

IEEE ICUS 2022
Invited Session Summary

Title of Session

Micro- and Nano-Scale Robotics and Autonomous Systems

Name, Salutation and Affiliation of Organizers

1. Prof. Yichao Tang

Tongji University, China

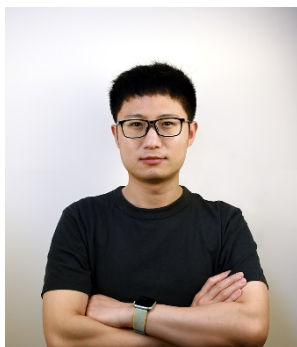
2. Asst. Prof. Jiachen Zhang

City University of Hong Kong, China

Biosketches of Organizers



Dr. Yichao Tang is currently a Full Professor in the Mechanical Engineering Department at Tongji University, Shanghai, China. He joined Tongji in 2021 Fall. Prior to Tongji, he was a postdoctoral researcher at Max Planck Institute for Intelligent Systems, Germany, and University of Illinois Urbana-Champaign, USA. Dr. Tang received his Ph.D. in Mechanical Engineering at Temple University, USA in 2018, and M.S. in Materials Science at Worcester Polytechnic Institute, USA in 2012. Dr. Tang is the recipient of the 2019 Humboldt Fellowship. He and his team in the Intelligent Biomedical Robotics Lab are currently developing novel miniature medical robotics, bio-inspired soft robotics, and artificial muscles for wearable robotics.



Dr. Jiachen Zhang joined the department of Biomedical Engineering at City University of Hong Kong as an Assistant Professor since the fall of 2021. At the same time, Dr. Zhang started an independent biomedical robotics laboratory, focusing on the development of novel robotic systems to answer urgent and grand healthcare challenges. Dr. Zhang received his PhD degree from the department of Mechanical and Industrial Engineering, University of Toronto, Canada in 2018. From 2019 to 2021, Dr. Zhang worked as a guest scientist and a Humboldt research fellow at Max Planck Institute for Intelligent Systems, Germany, on topics of magnetically actuated miniature robotics and smart shape-morphing materials. Dr. Zhang aims to

design applicable robotic systems and explore strategies to promote the application of miniature robotics in minimally invasive diagnostics and therapeutics. Employing magnetic fields and other smart materials as actuators, Dr. Zhang develops mobile multifunctional robotic systems to meet the ever-growing demands from complex and customized modern healthcare.

Details of Session

Micro- and nano-scale autonomous systems are the frontier of the artificial intelligent systems. This new field, which arises from intersection of multiple disciplines including robotics, automation, physics and new materials, are bringing evolutionary breakthroughs to biomedical fields especially for minimally invasive surgery, biosensing, and drug delivery. This session aims to spark great ideas and promote cooperation between researchers from different backgrounds, and to explore the possibility of using miniature autonomous systems to address real-world biomedical issues. The invited session invites original papers of innovative ideas and concepts, new discoveries and improvements, and novel applications relevant to the following selected topics of “Micro- and Nano-Scale Robotics and Autonomous Systems”:

- Physical principles of micro- and nano-scale autonomous systems
- Design and actuation strategy of micro- and nano-scale autonomous systems
- Cluster and collective behaviour of micro- and nano-scale autonomous systems
- Micro- and nano-scale autonomous systems in medical diagnosis and treatment
- Communications and sensing strategy of micro- and nano-scale autonomous systems
- Bio-hybrid micro- and nano-scale autonomous systems