



Symposium  
**Nanoengineering for Mechanobiology**  
Camogli, April 3-5, 2016



Mechanobiology and the influence of the physical environment on individual cells and multicellular systems, attract researchers from various scientific fields, including biology, physics and engineering. Their common aim is to understand how mechanical forces are integrated in biological signalling and to describe complex cellular behaviours with physical models. The complexity of wiring between cells and the extracellular environment is being unravelled along with the development of new engineering technologies enabling the nanoscale control and measurements of physical parameters.

This symposium will discuss recent advances and current challenges in nanoengineering applied to biological systems and mechanobiology: from the development of new methods to their application for the discovery of molecular mechanisms.

### Scientific Program

#### Monday 4 8:45-13:00 Session 1: Nanoscale manipulation of biological objects

08.45 – 09.00 **A. Ferrari - M. Vassalli**

*Introduction*

09.00 – 9.45 **Manuela Teresa Raimondi**, Politecnico di Milano, Italy

*Nanoscale manipulation of stem cell shape*

9.45 – 10.30 **Peter Glynne-Jones**, Southampton University, UK

*Acoustic radiation forces for mechanobiology*

10.30 – 11.15 **H. Eghlidi**, ETH Zurich, Switzerland

*Controlling and dictating the motion of nanoscale viruses in a liquid with single virus resolution*

#### COFFEE BREAK

11.30 – 12.15 **Pere Roca-Cusachs**, Institute for Bioengineering of Catalonia, Barcelona, Spain

*Understanding the cell-extracellular matrix mechanical link: from molecular roles to emerging behaviors*

12.15 – 12.45 **Dario Carugo**, University of Southampton, UK

*Micro-engineered devices for ultrasound-mediated drug delivery: production, characterisation and bio-physical effects*

12.45 – 13.15 **Melania Paturzo**, ISASI, National Research Council, Naples, Italy

*Label-free cell behavior analysis by digital holographic methods*

#### LUNCH TIME

## Monday 4, 15:00-18:45 Session 2: Mechanical sensing and transduction

15.00 – 15.45 **Giorgio Scita**, IFOM Foundation, Inst. FIRC of Molecular Oncology, Milan, Italy  
*Endocytic control of collective motility*

15.45 – 16.30 **Alice Nicolas**, CNRS, Grenoble, France  
*Multiscaled confinement and guidance of cells by gradients of rigidity*

16.30 – 17.15 **Claudio Canale**, Fondazione Istituto Italiano di Tecnologia, Genova, Italy  
*Single cell force spectroscopy suggests the unpredicted affection of cells adhesion capability induced by toxic amyloid oligomers*

COFFEE BREAK

17.30 – 18.00 **Christian Bippes**, Nanosurf AG, Liestal, Switzerland  
*AFM beyond imaging*

18.00 – 18.30 **Tobias Lendenmann**, ETH Zurich, Switzerland  
*Confocal reference-free Traction Force Microscopy*

18.30 – 19.00 **Anna Taubenberger**, Biotechnology Center, TU Dresden, Germany  
*Studying mechanical aspects of adipogenesis*

## Tuesday 5, 9:00-12:30 Session 3: Biophysical control of cellular function

09.00 – 09.45 **Jochen Guck**, Biotechnology Center, TU Dresden, Germany  
*Feeling for cell function: mechanical phenotyping at 1000 cells/sec*

09.45 – 10.30 **Daniele Arosio**, IBF, National Research Council, Trento, Italy  
*Chloride and pH imaging from live neurons to brain*

COFFEE BREAK

10.45 – 11.15 **Magdalini Panagiotakopoulou**, ETH Zurich, Switzerland  
*Paramorphotic youth: a new mechanism of tumor migration unveiled in a nanoprinted model*

11.15 – 11.45 **Gemma Palazzolo**, Fondazione Istituto Italiano di Tecnologia, Genova, Italy  
*Shaping the extracellular microenvironment to control cell function*

11.45 – 12.15 **Roger Oria**, Institute for Bioengineering of Catalonia, Barcelona, Spain  
*Force loading explains how substrate rigidity and ligand nano-distribution regulate cell response*

12.15 – 12.30 Concluding Remarks

LUNCH TIME



Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich



National Research Council of Italy