIT), he was appointed Research Scientist at the BioInstrumentation Laboratory, Department of Mechanical Engineering at MIT. From Feb. 2001 to Sept. 2004, he had dual appointments at MIT and as Assistant Professor in the Department of Electrical and Computer Engineering, and the Institute of Biomedical Engineering at École Polytechnique de Montréal (EPM), Campus of the University of Montréal, Montréal, Canada. He is currently Associate Professor in the Department of Computer and Software Engineering and the Institute of Biomedical Engineering, and Director of the NanoRobotics Laboratory at EPM that he founded in 2002. Dr. Martel holds the Canada Research Chair (CRC) in Micro/Nanosystem Development, Fabrication and Validation since 2001. Among several recognitions, recently in 2008 alone Dr. Martel has been nominated in Canada among the three finalists for engineer of the year; among the 10 finalists for personality of the year by the Federation of Information Technologies; one of his project has been quoted by the Canadian Minister of Health as one of the top projects and was also selected as one of the 10 most important scientific discoveries by the Magazine Quebec Science.

**Eingeladen von: Prof. Dr. Sergej Fatikow**

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