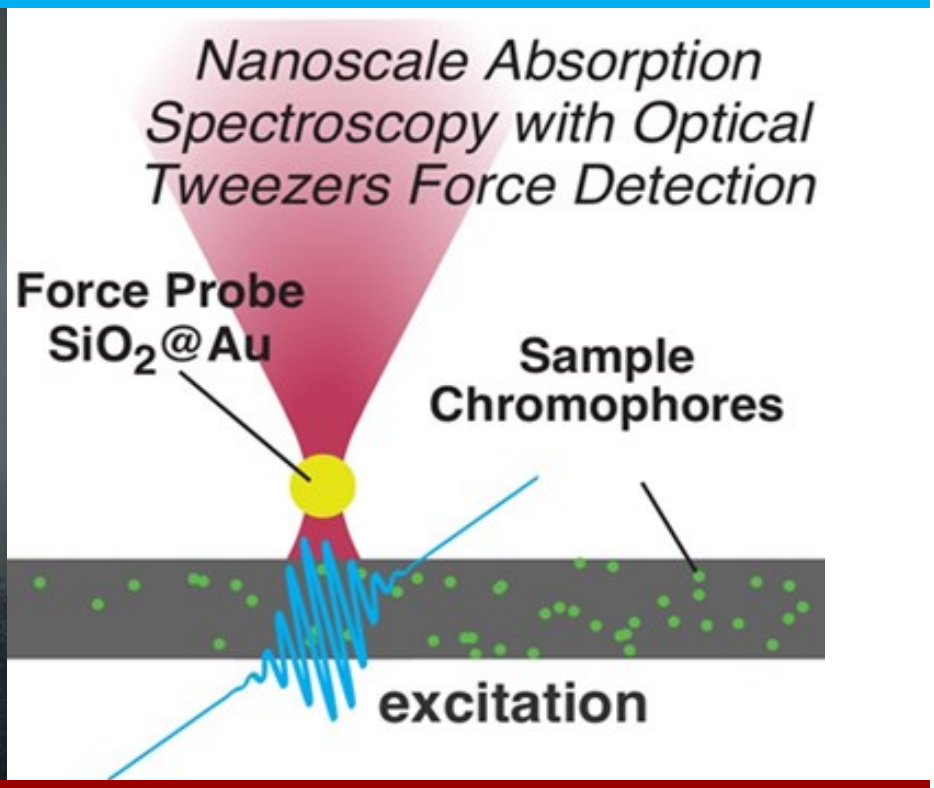
PHYSICAL SEMINAR

"Development of Single Molecule Absorption Spectroscopy using Optical Tweezers Force Detection"



Monday, January 22, 4:00pm
Hutchison Hall Room 473
University of Rochester
Department of Chemistry

Guest Speaker:
Professor Ziad Ganim
Yale University
Department of Chemistry

Abstract:

Measuring absorption spectra of single molecules presents a fundamental challenge for standard transmission-based instruments because of the inherently low signal relative to the large background of the excitation source. Since most biomolecules are not natively fluorescent, single molecule absorption spectroscopy would provide a powerful tool to study a biochemical reactions by observing real-time changes in the infrared absorption spectrum. Our group has recently demonstrate a new approach for performing absorption spectroscopy in solution using optical tweezers to read out photoexcitation at the nanoscale. We have found that optically trapped gold nano shells provide a force probe capable of measuring the femtoNewton force changes necessary to measure nanoscale absorption spectra over the 400-800nm range. This proof-of-concept measurement sets up a new paradigm for performing absorption spectroscopy in solution and paves the way towards realizing universal single molecule absorption spectroscopies that operate under ambient chemical conditions.

Host: Professor David McCamant ● Email: david.mccamant@rochester.edu