

Controlled Nanoscale Motion in Biological and Artificial Systems
Nobel Symposium 131, Bäckaskog Slott, Sweden (13 – 17 June 2005)
Program (June 6, 2005).

Monday, 13 June 2005		
<i>Session 1: Single-motor characterization</i>		
Arrival, check-in.		
12:30 Lunch		
14.00	Symposium opening	
14.10	Tom Pollard (Chair)	Force production by actin polymerizing machines.
14.40	Carlos Bustamante	Following the footsteps of single bio-molecular motors.
15.20	Toshio Yanagida	Single Molecule Nano-Bioscience: Learning Nanoscience from Biology.
16.00	<i>Break</i>	
16.30	Sunney Xie	Holding Biology up to the Light: Optical Studies of Single Enzyme Molecules and Their Birth in Living Cells.
17.10	Anne Houdusse	Structural insights for myosin motility mechanism and directionality.
17.50	<i>Session ends.</i>	

Dinner

Free evening.

Tuesday, 14 June 2005		
<i>Session 2: Synthetic motors and integration of bio-motors with synthetic systems</i>		
8.30	Josef Michl (Chair)	Physics of artificial molecular rotors.
9.00	Ben Feringa	Light-driven synthetic molecular motors.
9.40	Andrew Turberfield	Molecular machines made from DNA.
10.20	<i>Break</i>	
10.50	Alf Månsson	Nanotechnology based assays for functional studies of molecular motors – potentials and challenges.
11.30	David Leigh	Hydrogen bonded synthetic molecular motors and machines.
12.10	<i>Session ends.</i>	

Lunch

<i>Session 3: Nanomechanics and single-molecule manipulation</i>		
14.20	Jim Gimzewski (Chair)	Nanomechanics of single cells
14.50	Hermann Gaub	Single Molecule Force Spectroscopy by AFM Related Techniques
15:30	David Bensimon	Chromatin remodelling factors.
16:10	<i>Break</i>	
16.40	Michael Roukes	Nanomechanical Devices for Single-Molecule Biophysics
17.20	Alexander Zettl	Operational synthetic nanomotors.
18.00	<i>Session ends.</i>	

Dinner

19.30 Poster session

Wednesday, 15 June 2005		
<i>Session 4: Protein motor structure and function</i>		
8.30	Jon Howard (Chair)	What single-motor mechanics can tell us about mitosis
9.00	Ivan Rayment	Structural studies on Actin and Myosin
9.40	Paul Selvin	Fluorescence Imaging with One Nanometer Accuracy (FIONA): Application to Molecular Motors
10.20	<i>Break</i>	
10.50	Howard Berg	Navigation on a micron scale
11.30	Yale Goldman	Torque on Actin by Conventional and Unconventional myosins
12.10	<i>Session ends</i>	

Lunch

13.30 Conference photo

14 – 18 Excursion to Wanås sculpture park (guided tour)

<http://www.wanas.se> (Contemporary Nordic sculpture 1980 – 2005)

19.00 BANQUET

Thursday, 16 June 2005		
<i>Session 5: Directed motion in thermal systems: fundamental experiments and theory</i>		
8.30	Jacques Prost (Chair)	What do single motor experiments tell us about cell traffic and cell motility?
9.00	Peter Hänggi	Brownian Motors: New Results - New Applications - New Goals.
9.40	Christopher Jarzynski	Nonequilibrium fluctuations of a single biomolecule.
10.20	<i>Break</i>	
10.50	Kazuhiko Kinoshita, Jr.	F1-ATPase: a rotary motor/generator.
11.30	Dean Astumian	Transition from a power-stroke driven rotor to a Brownian rotor.
12:10	<i>Session ends.</i>	

Lunch

<i>Session 6: Nanofluidics and single-molecule manipulation</i>		
14.20	Harold Craighead (Chair)	Nanofabricated structures for single molecule analysis.
14.50	Michael Ramsey	Fluid and molecular transport through top-down fabricated nanochannels.
15.30	Cees Dekker	DNA translocation through solid-state nanopores.
16.10	<i>Break</i>	
16.40	Bob Austin	Single Molecule Dynamics of Polymers Confined in Nanochannels.
17.20	Owe Orwar	Controlling Single-Molecule Transport in Nanoscale Soft Matter Networks.
18.00	<i>Session ends.</i>	

Dinner

19.30 Discussion session (Chairs: Viola Vogel and Joe Howard)

Questions and topics to be discussed will be solicited from participants during the conference. Suggestions can also be emailed to Viola Vogel (viola.vogel@mat.ethz.ch) or to Joe Howard (howard@mpi-cbg.de) prior to the meeting.

Friday, 17 June 2005		
<i>Session 7: Biomedical significance of controlled nanoscale motion</i>		
8.30	Lawrence Goldstein (Chair)	Cargo flux within the neuron: theoretical treatment of a biological process.
9.00	Dominique Soldati	Gliding through life - the apicomplexan way.
9.40	Anders Fridberger	Nanoscale motion in the inner ear: How molecular motors makes hearing happen.
10.20	<i>Break</i>	
10.50	Marileen Dogterom	Protein polymerization motors for cellular and intracellular motility.
11.30	Nobutaka Hirokawa	Kinesin Superfamily Proteins and Intracellular Transport: Structure, Function and Dynamics.
12.10	<i>Symposium ends.</i>	

Lunch

Departure:

First bus to Copenhagen Airport leaves 12:15 (lunch bags provided). Travel time less than three hours.

Second bus to Malmö and Copenhagen Airport leaves after lunch (no later than 2 pm).