



Applied Physics & OSA
Optics Seminar

Single molecule probing of dynamic conformation, molecular interactions and dynamic localizations in-vitro, in live cells and in small organisms

Professor Shimon Weiss

Department of Chemistry and Biochemistry, UCLA

Abstract:

We applied single molecule spectroscopy using alternating laser excitation (ALEX) to the study of transcription initiation by e-coli RNA polymerase. We found that the transcription factor sigma70 is not obligatorily released in the transition from initiation to elongation and that the mechanism for abortive initiation is governed by DNA scrunching. We also applied ALEX spectroscopy to the study of protein folding. We found that the collapsed state of protein L is not driven by native contacts, while the collapse of Acyl-CoA binding protein (ACBP) is likely to be driven by native contacts, as evident from the presence of residual structure in the denatured state. We demonstrated the use of peptide-coated CdSe/CdS/ZnS quantum dots for the study of lipid rafts in live cells' membranes and the use of peptide-coated near-infrared InAs/CdSe/ZnS quantum dots for molecular imaging in living cells and small organisms.

Brief Biography:

Professor Shimon Weiss received his Ph.D. in Electrical Engineering from the Technion, Haifa, Israel in 1989. From 1990 until 2001 he was a staff scientist at the Lawrence Berkeley National Lab. Since 2001, he is a Professor of Chemistry and Biochemistry and a Professor of Physiology at UCLA. Prof. Weiss is a member of the California Nanosystems Institute, the Molecular Biology Institute, and the Crump Institute for Molecular Imaging, all at UCLA, and he is a member of the scientific advisory board of the Lawrence Livermore National Laboratory. Prof. Weiss was the recipient of the Lawrence Berkeley National Lab Outstanding Performance Award in 1993, the Michael and Kate Barany Biophysical Society Award in 2001, and the Rank Prize of the Royal College of Physicians, London, in 2006. He is a fellow of the Optical Society of America.

Prof. Weiss single molecule biophysics research group develops and applies cutting-edge techniques from fluorescence spectroscopy, fluorescence microscopy and biological imaging to studying proteins.

October 28th 2008.

4:00pm-5:00pm.

Watson 104

Refreshments will be available in the Watson Lobby at 3:45pm