"Optical and Electron Spectroscopy for Catalysts and Plasmonics" by Emilie Ringe, Department of Materials Science and Nanoengineering, Department of Chemistry, Rice University

Date:
Friday, October 17, 2014 - 1:00pm to 2:00pm

Location:
Room W122, Building D3

Abstract: Interest in nanotechnology is driven by unprecedented means to tailor physical behavior via structure and composition. Most properties, including optical, catalytic, and electronic, can be fine tuned through choice of composition, size, and shape of nanoparticles. Characterization of such structure-function relationships are crucial to the development of novel applications such as biological sensors and plasmonic devices. This talk covers recent experimental advances in optical and electron microscopy aimed at the correlation of local and far-field mapping of the plasmon resonance in noble metal nanoparticles (Ag, Au, and alloys). In particular, high throughput single particle optical scattering approaches will be discussed, in addition to monochromated electron-energy loss spectroscopy and electron tomography. Results from such approaches will be discussed, including new quantitative understanding on the effects of size, composition, and shape on the resonance frequency, field enhancement and distribution, plasmon decay, and refractive index sensitivity.

Bio of Dr. Ringe: Emilie Ringe is an assistant professor of Materials Science and Nanoengineering, as well as an assistant professor of Chemistry at Rice University. She started her undergraduate studies at McGill University, and earned her B.A./M.S. (summa cum laude) as well as her Ph.D. from Northwestern University where she held a Presidential Fellowship. Her doctoral studies were supervised by Richard P. Van Duyne and Laurence D. Marks and focused on new statistical approaches to the correlation of plasmonic behavior and particle morphology in noble metal particles (Ag and Au) as well as new analytical models to predict the shape of small alloy and kinetically grown nanoparticles. After her time at Northwestern, Dr. Ringe became the Gott Research Fellow at Trinity Hall as well as a Newton International Research Fellow (Royal Society) in the Electron Microscopy group in the Materials Science and Metallurgy Department at Cambridge University. There, she studied atomic resolution and three-dimensional reconstruction of alloy nanoparticles relevant for catalysis and plasmonic applications, as well as near-field plasmon mapping using electron energy loss spectroscopy. In January 2014, she joined Rice University to pursue her research interests in catalysis and plasmonics, focusing on advanced optical and electron spectroscopy.

Contact Prof. Jiming Bao (jbao [at] uh [dot] edu) if you would like to arrange for a time to meet with Dr. Ringe.