



CHEMISTRY SEMINAR SERIES SPRING 2015



TIME: **12:30-2:00 PM** PLACE: **SCIENCE HALL WEST 301**

WHEN: **THURSDAY, FEBRUARY 12TH, 2015**



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“LOOKING OUT FOR THE TINIEST LIGHTS: WHAT CONTROLLING LIGHT AT THE NANOSCALE CAN DO FOR CHEMISTRY”

Nanophotonics and plasmonics, which seek to control light at nanometer length scales, share many rich interfaces with chemistry. A classic example is surface enhanced Raman spectroscopy, where the extraordinary optical properties of metal nanoparticles - particularly their ability to concentrate optical energy through surface plasmon resonance (collective oscillations of metal conduction electrons) - have been leveraged to significantly enhance the sensitivity of analytical techniques based on Raman scattering. Recently, tremendous progress has been made towards exploiting nanophotonics and plasmonics phenomena to exercise active control over chemical processes, including using surface plasmons to mediate photochemistry and to enhance optical forces that can guide the assembly of materials. In this talk, I'll describe some of the surprising ways light can behave when it interacts with nano-structured materials. In particular, I'll describe how the simple process of refraction can lead to a completely new phenomenon known as an "Inhomogeneous Surface Plasmon Polariton" (ISPP), which allows light to be squeezed down to one dimension. I'll also discuss some of the ways I envision these phenomena can be leveraged for a variety of applications in chemistry and materials science, as well as some of my plans for future investigations.