

Webinar of the IEEE TC Micro/Nano Robotics and Automation

The IEEE Technical Committee for Micro/Nano Robotics and Automation launches a series of online seminars. **One selected speaker will present cutting-edge research** in the micro/nano robotics field. Join us **Tuesday March 14th 2023, 1pm UTC**, for one hour. This month, we will welcome:

Prof. Selman Sakar

Assistant Professor, Institute of Mechanical Engineering, EPFL



Title: Biomedical research in the era of microrobotics

Abstract: All types of organisms as well as the cells that live in our bodies demonstrate social behaviors. Unlike engineered systems where components are expected to perform the same in isolation, biological systems possess emergent properties that cannot be deduced by following a reductionist approach. Our group has been developing microrobotic manipulation tools that are integrated with automated imaging systems to perform microsurgical operations, and apply spatiotemporally resolved forces within living tissues. In tandem with time-lapse imaging and computational mechanics, our toolkit allows us to deconstruct tissue morphogenesis in developing embryos, and discover mechanobiological principles to engineer designer tissues and create synthetic biological machines. I will argue that the overall methodology can be applied to study

biological organization across scales and kingdoms by giving examples from social insects. Complimentary to these efforts, we invented a microrobotic technology that provides safe and rapid access for slender instruments to deep-seated tissues inside living animals via the endovascular path. I will summarize our efforts to leverage this technology for translational research in neuroscience and oncology.

Bio: [Mahmut Selman Sakar](#) is a Tenure Track Assistant Professor in the Institutes of Mechanical Engineering and Bioengineering at EPFL, and the head of the [MicroBioRobotic Systems \(MICROBS\) Laboratory](#). He obtained his PhD in Electrical and Systems Engineering from the University of Pennsylvania. He has done pioneering work on the development of tissue-engineered biological machines while working as a postdoctoral associate at the Massachusetts Institute of Technology. He was a research scientist at ETH Zurich, exploring advanced manufacturing and magnetic manipulation



techniques at microscale, before joining EPFL in 2016. His current work focuses on the applications of microrobotics technology in life and health sciences including mechanobiology, neuroscience, and minimally invasive medicine. He is a recipient of ERC Starting (2017) and Proof of Concept Grants (2021).

Lab website: <https://www.epfl.ch/labs/microbs/>

Link for the connection: The **link will be announced** a few days before the event on the IEEE Technical Committee for Micro/Nano Robotics and Automation webpage:

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