

# Simplifying industrial dispersions

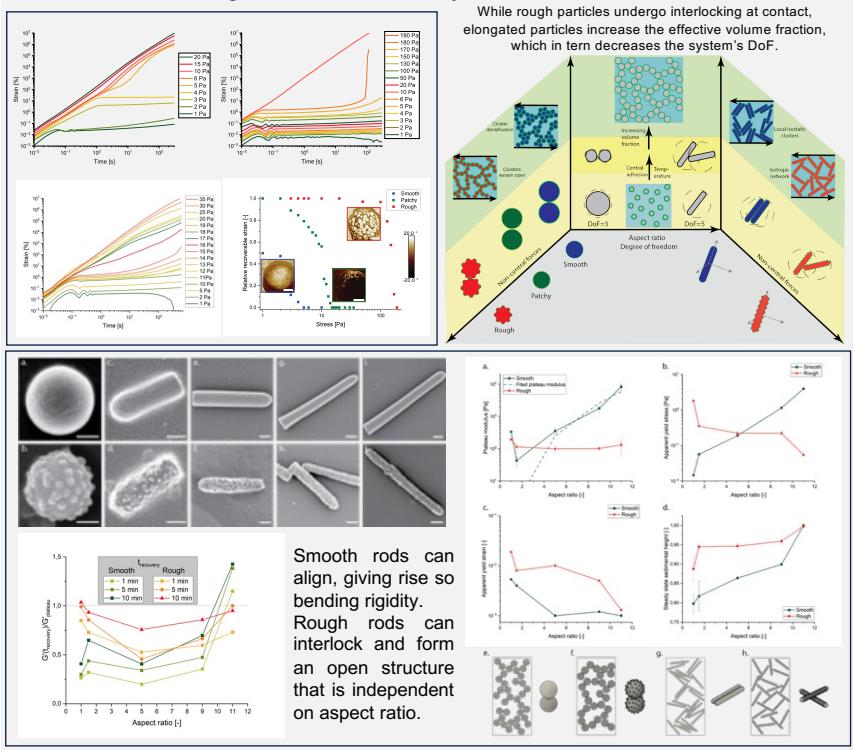
Florence Müller<sup>1</sup>, Pierre Lehericey<sup>1</sup>, Gabriele Pagani<sup>1</sup>, Lukas Woolley<sup>1</sup>, Lucio Isa<sup>2</sup> and Jan Vermant<sup>1</sup>  
<sup>1</sup>Laboratory of Soft Materials, ETH Zurich; <sup>2</sup>Laboratory of Soft materials and Interfaces, ETH Zurich

## 1. Introduction

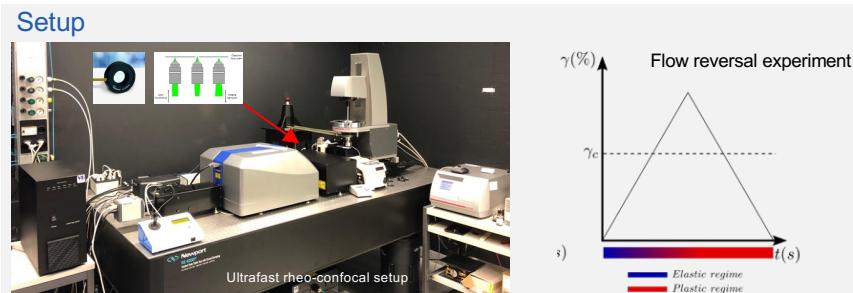
The goal of this work is threefold: First, design and characterize model system with new design handles, exploiting shape & roughness; Second, develop advanced characterization methods - macroscopic and microscopic; Third, compare to selected simplified industrial systems

## 2. Roughness and aspect ratio as design parameters

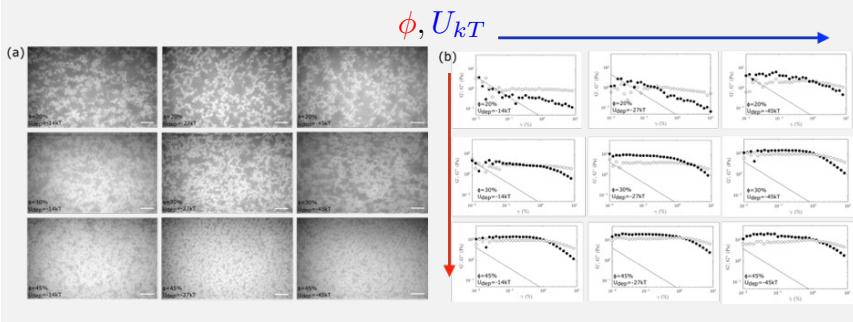
Decreasing the system's degrees of freedom (DoF) enhances material's toughness and stability



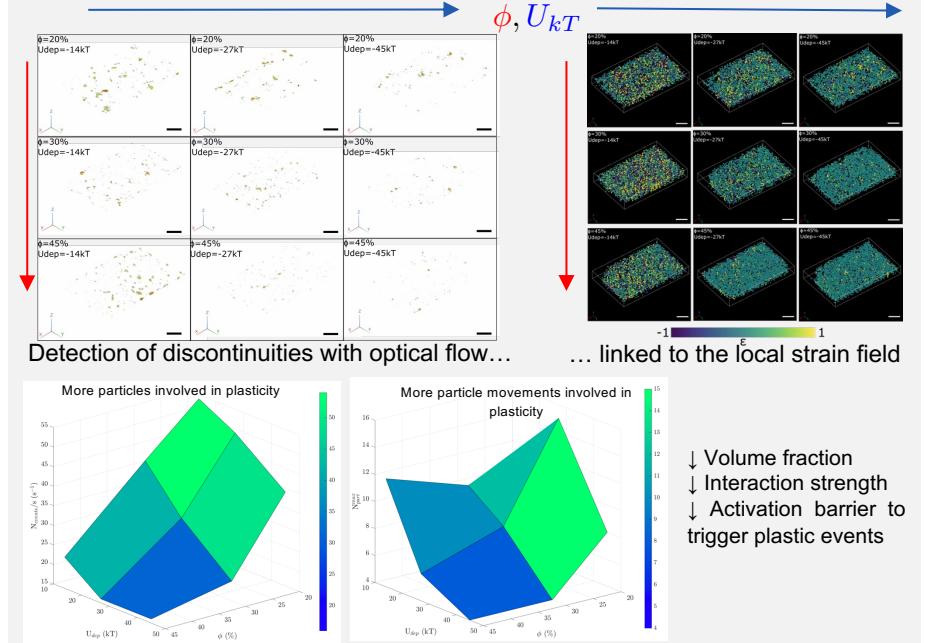
## 3. Microstructural evolution and plastic event detection



Gels observed and measured after a pre-shear at  $Pe = 20$

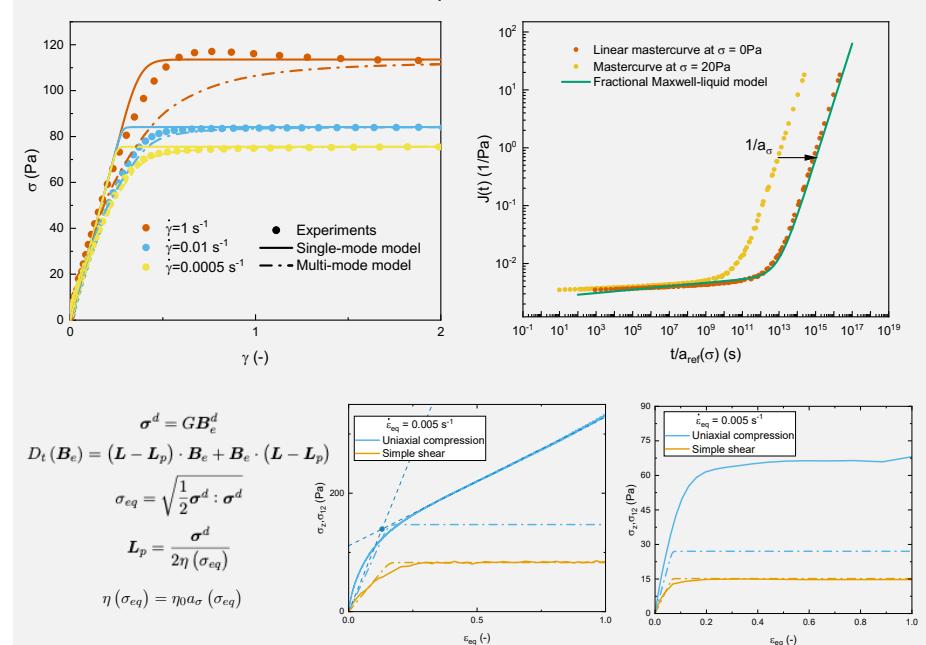


Detection of plastic events by optical flow and particle tracking

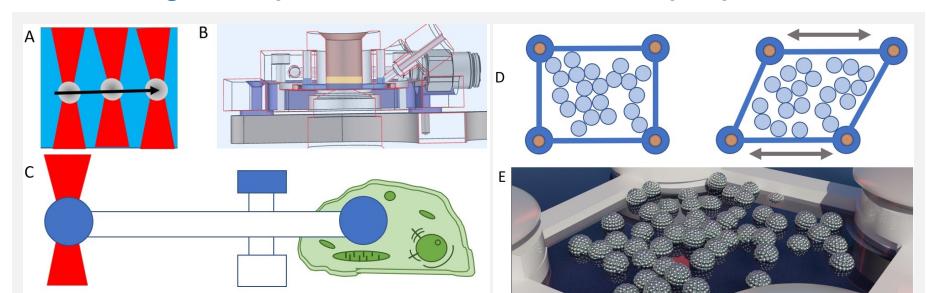


## 4. Constitutive model using simplifies industrial systems

A minimal model for Elasto-visco-plastic materials



## 5. Probing inter-particle and inter-cluster properties



### Conclusions and further work:

- Detailed microstructural studies on rough and high aspect ratio systems
- Opto-mechanical characterization of sheared structures to detect plastic events
- 3D constitutive model for elasto-visco-plastic materials relevant for industry
- Micro-scale probing of single particles or clusters and targeted shearing