# Webinar of the IEEE TC Micro/Nano Robotics and Automation

The IEEE Technical Committee for Micro/Nano Robotics and Automation presents a series of online seminars. **One selected speaker will present cutting-edge research** in the micro/nano robotics field. Join us **Tuesday, June 4, at 8 AM (UTC),** for one hour. We will welcome:

Prof. Hongsoo Choi, Ph. D.

Professor at the Department of Robotics and Mechatronics Engineering, Daegu-Gyeongbuk Institute of Science and Technology (DGIST), Korea

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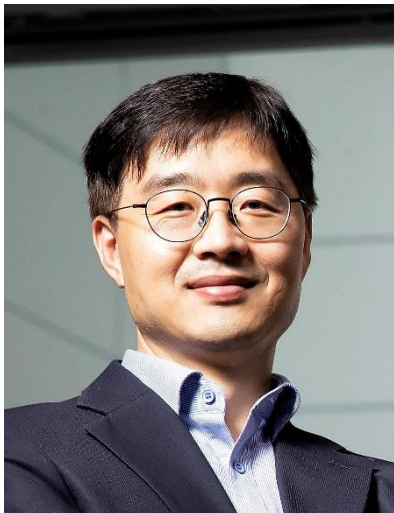
Title: Electromagnetically controllable tethered and untethered micro/nanorobots for robotic Interventions and cell therapy

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.

Bio: Hongsoo Choi received his M.S. (2003) and Ph.D. (2007) degrees from Washington State University, United States. He is a Professor in the Department of Robotics and Mechatronics Engineering at Daegu-Gyeongbuk Institute of Science and Technology (DGIST). He received several awards, including the Prime Minister's Commendation for Science, Information and Communication Day of Korea in 2020 and the Prize of the State of Geneva at the 47th International Exhibition of Inventions of Geneva, Switzerland in 2019. He was recognized as one of the top 10 Korean mechanical technologists two years in a row: in 2022 and 2023. His research interest includes micro/nanorobotic system, neural engineering, magnetic field generating (MFG) systems, and piezoelectric MEMS devices.

Lab website: mems.dgist.ac.kr

Link for the connection:
https://cnrs.zoom.us/j/93311003279?pwd=aWhiNzRBbC9YTnR2REdYak1tZXh2dz09

More information on the IEEE Technical Committee for Micro/Nano Robotics and Automation webpage:

https://www.ieee-ras.org/micro-nano-robotics-and-automation/activities

In case of questions, please contact aude.bolopion@cnrs.fr