

LadHyX Seminar – October 29, 14:00

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(EPFL)

Microrobotic Toolkit for Life Sciences

Our laboratory develops small-scale (characteristic length from hundreds of nanometers to few millimeters) actuators and robots. One of the expected outcomes is the introduction of a robotic toolkit that would allow researchers to apply spatiotemporally resolved forces and deformation within living tissues. This toolkit will complement recent advances in molecular engineering, biomaterials, and quantitative imaging. The development of untethered cell-sized biomedical devices relies on several technological contributions such as the introduction of manufacturing methods for shaping soft matter, the systematic investigation of wave-matter and fluid-structure interactions, and the construction of wireless powering and control systems. Another expected outcome is the embodiment of logic units and autonomy in micromechanical systems. This talk will summarize our recent efforts in all these fronts, and discuss the potential of using microrobotic tools for minimally invasive biomedical procedures.

Short bio: Mahmut Selman Sakar is a Tenure-Track Assistant Professor in the Institute of Mechanical Engineering 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 in 2010. He contributed to the development of tissue-engineered biological robots 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 small scale, before joining EPFL in 2016. His current work focuses on the applications of microrobotics in life sciences including mechanobiology, developmental biology, neuroscience, immunotherapy, and minimally invasive medicine. He was awarded ERC Starting (2017) and Proof of Concept Grants (2020).