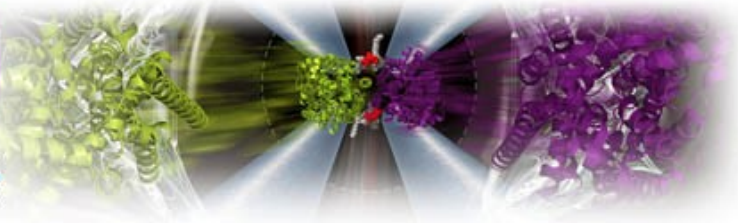


BPS19

63RD ANNUAL MEETING OF THE BIOPHYSICAL SOCIETY

BALTIMORE, MARYLAND • MARCH 2–6, 2019



Monday, March 4

5:30 pm – 7:00 pm

Room 303

LUMICKS

A VERSATILE PLATFORM FOR HIGH-RESOLUTION SINGLE-MOLECULE RESEARCH: EXPANDING CAPABILITIES AND EXPLORING NEW POSSIBILITIES

Proteins interact with nucleic acids and the cytoskeleton to perform biological processes that are key to cell metabolism and life. The direct observation of such interactions in real time and at the single-molecule enable scientists to make new discoveries and to test current biological models. Single-molecule studies of cytoskeleton filaments and their interaction to associated proteins are often developed in surface-based assays where the glass surface is used as a substrate to rigidly anchor the biological molecules of interest. To capture the dynamics of the system and its interactions, the samples are typically labeled with fluorescent dyes and are imaged with fluorescence methods. However, despite the versatility of fluorescent methods, label-free imaging methods are desirable to better mimic the native biological conditions and to reduce photo-damage due to fluorescence excitation during long experiments.

Here, we present our recent developments to further enable discoveries in the field of biology and biophysics with a special focus in surface-based assays. We present a novel instrument arrangement that includes optical tweezers in combination with Interference Reflection Microscopy (IRM) and Total Internal Reflection Fluorescence (TIRF) Microscopy. IRM is a recently introduced imaging method that allows visualization of biological structures in 3D without the need for fluorescence labeling and with sensitivity exceeding that of Differential Interference Contrast (DIC) microscopy.

In addition, we show the latest applications of these technologies and how they enhance our understanding of several fields of biology, including molecular motors and cytoskeleton filaments, DNA/RNA-protein interactions, protein folding/unfolding, cell membranes, and genome structure and organization. These applications show that the technological advances in hybrid single-molecule methods for imaging and manipulation can be turned into easy-to-use and stable instruments with the ability to open up new venues in many research areas.

Speakers

Andrea Candelli, Application Scientist, LUMICKS

Sara Tafoya, Application Scientist, LUMICKS

Trey Simpson, Application Scientist, LUMICKS