ETH zürich

Institute of Fluid Dynamics
Institute of Energy and Process Engineering

Colloquium Thermo- and Fluid Dynamics

Advances in Complex and Multiphase Flows: From both Numerical Methods and Experimental Techniques

Prof. Paris Mirbod
University of Illinois at Chicago

In this talk, I will provide an overview of recent research conducted by my group, along with insights from some external collaborations. I will begin with a brief overview of the key problems we have been exploring in recent years. Follow-ing this, I will demonstrate experimental analyses of complex and multi-phase flows across various structured/porous surfaces, using advanced techniques such as Magnetic Resonance Imaging (MRI), Particle Image Velocimetry (PIV), and Particle Tracking Velocimetry (PTV), as well as related numerical simulations. Next, I will discuss our work on the flow and instabilities of viscoelastic flows over porous walls. If time permits, I will discuss our work on aerosol and splatter formations during dental procedures, and how we use fluid mechanics and techniques like optical flow tracking velocimetry and shadowgraphy to assess droplet velocity, trajectory, and size, along with comprehensive flow dynamics. I will also outline some of our future research directions.

Dr. Parisa Mirbod is an Associate Professor in the Mechanical and Industrial Engineering Department at the University of Illinois at Chicago, a position she has held since 2018. Her research focuses on unraveling flow physics, instabilities, and transitions in non-Newtonian fluids, including viscoelastic and particle-laden flows, through a combination of theoretical, computational, and experimental approaches. At the intersection of fundamental fluid mechanics and applied engineering, her work is dedicated to uncovering the mechanisms governing droplet impact, multiphase flows, and structured/porous surfaces. Her research has broad implications for various industries, including aerospace, biomedical engineering, energy systems, and advanced manufacturing. Her research has been supported by major funding agencies, including the National Science Foundation (NSF), the Department of Defense Army Research Office (DOD-ARO), and the United States Department of Agriculture (USDA). Her contributions have earned her prestigious recognitions, including the I@UNITO Faculty Fellowship from the University of Turin, the IFPA-New Investigator Award from the National Institutes of Health (NIH), and the NASA Glenn Faculty Fellowship. She looks forward to engaging in stimulating technical discussions during the seminar.

Date: Wednesday, 26 March 2025
Time: 16:15 - 17:15 h
Place: ETH Zurich, ML H 44
Host: Prof. Filippo Coletti

Further information: https://ifd.ethz.ch/events/ktf.html

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