

Chez Pierre

Presents ...

Monday, February 14, 2011
10:00am

MIT Room 4-349 – Pappalardo Room



SPECIAL CHEZ PIERRE SEMINAR

Will Greenleaf
Harvard University

"Observing transcription with high-resolution optical tweezers, and sequencing DNA with reversibly sealable microreactors"

Optical tweezers have proven a powerful tool for the investigation biomolecular mechanisms. I will describe the development of high resolution optical tweezers that allow sub-nanometer motions of individual molecules to be observed under physiological conditions and under controlled loads. This technology has allowed the direct observation of single-nucleotide translocations of RNA polymerase, the investigation of the hierarchical folding pathway of an adenine riboswitch, as well as single-molecule sequencing of DNA using the motion of an RNA polymerase molecule. Finally, I will discuss recent work on a parallelizable DNA sequencing technology that takes advantage of reversibly sealable polydimethylsiloxane (PDMS) microreactors and fluorogenic nucleotides to sequence DNA. This "fluorogenic pyrosequencing" method is simple, rapid, inexpensive, and has the potential to be elegantly interfaced with a variety of PDMS-based microfluidic devices suitable for the preparation and amplification of nucleic acids for sequencing.