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.)