Department of
Mechanical Engineering
The University of Hong Kong

SEMINAR

(onsite and online)

Electromagnetically controllable tethered and untethered micro/nanorobots for robotic Interventions and cell therapy

Date: 29 January, 2024 (Monday)
Time: 5:30 p.m. (HKT)
Venue: Room 7-34 / 7-35, Haking Wong Building
HKU

Speaker: Prof. Hongsoo Choi
Professor, Department of Robotics and Mechatronics Engineering
Daegu-Gyeongbuk Institute of Science and Technology (DGIST)
Korea

Join Zoom Meeting:
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Meeting ID: 950 7404 5105
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Abstract:
Robotic magnetic systems offer potential advantages in interventional procedures, such as precise and rapid control of magnetically steerable interventional tools (e.g., guidewires and catheters) in tortuous vessels. Recently, a robotic magnetic intervention system was developed that enables remote manipulation and active control of guidewires for the treatment of neurocardiovascular diseases. The robotic magnetic intervention system consists of a microrobotic guidewire with a soft magnetic steerable robot (MSR) attached to the tip, a human-scale electromagnetic control system, a biplane X-ray imaging unit, and a master-slave system. The flexible magnetic MSR at the tip of the guidewire uses magnetic torque to actively guide the guidewire during magnetic actuation. The microrobotic guidewire can be teleoperated forward and retracted by the master-slave system. The robotic magnetic intervention system could open new avenues in several areas of vascular interventions. At the end of the presentation, some untethered micro and nanorobots will also be introduced to demonstrate the precise delivery of multiple cells to achieve specific goals in vitro, ex vivo, and in vivo applications, including cell delivery, selective neurite alignment, neuronal connections, cancer treatment, etc. A machine learning approach is also presented to control the position of a magnetic microrobot via gradient fields generated by electromagnetic coils.

ALL INTERESTED ARE WELCOME

For further information, please contact Dr. J.T. Kim at 3917 2631.