

# Colloquium Thermo- and Fluid Dynamics

## Sliding or rolling? Characterizing single-particle contacts

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The characterization of contact forces between particles has received increasing attention in recent years due to the role that they play in the rheology of dense suspensions. In particular, lateral force microscopy (LFM) has enabled measuring sliding friction at the single-particle level by measuring the torsion of an atomic force microscopy cantilever onto which a particle is glued and made to slide onto a counter-surface as a function of normal load. However, in addition to pure sliding, particles in a fluid are also free to rotate relative to one another, but the characterization of rolling friction at the single-particle level remains practically unexplored. Here, I will describe an upgrade to LFM, which uses nanofabricated probes to measure sliding and rolling friction among microparticles as a function of their surface properties and connect the results of single-particle characterization to the discontinuous shear thickening of dense suspensions.

*Lucio Isa obtained a Master's degree from the Politecnico di Milan (Italy) in and a PhD at the University of Edinburgh (UK). After a short postdoctoral spell in Edinburgh, he moved to the Materials Department of ETH Zurich at the end of 2008 to work in the Laboratory for Surface Science and Technology, first as a Marie-Curie Fellow and then as a Swiss National Science Foundation (SNSF) Ambizione Fellow. In 2012 he was awarded a SNSF travel grant as visiting fellow at the Chemical Engineering Department of the University of California, Santa Barbara, USA. In September 2013 Lucio Isa became SNSF Assistant Professor, heading the Laboratory for Interfaces, Soft matter and Assembly in the Department of Materials at ETH Zurich. In April 2019, he was promoted to Associate Professor of Soft Materials and Interfaces. Lucio Isa is a co-founder of Swiss Soft Days, an initiative aimed at creating a national network of scientists working in Soft Matter in Switzerland. He lives in Zurich with his wife and two children and has a passion for triathlon.*



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Time: 16:15 - 17:15h

Place: ETH Zurich, ML F 36

Host: Prof. Filippo Coletti, IFD