

Colloquium Thermo- and Fluid Dynamics

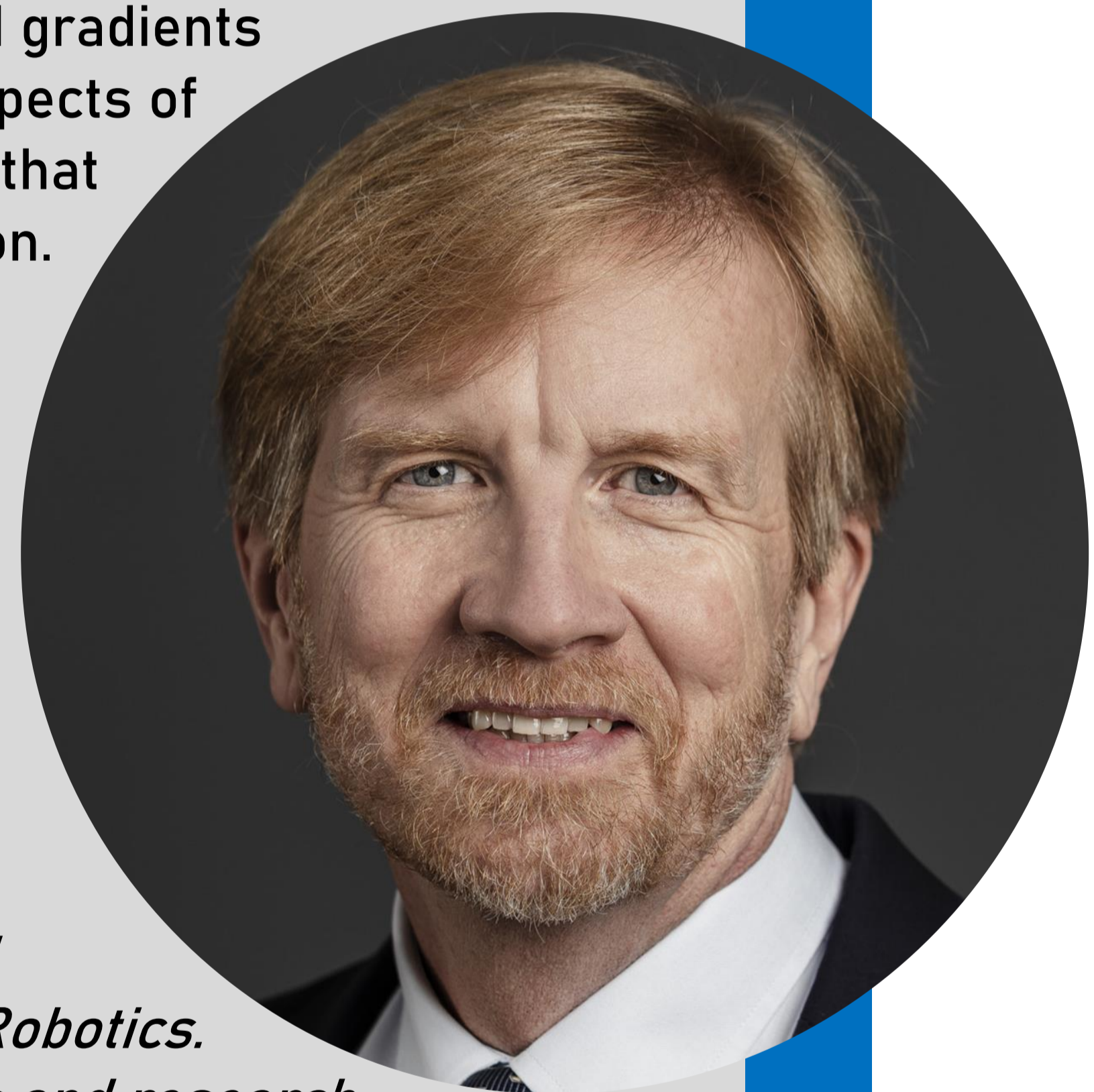
The Robotics Part of Micro and Nano Robots

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Micro and nano robots have made great strides since becoming a focused research topic over two decades ago. Much of the progress has been in material selection, processing, and fabrication, and paths forward in developing clinically relevant biocompatible and biodegradable micro and nano robots are becoming clear. Our group, as well as others, maintain that using biocompatible magnetic composites with externally generated magnetic fields and field gradients is perhaps closest to clinical application. One of the most challenging aspects of the field is in the development of the magnetic navigation system (MNS) that generates the fields and field gradients needed for microrobot locomotion. In this talk, I will present an overview of MNSs and show how these systems are fundamentally robotic in the way they must be designed and controlled. Decades of work in robotic manipulation can be brought to bear on this problem as we move forward in bringing MNS technology to the clinic. I will also look at recent efforts in creating more intelligent micro and nano robots that exhibit increasingly complex behaviors, some of which can even be programmed in situ. The field appears to be on the cusp of realizing the fantastic voyage.



Brad Nelson is the Professor of Robotics and Intelligent Systems at ETH Zürich and has recently become the Chief Scientific Advisor of Science Robotics. He serves on the advisory boards of a number of academic departments and research institutes across North America, Europe, and Asia. He is a member of the Swiss Academy of Engineering (SATW). Before moving to Europe, Nelson worked as an engineer at Honeywell and Motorola and served as a United States Peace Corps Volunteer in Botswana, Africa. He has also been a professor at the University of Minnesota and the University of Illinois at Chicago.

Date: Wednesday, 16 November 2022

Time: 16:15 – 17:15

Place: ETH Zurich, ML F 36

Host: Prof. Filippo Coletti, IFD