



Monday June 26th

8:30-10:15 AM : « Cell & tissues mechanics and dynamics I »

Chair : Simon Mochrie (Yale University, USA)

Paolo Pierobon, *Institut Curie, Paris, France* : Mechanics and force patterning in antigen extraction

Oleg Igoshin, *Rice University, USA* : Uncovering the mechanisms of self-organization behaviors of *Myxococcus xanthus* bacteria

Ivan Golushko, *LCC, Montpellier, France* : Interactions of curvature-active proteins with tubular lipid membranes and each other: a simple multipole approach

Conner Herndon, *Georgia Tech, USA* : Cross-species analysis of voltage and calcium dynamics temperature dependence in cardiac arrhythmias

Federico Bocci, *Rice University, USA* : Numb prevents a complete EMT by modulating Notch signalling

FLASH TALKS SESSION Ia

10:15-10:45 AM : Coffee Break

10:40-12:30 AM : « Novel concepts in theory and simulations »

Chair : Andrea Parmeggiani (Université de Montpellier, France)

Luca Ciandrini, *Université de Montpellier, F* : Gene length as a regulator for ribosome recruitment and protein synthesis: theoretical insights

Marian Breuer, *University of Illinois at Urbana-Champaign, USA* : The metabolic reconstruction of a minimal cell

Zachary Sethna, *Princeton University, USA* : Adaptive immune systems and the search for relevant receptors

Melia Bonomo, *Rice University, USA* : Evolution of Modularity for Performance on Frequency-Dependent Cognitive Tasks; Application to Understanding Cognitive Impairment in Alzheimer's Disease

FLASH TALKS SESSION Ib

12:30-2:00 PM : Lunch at Curie Institute (Picnic style)

2:00-4:00 PM : « Molecular structure and function »

Chair : Emmanuel Margeat (CNRS, Montpellier, France)

Jerson Silva, *Universidade Federal do Rio de Janeiro, Brazil* : Prion-like Aggregation of Proteins in Cancer and Neurodegenerative Diseases: The "Dr. Jekyll and Mr. Hyde" Actions of Amyloidogenic Proteins

Don Lamb, *LMU, Munich, Germany* : Elucidating Dynamic Processes using Fluorescence

Anatoly Kolomeisky, *Rice University, USA* : Understanding Molecular Mechanisms of Biological Error Correction

Anne-Marinette Cao, *Centre de Biochimie Structurale, Montpellier, France* : Structural dynamics of single metabotropic glutamate receptors in solution

Caitlin Davis, *University of Illinois at Urbana-Champaign, USA* : Fast Relaxation Imaging (FReI) of Live-Cell Spliceosomal Binding Affinity and Kinetics

Barbara Stekas, *University of Illinois at Urbana-Champaign, USA* : Switch-like behavior of helicase processivity regulated by accessory protein studied with optical tweezers.

Jennifer Gaines, *Yale University, USA* : Protein repacking with applications to changes in stability upon mutation

4:00-6:00 PM : POSTER SESSION I

6:00-7:00 PM : PLENARY LECTURE

Chair : Catherine Villard (CNRS – Institut Curie & PSL University, France)

Welcome address: **Edouard Husson**, *vice-president of Paris Sciences et Lettres University*

Yves Couder, *Université Paris Diderot, France* : “Understanding” as meant by biologists or by physicists: the example of vegetal stems growth.

Tuesday June 27th

8:30-10:15 AM : « Cell & tissues mechanics and dynamics II »

Chair : Lynne Regan (Yale University, USA)

Emmanuel Farge, *Institut Curie, Paris, France* : Mechanotransductive trigger of embryo gastrulation and mesoderm biochemical specification

Arpita Upadhyaya, *University of Maryland, USA* : Harnessing the force: mechanical modulation of immune cell dynamics

Ojan Khatib-Damavandi, *University of Michigan, USA* : Growth Coordination in *Drosophila*

David A Garcia Grisales, *University of Maryland, USA* : Force Dynamics During T Cell Activation

Susan Pratt, *Yale University, USA* : A new, reversibly-interacting tag-probe system for live-cell imaging

FLASH TALKS SESSION IIa

10:15-10:45 AM : Coffee Break

10:45-12:30 AM : « Cellular regulation, morphology and growth »

Chair : Joachim Rädler (LMU, Munich, Germany)

Marco Cosentino Lagomarsino, *University Sorbonne - Pierre and Marie Curie, Paris, France* : The empirical fluctuation pattern of *E. coli* division control

Ariel Amir, *Harvard University, USA* : Implications of cell size regulation on population growth

Clotilde Cadart, *Institut Curie, Paris, France* : Direct Observation of Cell Volume shows that Mammalian cells grow by a fixed amount each cell cycle to maintain cell size homeostasis

Sophie Marbach, *Ecole Normale Supérieure, Paris, France* : Pruning to increase transport in *Physarum Polycephalum*

Felix Wong, *Harvard University, USA* : Shape recovery through mechanical strain-sensing in *Escherichia coli*

FLASH TALKS SESSION IIb

12:30-2:00 PM : Lunch at Curie Institute (Picnic style)

2:00-4:00 PM : « Collective phenomena »

Chair : Philippe Marcq (Institut Curie, Paris, France)

David Hu, *Georgia Tech, USA* : Competitive eating, tail-swishing, and the Ig Nobel Prize

Nir Gov, *Weizmann Institute, Israel* : Physical modeling of collective motion in animal groups: carrying ants

Thierry Emonet, *Yale University, USA* : How diversity modulates group performance

Pawel Gniewek, *University of California, Berkeley, USA* : Collective forces in growing microbial populations

Sarah Moitrier, *Institut Curie, Paris, France* : Collective extrusion triggered by a light-inducible oncogene

Ashley Coenen, *Georgia Tech, USA* : Inferring interactions from time-series in complex virus-microbe communities

Shane Jacobsen, *Georgia Tech, USA* : The role of cellular packing efficiency in the evolution of nascent multicellularity

4:00-6:00 PM : POSTER SESSION II

6:00-7:00 PM : UNCONFERENCE I

7:00-8:00 PM : IPOLS BUSINESS MEETING (IPOLS representatives from participating institutions)

Wednesday June 28th

8:30AM - 2:00PM : Free time : Visit of Paris organized in small groups, driven by a student

2:00-4:00 PM : « Organism behavior »

Chair : Joshua Shaevitz (Princeton University, USA)

Daniel Goldman, *Georgia Tech, USA* : The geometry of self-propulsion in (and on) frictional fluids

Simon Sponberg, *Georgia Tech, USA* : Multiscale mechanisms of muscle mechanics and maneuverable movement

Andrew Leifer, *Princeton University, USA* : Probing neural drivers of behavior in freely moving animals

Megan Matthews, *Georgia Tech, USA* : Insect flight maneuvers and lift mechanisms in unsteady flow

Perrin Schiebel, *Georgia Tech, USA* : Collisional diffraction emerges from simple control in a sand-specialist snake

Ugne Klibaite, *Princeton University, USA* : Unsupervised quantification of social interactions in fruit fly pairs

Junjia Long, *Yale University, USA* : Non-normal dynamics and positive feedback between motion and sensation boosts run-and-tumble navigation

4:00-4:30 PM : COFFEE BREAK

4:30-6:30 PM : « Sensing and signaling »

Chair : Robert Austin (Princeton University, USA)

Silvina Ponce Dawson, *CONICET, Argentina* : Software programming vs. hardware remodeling in intracellular calcium signals

Debora Foguel, *Universidade Federal do Rio de Janeiro, Brazil.* : The role of neutrophils and microglia in amyloidoses

Herbert Levine, *Rice University, USA* : Towards a physics of cancer metastasis

Erin Dahlstrom, *Harvard University, USA* : Quantifying systemic dynamics of the heat shock stress response in *C. elegans*

Catherine Triandafillou, *University of Chicago, USA* : Intracellular pH shapes the heat shock response

Haicen Yue, *University of California, San Diego, USA* : Network topologies of signal processing for collective movement of border cell cluster

Ugur Cetiner, *University of Maryland, USA* : Experimental test of the fluctuation theorems with mechanosensitive ion channels in *E. coli*

Thursday June 29th

8:30-10:00 AM : « Motility »

Chair : Francesco Pedaci (CNRS, Montpellier, France)

Rama Bansil, *Boston University, USA* : How does *H. pylori* get across the gastric mucus barrier?

Garegin Papoian, *University of Maryland, USA* : Elucidating Physical Principles Giving Rise to the Emergence of Contractility in Disordered Acto-Myosin-Crosslinker Networks

Michael Murrell, *Yale University, USA* : Mechanical Force Production in a Biomimetic Cell Cytoskeleton

Ashley Nord, *Centre de Biochimie Structurale, Montpellier, F* : Stator stoichiometry and mechanosensitivity of the bacterial flagellar motor probed by load manipulation

David Fraebel, *University of Illinois at Urbana-Champaign, USA* : Environment determines evolutionary trajectory in a constrained phenotypic space

10:00-10:30 AM : Coffee Break

10:30-12:30 AM : « Intracellular self-organisation »

Chair : Jean-Baptiste Manneville (Institut Curie, Paris, France)

Erel Levine, *Harvard University, USA* : Sometime mRNAs get carried away and get too attached

Zaida Luthey-Schulten, *University of Illinois at Urbana-Champaign, USA* : Ribosome biogenesis in replicating cells: integration of experiment and theory

Erwin Frey, *LMU, Munich, Germany* : Generic Design Principles of Protein Pattern Formation in Cellular Systems

Jean-Charles Walter, *LCC, Montpellier, France* : Modelling active bacterial DNA segregation

Fridtjof Brauns, *LMU, Munich, Germany* : Taking protein dynamics seriously – from quantitative models to mechanistic understanding of protein pattern formation

Jonas Denk, *LMU, Munich, Germany* : Transient States with Long-Term Effects on Pattern Formation

Alexandra Murschhauser, *LMU, Munich, Germany* : Event Correlations in the Apoptosis Signaling cascade gained from Single Cell Time-lapsed Analysis