School of Materials Science and Engineering

Seminar Topic:
Manipulating Light At The Nanoscale with Earth-Abundant and Multimetallic Plasmonics

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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. Nanoparticles of free-electron metals, traditionally Ag and Au, can concentrate light via a phenomenon called localized surface plasmon resonances (LSPRs). LSPRs provide an attractive platform for enhanced photon absorption and scattering (far-field effects) at their (size, shape, and composition-dependent) resonance frequency, while concurrently generating a strong electric field close to the NP’s surface (near-field effects). In this talk, advances in the far-field and near-field characterization of plasmonic nanostructures, including high throughput hyperspectral optical approaches and monochromated electron spectroscopy in a TEM, will be explored. Then, the synthesis and characterization of multifunctional bimetallic structures, reconfigurable nanoparticles, and particles from cheap Earth-abundant elements will be discussed.

Biography

Dr Emilie Ringe earned her B.A./M.S. summa cum laude in chemistry, then Ph.D. in chemistry and materials science at Northwestern University in 2012. She 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 the University of Cambridge, UK. In 2014, she was hired as an Assistant Professor at Rice University, where she established the Electron Microscopy Center and received funding from the Air Force Office of Scientific Research (YIP), NSF, ACR-PRF, 3M, and the US/Israel Binational Science Foundation. In 2018, she is moving to take up a tenured lectureship in multi-scale, multi-dimensional imaging of natural and synthetic materials at the University of Cambridge, joint between the Department of Materials Science and Metallurgy and the Department of Earth Sciences. She has been elected fellow of Gonville & Caius College, and is an associate member of the Royal Society of Chemistry.

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Hosted by: Associate Professor Li Shuzhou

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