

KAVLI INSTITUTE FOR THEORETICAL PHYSICS
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KITP Conference: Non-linear mechanics and rheology of dense suspensions: Nanoscale structure to macroscopic behavior

(Jan 22 - 26, 2018)

Coordinators: Emanuela del Gado, Jeff Morris, Peter Olmsted and Wilson Poon

Monday, Jan 22, 2018

Dense suspensions -- rheology and instabilities, Chair: Jeff Morris (City College New York)

8:50am	Lars Bildsten (KITP)	Welcome
9:00am	Elisabeth Guazzelli (U Aix-Marseille)	Rheology of Dense Granular Suspensions: from Spheres to Fibers
9:45am	Matthieu Wyart (EPFL)	Hysteresis in Granular Materials
10:30am		Morning Break

Dense Suspensions -- Rheology and Instabilities Cont

11:00am	Ajay Sood (IIS)	Shear Thickening in Dense Anisotropic Colloids by Tunable Frictional Contacts
11:45am	Pascal Hebraud (U de Strasbourg)	Jet instability of a Concentrated Particles Suspension
12:15pm		Lunch Break

Thickening and Jamming, Chair: Eric Clement (ESPCI)

2:00pm	Heinrich Jaeger (U. Chicago)	The Plot Thickens: From Discontinuous Shear Thickening to Shear Jamming
2:45pm	Bulbul Chakraborty (chakraborty) Kabir Ramola (Brandeis U)	Landau theory for stresses in dense frictional suspensions
3:30pm		Afternoon Break
4:00pm	Guillaume Ovarlez (U de Bordeaux)	Discontinuous Shear Thickening of Cornstarch Suspension: Macroscopic, Local, and Microscopic Analysis
4:45pm	John Royer (U of Edinburgh)	Contact Forces and Particle Interactions in Shear Thickening Suspensions
5:15pm	Ben Guy (U of Edinburgh)	Granular Dispersion Rheology as Constraint Counting
5:45pm		SHUTTLE TO BWSCI

Tuesday, Jan 23, 2018

Dynamics in Shear Thickening Suspensions, Chair: Peter Olmsted (Georgetown U)

9:00am	Annie Colin (ESPCI)	Shear Thinning and Shear Thickening in Non-Brownian Suspensions
9:45am	Romain Mari (U Grenoble Alpes)	Vorticity Banding in Shear-thickening Suspensions
10:30am		Morning Break
11:00am	John Brady (Caltech)	A Hydrodynamic Mechanism For Discontinuous Shear Thickening
12:00pm	Jeff Morris (City College New York)	Strong Shear Thickening: Lubrication and its Breakdown
12:15pm		Lunch Break

Friction and Nanotribology, Chair: Emanuela Del Gado (Georgetown U)

- 2:00pm Mark Robbins (Johns Hopkins U) Bridging from Atomic Forces to Macroscopic Friction
 2:45pm Nic Spencer (ETH Zürich) When Tribology Meets Rheology--Friction, Lubrication, Polymer Brushes and the Burj Khalifa
 3:15pm Lucio Isa (ETH Zürich) When Rheology Meets Tribology--Impact of Contact Friction and Surface Roughness on the Discontinuous Shear Thickening of Dense Suspensions
 3:45pm **Afternoon Break**
 4:15pm Jay Fineberg (Weizmann Inst.) Friction is Fracture: A New Paradigm for the Onset of Frictional Motion
 5:00pm Tonya Kuhl (UC Davis) Confined Complex Fluids
 5:30pm **RECEPTION**
 6:00pm **SPECIAL EVENTS DINNER**
 8:00pm **SHUTTLE TO BWSCI**

Wednesday, Jan 24, 2018**Microscopic Dynamics and Non-linear Response, Chair: Annette Zippelius (U Goettingen)**

- 9:00am Sri Sastry (JNCASR) Yielding and Shear Banding in Amorphous Solids Under Oscillatory Shear Deformation
 9:45am Sebastien Manneville (ENS Lyon) Complex Spatio-temporal Dynamics in a Shear-thickening Cornstarch Suspension
 10:30am **Morning Break**
 11:00am Luca Cipelletti (U de Montpellier) Microscopic Dynamics and Failure Precursors of a Gel Under Mechanical Load
 11:30am Thibaut Divoux (MIT) Avalanche-like Fluidization of a Colloidal Gel
 12:00pm Jim Swan (MIT) Linear and Non-linear Viscoelasticity in Suspensions of Attractive Colloids
 12:30pm **Lunch Break**
 2:00pm **FREE AFTERNOON--SHUTTLE AVAILABLE TO BWSCI**

Thursday, Jan 25, 2018**Frontiers of Metrology, Chair: Wilson Poon (Edinburgh U)**

- 9:00am Gareth McKinley (MIT) Optimal Fourier Transform Rheometry for Probing the Rheology of Gels, Suspensions and Time-Evolving Soft Matter Systems
 9:45am Itai Cohen (Cornell U) Quantitative Light Microscopy of Dense Suspensions: Colloid Science at the Next Decimal Place
 10:30am **Morning Break**
 11:00am Dan Blair (Georgetown U) Oobleck Exposed! Microscopic Measurements of Shear Thickening Fluids
 11:45am Steve Hudson (NIST) Suspension rheoSANS
 12:15pm **Lunch Break**

Mechanical Heterogeneities and Constitutive Relations, Chair: Lucio Isa (ETHZ)

- 2:00pm Eric Brown (Yale U) Friction, Dilation, Boundary Conditions and Constitutive Relations
- 2:45pm Kirsten Martens (U Grenoble-Alpes) Permanent Shear-band Instability and the Emergence of a Finite Shear-rate Critical Point in Dense Complex Fluids
- 3:30pm **Afternoon Break**

Mechanical Heterogeneities

- 4:00pm Daniel Bonn (U of Amsterdam) S-shaped Flow Curves in Non-Brownian Suspensions
- 4:45pm Sarah Hormozi (Ohio U) Suspensions of Non-Brownian Particles in a Shear Thickening Matrix
- 5:30pm **RECEPTION**

- 6:00pm **SPECIAL EVENTS DINNER**

- 8:00pm **SHUTTLE TO BWSCI**

Friday, Jan 26, 2018

Jamming and Glassy Behavior, Chair: Elisabeth Guazzelli (CNRS)

- 9:00am Doug Durian (UPENN) Nonlocal Lubrication Forces and the Sedimentary Jamming Front
- 9:45am Alban Sauret (Saint-Gobain) Blending of Liquid and Grains: Accretion Dynamics on Wet Granular Materials
- 10:30am **Morning Break**

Jamming and Glassy Behavior Cont,

- 11:00am Michel Cloitre (ESPCI) Microscopic Design of Glassy Suspensions Using Soft Colloids
- 11:45am George Petekidis (FORTH) Non-linear Mechanics of Colloidal Gels and Attractive Glasses
- 12:15pm Lilian Hsiao (NC State) Colloid Surface Roughness and the Glass Transition
- 12:45pm **Lunch Break**

- 1:30pm Emanuela Del Gado (Georgetown U), Leader Closing Discussion with All Participants
- 2:00pm **CONFERENCE END- SHUTTLE TO BWSCI *Also available to SB Airport and SB Airbus, Goleta location (See Registration Desk BEFORE FRIDAY to sign up.)**