



Joint ICTP/FANAS Conference on Trends in Nanotribology

Cosponsor(s): FANAS (European Science Foundation), Università di Milano, SPECS-Zurich
Organizer(s): Directors: O. Gulseren, N. Manini, A. Vanossi; Local Organizer: E. Tosatti
Trieste - Italy, 19 - 24 October 2009

Venue: Leonardo da Vinci Building Main Lecture Hall

Final programme

Monday, 19 October (Room:Leonardo da Vinci Building Main Lecture Hall)

19 October 2009

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| 08:30 - 09:20 | --- Registration and Administrative Formalities outside Main Lecture Hall, Leonardo Building --- |
| 09:20 - 09:40 | Opening Ceremony |
| 09:40 - 10:20 | Joost Frenken / <i>University of Leiden, The Netherlands</i>
Friction and thermolubrication: thermal fluctuations and 'universal' behavior |
| 10:20 - 10:50 | --- Coffee Break --- |
| 10:50 - 11:30 | Martin Mueser / <i>Universitaet Saarbrücken, Germany</i>
Instabilities and solid friction: From linear response to Coulomb friction |
| 11:30 - 11:50 | Ion Marius Sivebaek / <i>Technical University of Denmark, Lyngby, Denmark</i>
The relation between sliding velocity and shear stress in polymer friction |
| 11:50 - 12:30 | Bharat Bhushan / <i>Ohio State University, Columbus, USA</i>
Nanotribology, nanomechanics and materials characterization studies and applications to bio/nanotechnology and biomimetics |
| 12:30 - 14:20 | --- Lunch Break --- |

- 14:20 - 15:00** **Andre Schirmeisen** / *Westfallische Wilhelms-Universitaet, Munster, Germany*
To slide or not to slide: Frictional duality of nanoparticles
- 15:00 - 15:20** **Martin Dienwiebel** / *Fraunhofer Institute for Mechanics of Materials, Freiburg, Germany*
Wear and friction of Au/Ni multilayers on the microscale
- 15:20 - 16:00** **Xiaohua Zhang** / *Suzhou Institute of Nano-Tech and Nano-Bionics, Suzhou, China*
Broken chiral symmetry in sliding carbon nanotubes
- 16:00 - 16:20** **Teresa Cuberes** / *University of Castilla La Mancha, Almaden, Spain*
Ultrasonic nanolithography on hard substrates
- 16:20 - 16:50** --- Coffee Break ---
- 16:50 - 17:30** **Udo Schwarz** / *Yale University, New Haven, USA*
Why is graphite so slippery? Gathering clues from three-dimensional lateral forces measurements
- 17:30 - 18:10** **Virginio Bortolani** / *Universita' degli Studi di Modena e Reggio Emilia, Modena, Italy*
Surface physics and friction
- 18:10 - 18:30** **Anisoara Socoliuc Toquant** / *SPECS-Zurich GmbH, Zurich, Switzerland*
Specs Zurich - company presentation
- 18:30 - 18:50** **Fabio Pulizzi** / *Nature Materials, London, UK*
Materials science at the cutting edge
- 19:00 - 21:00** (Room: Leonardo da Vinci Building Cafeteria)
--- Reception - Buffet Dinner ---

Tuesday, 20 October (Room:Leonardo da Vinci Building Main Lecture Hall)

20 October 2009

- 09:00 - 09:40** **Giampaolo Mistura** / *Universita' degli Studi di Padova, Italy*
Sliding friction of Neon monolayers on metallic surfaces
- 09:40 - 10:20** **Alexander Volokitin** / *Samara State Technical University, Samara, Russia*
Near-field radiative heat transfer and non-contact friction
- 10:20 - 10:50** --- Coffee Break ---
- 10:50 - 11:30** **Jacob Klein** / *Weizmann Institute of Science, Rehovot, Israel*
Hydration lubrication: exploring a new paradigm
- 11:30 - 11:50** **Merlijn van Spengen** / *Leiden University, The Netherlands*
A stochastic Prandtl-Tomlinson model to describe friction in MEMS (Micro-ElectroMechanical Systems)
- 11:50 - 12:30** **Ruben Perez** / *Universidad Autonoma de Madrid, Spain*
Understanding dissipation processes in dynamic atomic force microscopy
- 12:30 - 14:20** --- Lunch Break ---
- 14:20 - 15:00** **Lyderic Bocquet** / *Universite Claude Bernard-Lyon I, Villeurbanne, France*
Lubrication at nanoscales: surface effects

15:00 - 15:20	Guido Paolicelli / CNR-INFM Modena, Italy Controlling single cluster dynamics at the nanoscale
15:20 - 16:00	Michael Urbakh / Tel Aviv University, Israel Modeling friction: from the nano- to macro-scales
16:00 - 16:20	Rosario Capozza / CNR INFM Modena, Italy Exactly quantized sliding of a confined solid lubricant under shear
16:20 - 16:40	Rainer Heise / Institut für Mechanik, Berlin, Germany Pure adhesion in friction
17:00 - 19:30	Poster Session - Wine and Refreshments

Wednesday, 21 October (Room:Leonardo da Vinci Building Main Lecture Hall)

21 October 2009

09:00 - 09:40	Eduardo Jagla / Centro Atomico Bariloche, Argentina Temporal effects in dry friction
09:40 - 10:00	Pierre-Emmanuel Mazeran / Laboratoire Roberval UMR CNRS, Compiègne, France Influence of sliding speed and surface properties on adhesion and friction forces
10:00 - 10:20	Andrzej Kulik / Ecole Polytechnique Federale de Lausanne, Switzerland Friction Force Microscopy studies of antigen-antibody interaction
10:20 - 10:50	--- Coffee Break ---
10:50 - 11:30	Oleg Braun / Academy of Sciences of Ukraine, Kiev, Ukraine Friction on a mesoscale
11:30 - 11:50	Marek Szymonski / Jagiellonian University, Krakow, Poland Atomic-scale friction on a stepped surface of NaCl(001)
11:50 - 12:10	Shigeki Kawai / University of Basel, Switzerland Formations of KBr chain studied by small amplitude dynamic force microscopy
12:10 - 12:30	Alexey Lyulin / Eindhoven University of Technology, The Netherlands Mechanical rejuvenation and ageing of glassy polymers: effect of plastic deformation
12:30 - 14:00	--- Lunch Break ---
14:00 - 16:00	FANAS PROJECT MEETINGS
16:00 - 16:30	--- Coffee Break ---
16:30 - 19:00	FANAS SCIENCE COMMITTEE (Aigars Ekers)
20:00 - 23:00	--- Conference Dinner (at restaurant in town: Osteria "De Scarpon", Via Ginnastica 20, Trieste) - transportation will be provided after dinner from Piazza Oberdan back to ICTP (map) http://www.paginegialle.it/pgol/4-scarpon/3-trieste ---

Thursday, 22 October (Room:Leonardo da Vinci Building Main Lecture Hall)

22 October 2009

- 09:00 - 09:40** **Karine Mouglin** / *Institut de Science des Materiaux de Mulhouse, France*
Self-assembly and manipulation of bare and coated gold nanoparticles
- 09:40 - 10:20** **Stanislav Gorb** / *University of Kiel, Germany*
Materials for reversible adhesion: from biological systems to wall-climbing robots
- 10:20 - 10:50** --- Coffee Break ---
- 10:50 - 11:30** **Roland Bennewitz** / *Leibniz Institut für Neue Materialien GmbH, Saarbrücken, Germany*
Jumps in friction
- 11:30 - 11:50** **Maurice Brogly** / *Université de Haute Alsace, Mulhouse, France*
Assessment of nanoadhesion and nanofriction surface properties of polymer and biopolymers films by AFM
- 11:50 - 12:30** **Bernd Gotsmann** / *IBM Zurich Research Laboratory, Rüschlikon, Switzerland*
Nanoscale wear of single asperities
- 12:30 - 14:20** --- Lunch Break ---
- 14:20 - 15:00** **Bo Persson** / *Institut für Festkörperforschung, Jülich, Germany*
Contact mechanics with applications
- 15:00 - 15:20** **Frieder Mugele** / *University of Twente, Enschede, The Netherlands*
Small amplitude AFM spectroscopy: a quantitative tool for studying nano-scale fluid flow
- 15:20 - 16:00** **Lionel Bureau** / *Institut des Nanosciences de Paris, France*
Collapse, adhesion and friction of thermoresponsive polymer brushes probed with the surface forces apparatus
- 16:00 - 16:20** **Akshata Rao** / *University of Basel, Switzerland*
Trajectory Fluctuations Accompanying the Manipulation of Spherical Nanoparticles
- 16:20 - 16:50** --- Coffee Break ---
- 16:50 - 17:30** **Adam Foster** / *Tampere University of Technology, Finland*
Atomic scale characterization, manipulation and dissipation on insulating surfaces
- 17:30 - 18:10** **Jacqueline Krim** / *North Carolina State University, Raleigh, USA*
Lubrication and sliding friction levels in adsorbed films at sub-monolayer and ultra-low coverages

Friday, 23 October (Room:Leonardo da Vinci Building Main Lecture Hall)

23 October 2009

- 09:00 - 09:40** **Ernst Meyer** / *University of Basel, Switzerland*
Atomic friction: Ways to determine the elastic and viscous properties of nano-contacts
- 09:40 - 10:20** **Stefano Zapperi** / *CNR-INFN Modena, Italy*
Triggering frictional slip
- 10:20 - 10:50** --- Coffee Break ---

10:50 - 11:30	Alexander Filippov / <i>National Academy of Sciences of Ukraine, Donetsk, Ukraine</i> Relation between friction force, roughness of fractal contact surface and Hurst exponent
11:30 - 11:50	Prerna Sharma / <i>Tata Institute of Fundamental Research, Mumbai, India</i> Microrheology of a sticking transition
11:50 - 12:30	Annalisa Fasolino / <i>Institute for Molecules and Materials, Nijmegen, The Netherlands</i> Periodic orbits in the sliding of graphite flakes
12:30 - 14:20	--- Lunch Break ---
14:20 - 15:00	Enzo Granato / <i>Instituto Nacional de Pesquisas Espaciais, Sao Jose dos Campos, Brazil</i> Phase-field-crystal model for pinning a sliding of adsorbed layers
15:00 - 15:20	Helmut Baltruschat / <i>Universitat Bonn, Germany</i> Friction force on the electrodes
15:20 - 16:00	Bill Allison / <i>Cavendish Laboratory, Cambridge, UK</i> Friction measurements in the single-molecule limit
16:00 - 16:20	Zion Tshiprut / <i>Tel Aviv University, Israel</i> Temperature-induced enhancement of nanoscale friction
16:20 - 16:50	--- Coffee Break ---
16:50 - 17:10	Oded Ben-David / <i>Hebrew University, Jerusalem, Israel</i> Slip-stick: How frictional strength evolves
17:10 - 17:30	Michael Chandross / <i>Sandia National Laboratories, Albuquerque, USA</i> Water in nanoconfinement: diffusion, friction and viscosity
17:30 - 18:10	Robert Carpick / <i>University of Pennsylvania, Philadelphia, USA</i> The extreme and unusual nanotribological properties of carbon
18:10 - 18:25	Closing Ceremony

Saturday, 24 October (Room:Leonardo da Vinci Building Main Lecture Hall) (**Saturday**)

24 October 2009

09:00 - 12:00 **Informal Discussion Time**