

New Challenges in the Physics of the Brain: February 14-19, 2016

Organizers: Alain Goriely, Antoine Jérusalem, Julian Andres Garcia-Grajales, and Ellen Kuhl

Talks are either **90 minutes (lecture)**, **20+5 minutes (seminar)**, or 15+5 minutes (student talk)

MONDAY: Morphogenesis and Mechanics

- 9:00-9:10** Introductory remarks
9:10-10:40 Jayamohan Jayaratnam: Brain physiology: a neurosurgeon perspective
11:00-12:30 Riya Shi : Functional mechanics
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- 16:45-17:10** François Rousseau: On early brain development from MRI data
17:10-17:35 Michael Deem: Performance, Flexibility, and Modularity in Adult Human Brains
17:35-17:55 Silvia Budday: On cellular mechanisms during cortical folding
17:55-18:15 **BREAK**
18:15-18:35 Amelia Joy Thompson: Tissue mechanics in early brain development
18:35-19:00 Svein Kleiven: Biomechanics of traumatic head injuries
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TUESDAY: Fluid and Electrochemistry

- 9:00-10:30** Yiannis Ventikos: Cerebral fluid mechanics
11:00-12:30 Alain Goriely: Brain electrochemistry
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- 16:45-17:10** John C Vardakis: Exploring the fully dynamic multi-compartmental poroelastic system
17:10-17:40 **BREAK and POSTER SESSION**
17:40-18:05 Patrick Selvadurai: Poro-Hyperelasticity: role of fluids in soft tissues
18:05-18:30 Liwei Gou: A 3D multicompartmental poroelasticity model for brain and modelling
18:30-18:55 Jose Maria Pena: Data analysis of functional connectivity
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WEDNESDAY: Head models and traumas

- 17:00-17:25** Nele Famaey : Head protection - experimental and numerical aspects
17:25-17:45 Markos Kapeliotis: Introduction of bridging veins into head models
17:45-18:05 Dries De Kegel: Compression of brain tissue in impacts and its relation to contusions
18:05-18:30 Roy Burek: how an impact to the head can lead to neuron death
18:30-18:55 Michael Krieg: The role of spectrin and tau in the neuronal protection of form and function
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THURSDAY: Axon mechanics and Multiscale

- 9:00-10:30** Kristian Franze: Axon mechanics
11:00-12:30 Antoine Jérusalem: Multiscale computational mechanobiology of TBI and SCI
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- 16:55-17:20** Pierre Recho: Growth, collapse, and stalling in a mechanical model for neurite motility
17:20-17:40 **BREAK**
17:40-18:00 Rijk de Rooij: Modeling the Role of Dynein Motors in Axonal Elongation
18:00-18:25 Julian Andres Garcia-Grajales: Mechanical modelling of axonal growth
18:35-18:55 Helene Gautier: The mechanical control of neuronal maturation
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FRIDAY: Head models and Functional mechanics

- 9:00-10:30** Michael Gilchrist : Head models and helmets
11:00-12:00 Ellen Kuhl: Modeling brain morphogenesis (Ellen will not be able to attend, a shorter version of ellen's lecture may be given by alain goriely)