



BPS 2021

65th Biophysical Society Annual Meeting
February 22–26, 2021

Wednesday, February 24, 2021

11:30 AM-12:00 PM

Bruker

Bruker's BioAFM Nano-Toolkit for Investigation of Mechanics, Structures and Dynamic Processes in Life Science

The ability of atomic force microscopy (AFM) to obtain three-dimensional topography images of biomolecules and complexes with nanometer resolution, and optical tweezers (OT) to measure sub-piconewton molecular forces under near-physiological conditions remains unmatched by other single molecule techniques. JPK BioAFM has developed the new NanoWizard® 4 XP and NanoRacer AFM's, and Nanotracker2 (NT2) optical tweezers to set the bar even higher in these areas. The NW4XP is capable of high-speed study of the time-resolved dynamics associated with cellular processes; Nanoracer is designed for studying single molecule dynamics at 50 frames/sec; and NT2 can measure intra/inter molecular forces with multiple laser/trap options (up to 10 mW). With the latest scanner technologies inbuilt into NW4XP, NT2 and their compact design also allows full integration of AFM and OT into advanced commercially available light microscopy techniques. This seminar will focus on how the advances in Bruker's latest BioAFM can be applied to study a wide-range of biological samples, from individual biomolecules to mammalian cells and tissues in real-time, in-situ experiments. We will present examples of how we are able to resolve the nanoscale structure of individual biomolecules at high-speed scan rates (150 - 5000 Hz), follow the dynamic reorganization of the membrane-associated cytoskeleton of living cells at high-temporal and high-spatial resolution, and automatically map the topography of cell cultures across the entire area of the microscope stage. We will also introduce our new scanning electrochemical microscopy (SECM) module and discuss the full suite of BioAFM modes and accessories for studying the nanomechanical properties of cells and tissues, including direct correlation of multiparametric, quantitative AFM and super-resolution (STED) datasets.

Speaker

Samrat Dutta, Sales Applications Scientist, Bruker