

ESI-CECAM joint Workshop

“Failure in soft materials: from yielding to fracture”

September 9 - 13, 2024

within the Thematic Programme “Linking Microscopic Processes to the Macroscopic
Rheological Properties in Inert and Living Soft Materials”

organized by

Roberto Cerbino (U of Vienna), Emanuela Del Gado (Georgetown U), Giuseppe Foffi
(Paris-Saclay U)• **Monday, September 9th, 2024**09:00 – 09:30 **Registration**09:30 – 10:00 **Edouard Hannezo (ISTA, Klosterneuburg)***Mechanochemical models of tissue shape changes*10:00 – 10:30 **Helene Delanoe-Ayari (U Lyon)***Stoke's flow experiment in biological tissues: comparison with an active abiotic system*10:30 – 11:00 **Coffee Break**11:00 – 11:30 **Saroj Kumar Nandi (TIFR)***The cell shape variability and its implications in epithelial monolayers*11:30 – 11:45 **contributed talk Diogo Pinto (U Roma 1)***Cell motility in confluent tissues induced by substrate disorder*11:45 – 12:30 **Discussion**12:30 – 14:00 **Lunch**14:00 – 14:30 **James Harden (U of Ottawa)***Rheo-XPCS studies of yielding, recovery and memory in soft colloidal glasses*14:30 – 15:00 **Safa Jamali (Northeastern)***Topological origins of yielding in soft glassy materials*15:00 – 15:30 **Coffee Break**15:30 – 16:00 **Simon Rogers (U Illinois)***Brittle and ductile yielding in soft materials*16:00 – 16:45 **Discussion**17:00 – 19:00 **Welcome Reception**• **Tuesday, September 10th, 2024**09:00 – 09:30 **Giorgio Scita (IFOM)***Tissue Fluidification in pathophysiology: contact percolation sets phase transition and genetic rewiring in heterogeneous breast cancers*09:30 – 10:00 **Dapeng “Max” Bi (Northeastern)***Shear-Induced Dynamics and Mechanical Responses in Biological Tissues*

10:00 – 10:30 **Coffee Break**

10:30 – 11:00 **George Petekidis (U of Crete)**

Hydrodynamic reversibility in shear-induced crystals of Brownian Hard sphere glasses under non-linear oscillatory shear

11:00 – 11:30 **Francesco Puosi (U Gustave Eiffel, Paris)**

Predictive relation for the structural relaxation of a polymer model under steady-state shear

11:30 – 12:30 **Discussion**

12:30 – 14:00 **Lunch**

14:00 – 14:30 **Diana Pinheiro (Vienna Biocenter)**

Shaping developing tissues via dynamic signaling gradients

14:30 – 15:00 **Suzanne Fielding (Durham U)**

Strain localisation during yielding of amorphous materials

15:00 – 15:30 **Coffee Break**

15:30 – 16:00 **Kirsten Martens (CNRS -UGA)**

How activity changes the rheological properties of dense disordered soft matter systems

16:00 – 16:15 **contributed talk Magali LeGoff (U of Innsbruck)**

A coarse-grained molecular dynamics study of damage localization during the fracture of double polymer networks

16:15 – 16:45 **Discussion**

• **Wednesday, September 11th, 2024**

09:00 – 09:30 **Guillaume Charras (University College London)**

Rupture strength of living cell monolayers

09:30 – 10:00 **Alessandra Bonfanti (Politecnico Milano)**

Disentangling the role of rheology and intercellular bond rupture in predicting tissue rupture strength

10:00 – 10:30 **Coffee Break**

10:30 – 11:00 **Mathieu Leocmach (CNRS)**

Direct Confocal Imaging of Fracture Precursors in Casein Gel

11:00 – 11:30 **Irmgard Bischofberger (MIT, Cambridge)**

Under Pressure: Suspensions Pushed Too Far

11:30 – 11:45 **contributed talk Tanja Denise Singewald (JKU, Linz)**

Coiled coils as mechanoresponsive material building blocks: towards molecular control of smart biomimetic hydrogels

11:45 – 12:30 **Discussion**

12:30 – 14:00 **Lunch**

14:00 – 14:30 **Xavier Trepap (IBEC)**

Epithelial mechanics from the bottom up

14:30 – 15:00 **Bulbul Chakraborty (Brandeis University)**

Emergent Elasticity in Non-Thermal Solids

15:00 – 15:30 **Coffee Break**

15:30 – 16:00 **Laurence Ramos (CNRS, Montpellier)**

Compression of beads of colloidal gel

16:00 – 16:45 **Discussion**

17:00 – 18:15 **Aperitivo + departure for social dinner**

19:00 – 22:00 **Conference Dinner at Feuerwehr-Wagner**

• **Thursday, September 12th, 2024**

09:00 – 09:30 **Alberto Rosso (Paris-Saclay U)**

The fate of shear-oscillated amorphous solids

09:30 – 10:00 **Peter Sollich (Georg-August-U, Göttingen)**

Towards a complete mean-field theory for the ductile and brittle yielding of amorphous solids: beyond the paradigm of the Ising model in a random field

10:00 – 10:30 **Coffee Break**

10:30 – 11:00 **Matthieu Wyart (EPFL, Lausanne)**

Thermal avalanches in liquids, amorphous solids and crumpled paper

11:00 – 11:30 **Frederick C. MacKintosh (Rice)**

Critical phenomena in biopolymer rheology

11:30 – 12:30 **Discussion**

12:30 – 14:00 **Lunch**

14:00 – 14:30 **Nicoletta Petridou (EMBL, Heidelberg)**

Passive vs active tissue material phase transitions instruct different morphogenetic trajectories

14:30 – 15:00 **Stefano Aime (ESPCI, Paris)**

Microscopic plasticity and dynamic heterogeneities in yielding soft glasses

15:00 – 15:30 **Coffee Break**

15:30 – 16:00 **Fabio Giavazzi (U Milan)**

Intermittent, cooperative plastic events associated with homogeneous and heterogeneous deformations in yield stress fluids under oscillatory shear

16:00 – 16:15 **Raffaele Pastore (Naples U)**

Yielding and rheology of charged vesicle gels

16:15 – 16:45 **Discussion**

• **Friday, September 13th, 2024**

09:00 – 09:30 **Mazi Jalaal (U of Amsterdam)**

Light Production and Adaptive Morphodynamics in an Active Biological System

09:30 – 10:00 **Zvonimir Dogic (UC, Santa Barbara)**

Encoding Shape, Structure, Mechanics, and Dynamics of a Soft Network with an Active Fluid

10:00 – 10:30 **Coffee Break**

10:30 – 11:00 **Srikanth Sastry (JNCASR)**

Computer simulations of fatigue failure in glasses

11:00 – 11:30 **Veronique Trappe (U of Fribourg)**

Memory of shear flow in soft jammed materials

11:30 – 11:45 **contributed talk Pinaki Chaudhuri (IMSC)**

Creep response of amorphous materials

11:45 – 12:30 **Discussion**

12:30 – 14:00 **Lunch**

14:00 – 14:30 **Anael Lemaitre (U Gustave Eiffel, Paris)**

Non-structural aging in adhesive colloidal suspensions

14:30 – 15:00 **Giuliano Zanchetta (U Milan)**

Of microgels and particles: trapping, yielding, sliding and swelling in water and non-aqueous solvents

15:00 – 15:30 **Coffee Break**

15:30 – 16:00 **Thomas Gibaud (ENS Lyon)**

Early stage of cheese making: a two step aging process in milk gels

16:00 – 16:45 **Discussion**

All talks take place at ESI Boltzmann Lecture Hall!