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 (FRel) 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 Superieure, 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 Jacobeen, Georgia Tech, USA: The role of cellular packing efficiency in the evolution of nascent multicellularity
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

Junjiajia 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