

Open Events for Bioengineering Day, Friday March 2:

Center/IGERT info sessions:

Location: 1000 MNTL

1:00-1:45pm CNTC/CMMB –

1:45-2:15pm Neuro IGERT –

2:15-2:45pm EBICS –

2:45-3:15pm IGB IGERT –

Rashid Bashir
Student Trainee – TBD
Doug Jones
Student Trainee - Olivia
Cangellaris, Joe Holtrop
Jimmy Hsia
Student Trainee - TBD
Andy Suarez
Student Trainee – Brielle
Fischman

Special Guest Presentation: Taekjip Ha – Professor, Department of Physics

Location: 1000 MNTL, Friday, March 2 – 3:30-4:30pm

Single Molecule Biology: One, two, three and four

Abstract: In this talk, I will highlight the recent developments in single molecule nanometry where a position of a single fluorescent molecule can be determined with a single nanometer precision, reaching the limited imposed by the shot noise, through centroid tracking and the relative motion between two molecules can be determined with ~ 0.3 nm precision at ~ 1 milliseconds time resolution through single molecule fluorescence resonance energy transfer (FRET). I will also illustrate how these new tools are providing fundamental insights on how molecular motors move on cellular highways. We have recently succeeded in combining optical tweezers that can apply and measure pico-Newton forces to single biological molecules with single molecule FRET. This led us to map out the free energy landscape of conformational transitions of the DNA four-way junction and to calibrate an in vivo tension sensor that measure tension applied across a single protein in the cell. I will also show our recent progress in combining angstrom scale optical tweezers with single molecule fluorescent detection. We are now extending our single molecule fluorescence techniques to three and four colors. Ultimately, we hope to study complex processes that require coordination between multiple proteins, such as DNA replication, using multi-dimensional single molecule measurement techniques.