

**Title** Numerical simulations of turbulent flows of particle suspensions

**Speaker** Prof. Luca Brandt  
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**Date & Time** Wednesday, December 5, 2018 3:00 p.m.  
**Place** I<sup>2</sup>CNER hall, I<sup>2</sup>CNER Bldg.1, Ito campus, Kyushu University

### Abstract

We present fully resolved simulations of finite-size particles in turbulent channel flows.

First, we use the momentum balance to define the three regimes characterising the flow of suspensions for different Reynolds numbers and particle volume fractions, from the laminar viscous laminar regime to the turbulent flow and a particle-stress dominated regime.

Simulations at high Reynolds numbers will suggest a new scaling for the mean velocity profile and scaling.

We then focus on the role of particle inertia, particle polydispersity and, in more details, particle shape. We will show, in particular, how drag is reduced in suspensions of oblate particles. In addition, we will discuss heat transfer in particle suspensions is considered as well as more recent studies on droplet evaporation in turbulence.

### About the Speaker

Prof. Luca Brandt is professor in Fluid Mechanics at KTH Stockholm, where he obtained his PhD in 2003, since 2012. He has been working on transition to turbulence, flow control, biofluids, complex fluids and multiphase flows. He has expertise on large scale numerical simulations. He received an ERC consolidator grant in 2013 to study particle suspension. In 2014 he received the prize as outstanding young researcher from the Swedish Research Council and since 2017 he is director of the multidisciplinary research centre INTERFACE, supported by the Swedish Research Council. Within this newly formed center he will be conducting research on boiling on micro and nano patterned surfaces.

He is associate editor for MECCANICA and European Journal of Mechanics/B fluids and in the advisor board of the International Journal of Multiphase Flow and Flow, Turbulence and Combustion.

**Host:** Professor Yasuyuki Takata

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