

Transport Processes in Physics and Biology

Workshop

May 26-28, 2008

Jacobs University Bremen

- All presentations take place in the lecture hall of RES IV -

Mass transport processes range from the macroscopic scale (e.g. traffic of cars) to the microscopic (nano-) scale (e.g. traffic within the cell). This workshop will focus on stochastic processes that are supposed to model traffic in biological applications, in particular traffic within the cell. The description of such processes provides a challenge for statistical physics out-of-equilibrium. When analytical solutions for the stationary states are available in one and two dimensions, they can be used to check the numerical simulations. According to this interdisciplinary topic, the expertise of the speakers ranges from theoretical physics to molecular biology. Therefore we invite as audience graduate students and colleagues who are interested in the modeling of traffic phenomena in biology.

Invited speakers:

K. Brix (Cell Biology, Jacobs University Bremen)
D. Chowdhury (Physics Department, Institute of Technology, Kanpur, India)
C. Chimere (Biophysics, Jacobs University Bremen)
P. Greulich (Theoretical Physics, University of Cologne)
W. Janke (Theoretical Physics, University of Leipzig)
E. Mandelkow (Structural Molecular Biology, Max-Planck Institute, DESY, Hamburg)
A. Marx (Structural Molecular Biology, Max-Planck Institute, DESY, Hamburg)
A. Schadschneider (Theoretical Physics, University of Cologne)
J. Sopik (Theoretical Physics, Jacobs University Bremen)
B. Waclaw (Theoretical Physics, University of Leipzig)
M. Winterhalter (Biophysics, Jacobs University Bremen)

Program

Monday, May 26

9.00 - 10.00	B. Waclaw: Analytical challenges of mass transport on networks
	coffee break
10.30 - 11.30	D. Chowdhury: Modeling traffic-like collective phenomena in biology I
	lunch break
14.00 - 15.00	P. Greulich: Statistical properties of disordered driven lattice gases
	coffee break
15.30 - 16.30	D. Chowdhury: Modeling traffic-like collective phenomena in biology II
16.45 - 17.30	K. Brix: Protease trafficking in epithelial cells

Tuesday, May 27

9.00 - 10.00	A. Schadschneider: Physics of driven diffusive systems with applications to biological transport
	coffee break
10.15 - 11.15	D. Chowdhury: Modeling traffic-like collective phenomena in biology III
11.20 - 12.00	W. Janke: Condensation in zero-range processes on inhomogeneous networks
	lunch break
14.00 - 15.00	E. Mandelkow: Mechanisms of axonal transport in neurons
	coffee break
15.30 - 16.30	A. Marx: About the structure of motor proteins
19.30	Workshop Dinner

Wednesday, May 28

9.00 - 9.30	M. Winterhalter: Ion transport through nanopores I
9.40 - 10.10	C. Chimere: Ion transport through nanopores II
	coffee break
10.30 - 11.30	D. Chowdhury: Modeling traffic-like collective phenomena in biology IV
11.40 - 12.10	J. Sopik: Interaction driven condensation phenomena and traffic jams
	lunch and departure

Organizer:

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