

Magnetic Microrobots for Biomedicine

Abstract:

People have envisioned tiny machines and robots that can explore the human body, find and treat diseases since Richard Feynman's famous speech, "There's plenty of room at the bottom," in which the idea of a "swallowable surgeon" was proposed in the 1950s. Even though we are at a state of infancy to achieve this vision, recent intense progress on micro-/nanorobotics, and micro-/nanotechnology has accelerated the pace toward the goal. A number of research efforts have been recently published regarding the development of tiny machines/robots from the basic principles and fabrication methods to practical applications.

In this talk, I will present the recent research progress in my lab on magnetic microrobots for early diagnosis of *C. Difficile* Infection (CDI) and active delivery using magnetic microswarm. The potential applications of the microrobotic swarm will be discussed as well.



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Li Zhang is currently an Associate Professor in the Department of Mechanical and Automation Engineering at The Chinese University of Hong Kong (CUHK). He received the Ph.D. degree from the University of Basel, Basel, Switzerland, in 2007. And then, he joined the Institute of Robotics and Intelligent Systems, Swiss Federal Institute of Technology (ETH) Zurich, Switzerland as a postdoctoral fellow until 2009, and as a senior scientist from 2009 to 2012. He joined CUHK as an Assistant Professor in 2012, and became an Associate Professor in 2017.

His main research interests include micro-/nanorobots and their biomedical applications. He won the Hong Kong Research Grants Committee (RGC) Early Career Award in 2013, and the CUHK Young Researcher Award 2017. Dr. Zhang is a senior member of IEEE, who has won several awards from IEEE international conferences including ICRA and IROS. Since 2004 he has authored and co-authored over 190 papers including *Science Robotics*, *Nature Communications*, *Science Advances* as the corresponding author. He is an Associate Editor of *IEEE/ASME Transactions on Mechatronics (TMECH)* and *IEEE Robotics and Automation Letters (RA-L)*.

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Friday, December 6, 2019
2:30 pm – 3:30 pm
**Center for Advanced Manufacturing
(CAM)**