

PROGRAM

Version Aug. 16, 2016

1st POEM WORKSHOP

NIELS BOHR INSTITUTE

AUG.29-AUG.31, 2016

Monday, Aug. 29

IT - invited talk

CT - contributed talk

8:30-9:00 Arrival, registration, coffee

9:00-9:10 Thomas Heimbürg

Welcome

SESSION 1 Electromechanical properties of membranes

TITLE:

9:10-9:50 Alexander Petrov, Bulgarian Acad. Sciences (IT)

Bioflexoelectricity: Active interface of the cell with the environment

9:50-10:30 Jochen Guck, TU Dresden (IT)

Mechanosensing in the central nervous system

10:30-10:50 Karis Zecchi, Niels Bohr Institute (CT)

Spontaneous polarization in lipid membranes

10:50-11:20 coffee break

SESSION 1 continued

11:20-12:00 John H. Ipsen, Univ. Southern Denmark (IT)

Tracing membrane mechanics, electrostatics and dynamics by vesicle fluctuations

12:00-12:40 Ben Machta, Univ. Princeton (IT)

Mechanical surface waves accompany action potential propagation

12:40-14:00 lunch break

SESSION 2 Electromechanical Solitons

14:00-14:40 Andrew D. Jackson, Niels Bohr Intern. Acad. (IT)

Ten years with the soliton model of the action potential

14:40-15:20 Rima Budvytyte, Niels Bohr Institute (IT)

Action potential collision in invertebrate nerves

15:20-15:40 Tian Wang, Niels Bohr Institute (CT)

Effect of anesthetics on action potential propagation

15:40-16:10 coffee break

SESSION 3 Electromechanics and Oscillations

16:10-16:50 Thomas Heimbürg, Niels Bohr Institute (IT)

Linear nonequilibrium thermodynamics of periodic processes and chemical oscillations

16:50-17:30 Luis Bagatolli, Univ. Southern Denmark (IT)

Tight coupling of metabolic oscillations and intracellular water dynamics in SAC

Tuesday, Aug. 30

IT - invited talk

CT - contributed talk

8:30-9:00 coffee

SESSION 4 Nerve and excitable cell activity

TITLE:

9:00-9:40 Sonia Contrera and Antoine Jerusalem,
Univ.Oxford (IT)

NeuroPulse, a coupled experimental-numerical approach
to the study of electromechanical properties of neurons.

9:40-10:20 Claus-Peter Richter, Northwestern University (IT)

Photonic stimulation of neurons

10:20-10:40 Vardan Azizian, Niels Bohr Institute (CT)

Mechanical Stimulation of nerve pulses

10:40-11:10 coffee break

SESSION 4 continued

11:10-11:50 Uri Nevo, Tel Aviv Univ. (IT)

Neural excitation and neural damage studied using diffusion MRI

11:50-12:30 Kasper Jensen, Niels Bohr Institute (IT)

Non-invasive detection of nerve impulses with an optical magnetometer

12:30-14:00 lunch break

SESSION 5 Pores & Transport

14:00-14:40 Mathias Winterhalter, Jacobs Univ. Bremen (IT)

Permeation of small hydrophilic molecules across bacterial membranes

14:40-15:20 Ulrich Keyser, Univ. Cambridge (IT)

DNA (origami) nanopores

15:20-15:40 Kerstin Goepfrich, Univ. Cambridge (CT)

Expanding the design space of synthetic membrane pores

15:40-16:10 coffee break

ENTERTAINMENT AND DINNER

16:10-17:00 Bus transport to boat

Starting from the Niels Bohr Institute

17:00-18:00 Boat trip on the canals of Copenhagen

19:00-23:00 Conference Dinner

Restaurant Ofelia, Sankt Annæ Pl. 36 ved vandet, 1252 København

Wednesday, Aug. 31

IT - invited talk

CT - contributed talk

8:30-9:00 coffee

SESSION 6 **Interfacial waves and communication**

TITLE:

9:00-9:40 Matthias Schneider, Univ. Dortmund (IT)

On the physical basis of communication in living systems in general and it's specificity arising from thermodynamics

9:40-10:20 Shamit Shrivastava, Univ. Oxford (IT)

On the principles of nonlinear pulse propagation in quasi-2D biological interfaces as observed in a lipid monolayer

10:20-10:40 Bernhard Fichtl

Biological signaling by interfacial sound pulses. A physics approach.

10:40-11:10 coffee break

SESSION 7 **Theory of singular waves in nerves**

11:10-11:50 Jüri Engelbrecht, Univ. Tallin (IT)

On mathematical modeling of waves in nerve fibers

11:50-12:30 Edgar Villagran-Vargas, Bajío Campestre, Mexico (IT) The nonlinear Schrödinger equation for the description of mechanical changes in phase with the action potential in neurons

12:30-14:00 lunch break

SESSION 8 **Proteins and excitable cells**

14:00-14:40 Dimitrios Stamou, Univ. Copenhagen (IT)

Heterogeneities in membrane composition and curvature as non stochastic regulators of peripheral protein binding, trafficking and sorting (Ras and annexins)

14:40-15:20 Gary Wnek, Case Western Reserve Univ., Ohio. (IT) Multiple role of macromolecules in excitable cells

15:20-15:40 Christian Fillafer, Univ. Dortmund (CT) On nerve pulse transmission in cholinergic synapses

15:40-15:45 Thomas Heimburg

Closing remarks

15:45-16:15 coffee and departure

END OF WORKSHOP