



## Weekly Seminar

### **Mechanical and Biochemical Micromanipulation of Individual Suspended Cells Probed with Optical Tweezers**

Invited Speaker:  
Dr. Samaneh Rezvani

*Third Institute of Physics – Biophysics, University of Göttingen, Göttingen, Germany*

**Abstract:**

Cells communicate with their environment through biochemical and mechanical interactions. They can respond to stimuli by undergoing shape- and, in some situations, volume changes. Key determinants of the mechanical response of a cell are the viscoelastic properties of the actomyosin cortex, effective surface tension, and osmotic pressure. It is challenging to measure the mechanical response of cells while changing environmental conditions. We here demonstrate the use of a novel microfluidic device with integrated hydrogel micro-windows to change solution conditions for cells suspended by optical traps. Solution conditions can be rapidly changed in this device without exposing the cells to direct fluid flow. We use biochemical inhibitors and varying osmotic conditions and investigate the time-dependent response of individual cells. Using a dual optical trap makes it possible to probe the viscoelasticity of suspended cells by active and passive microrheology and to quantify force fluctuations generated by the cells at the same time.

**Ref:**

1. D. Mizuno and C. F. Schmidt. High-Resolution probing of cellular force transmission. *Phys. Rev. Lett.* 102, 168102 (2009).
2. Joel S. Paustian and Todd M. Squires. Microfluidic Microdialysis. *Phys. Rev. X* 3, 041010 (2013).
3. F. Schlosser, F. Rehfeldt and C. F. Schmidt. Force fluctuations in three-dimensional suspended fibroblasts. *Phil. Trans. R. Soc. B* 370: 20140028.

**Wednesday, 29 Azar 1396 (Dec. 20, 2017), 14:00-15:00**

**Seminar Room (classroom A), Farmanieh Building, IPM**