

Dear Colleague,

we cordially invite you to the

BIOPHYSICS SEMINAR

REAL-TIME SINGLE-MOLECULE INVESTIGATION OF DYNAMIC BIOLOGICAL PROCESSES: FROM STRUCTURE TO FUNCTION

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Abstract

Essential biological processes ensuring proper cellular metabolism, imperative to life, are performed by proteins interacting with and processing DNA and RNA amongst other biological matter. In fact, detailed insights into these processes provide essential information for understanding the molecular basis of life and the pathological conditions that develop when such processes go awry. The next scientific breakthrough consists in the actual, direct, real-time observations and measurements of the individual mechanisms involved, in order to validate and complete the current biological models. To this end, structural and functional information, which are often indivisible, need to be studied together in real time and at the molecular level. In this complex context, single-molecule technologies offer an exciting opportunity to meet these challenges. Here, we present our efforts in further enabling discoveries in the field of biology and biophysics using a fully integrated optical tweezers with single-molecule fluorescence microscopy technology.

We show the latest applications of these technologies that can enhance our understanding not only in the field of *DNA/RNA structure and their interactions with proteins but also in the fields of molecular motors, protein folding/unfolding, cell membranes and genome structure and organization*. These experiments show that the technological advances in hybrid single-molecule methods can be turned into an easy-to-use and stable instrument with the ability to open new venues in many research areas.

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