Optical Society of Southern California

Free Online Webinar Announcement

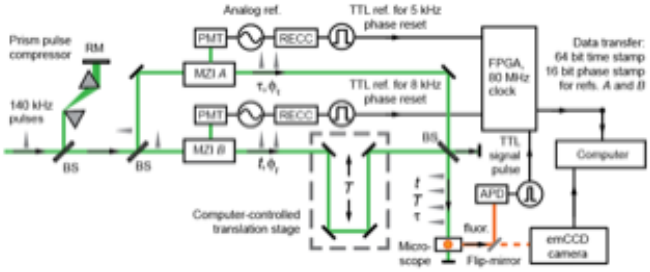
January 12, 2022

Registration Information Below

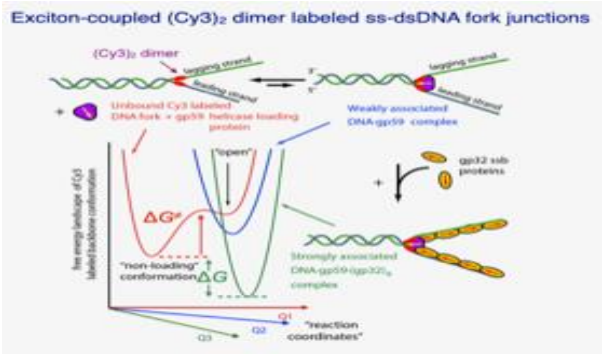
Fluorescence-Detected Spectroscopy of Exciton-Coupled Cyanine Dimers in Model DNA Replication Fork Constructs

Dr. Andrew H. Marcus, Center for Optical Molecular and Quantum Science, University of Oregon

Abstract: In DNA replication, genome regulatory proteins must recognize, bind to, and carry out their functions near single-stranded (ss) – double-stranded (ds) DNA junctions. The local conformations of the sugar-phosphate backbones of DNA near ss–ds junctions undergo 'breathing' fluctuations to permit the proper binding of proteins that function at these sites. In this talk, I will discuss optical interferometry-based experiments developed in my lab – both at the ensemble and single-molecule levels – to study DNA breathing of fluorescent probe-labeled model DNA fork constructs, which contain a pair of cyanine chromophores [i.e., a (Cy3)2 dimer] incorporated into the sugar-phosphate backbones at various positions relative to the ss – ds DNA fork junction.



These experiments apply a continuous phase sweep to the relative optical path of an interferometer and the source laser is used to resonantly excite the sample. The ensuing modulated fluorescence is detected as a function of the phase of the exciting optical field, and information is obtained about the local structure and fluctuations of the (Cy3)2 dimer-labeled sites.



Experiments using a continuously rotating polarized laser differentially excite the polarized excitons of the (Cy3)2 dimer in a single-molecule sample, and the weak modulated fluorescence is detected using a phase-tagged photon counting (PTPC) method. These experiments directly monitor the breathing fluctuations at the (Cy3)2 dimer-labeled DNA fork junction and provide insights to understand the mechanisms of protein-DNA binding and macromolecular complex assembly

About our speaker: Andy Marcus is a Professor of Chemistry and Biochemistry at the University of Oregon, where he joined the faculty in 1996. He received his B.A. in 1988 from the University of California at San Diego, his Ph.D. in 1994 from StanfordUniversity, and he did postdoctoral work at the University of Chicago. His research focuses on the development of linear and nonlinear spectroscopic methods under low signal conditions and the applications of these methods to biophysical problems related to protein-DNA interactions.

Optical Society of Southern California

Free Online Webinar Announcement

January 12, 2022

Registration Information Below

Agenda and Registration

Wednesday, January 12th, 2021

Prior Registration Required: http://www.OSSC.ORG
Login Credentials emailed on Jan 12.

Attendee Logon 6:30pm
7:00pm –7:15pm OSSC President Opens Meeting & Speaker Introduction
7:15pm—8:15 Professor Marcus Presentation
8:15pm--8:45pm Q & A
9:00pm Meeting Closes