ETH zürich

Institute of Fluid Dynamics
Institute of Energy and Process Engineering

Colloquium Thermo- and Fluid Dynamics

New subgrid-scale models for turbulent particle-laden flows

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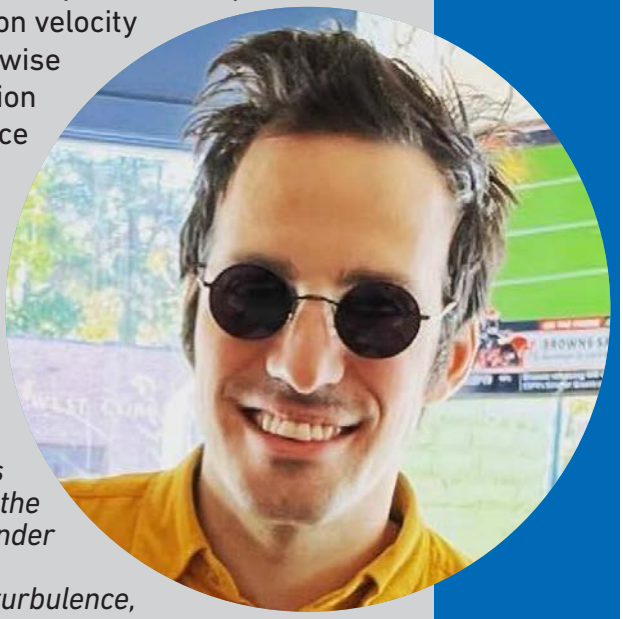
Many natural and industrial processes involve the flow of solid particles or liquid droplets in turbulence. In this talk, we focus on the challenges involved in simulating turbulent particle-laden flows and propose new subgrid-scale (SGS) models for dilute and dense particulate suspensions. By treating the drag force as an Ornstein-Uhlenbeck process, we present models that can capture the effect of particle microstructure on velocity statistics. It will also be shown that embedding two-point pairwise interactions in the stochastic process enables spatial correlation between particles, resulting in the first SGS model to reproduce both one-point fluid and two-point particle statistics.



KJesse Capecelatro is an Associate Professor in the Departments of Mechanical Engineering and Aerospace Engineering at the University of Michigan. He received a Ph.D. from Cornell in 2014. Prior to joining the University of Michigan in 2016, he was a postdoctoral researcher at the University of Illinois Urbana-Champaign. He is a recipient of the NASA Early Stage Innovations Award, NSF CAREER Award, ONR Young Investigator Award, and the ASME Pi Tau Sigma Gold Medal Award. His research is broadly under the realm of fluid mechanics, with an emphasis on multiphase flow, turbulence, reacting flows, and high-performance computing

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Time: 16:15 - 17:15h
Place: ETH Zurich, ML H 44
Host: Prof. Filippo Coletti IFD, D-MAVT

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

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