Fall 2018 Joint Colloquium
Materials Department & Materials Research Laboratory

Professor Daniel Shoemaker
Materials Science and Engineering Department
University of Illinois, Urbana-Champaign

Friday, October 19th, 2018
11:00 am, ESB 1001

In Situ Synthesis and Discovery of Functional Inorganic Materials

Uncovering new physical phenomena and functional materials is often an exercise in navigating nature's collection of stable, or near-stable, crystal structures. We are interested in exploring this space experimentally to make new phases, examine old ones, and understand how known compounds respond to dopants. We are often guided by theory and computation, while our experimental work utilizes a unique in-situ X-ray diffraction platform that allows us to watch a wide variety of synthesis reactions. I will present recent results from our searches for entirely new compounds, including superconductors, transparent conducting oxides, and low-dimensional magnets. With windows into how materials form, we can critically evaluate computational predictions and explore novel reactions that tilt chemistry in our favor—usually toward the unknown.

Bio

Daniel received his BS in Materials Science and Engineering from the University of Illinois in 2006 and his PhD in Materials from the University of California, Santa Barbara in 2010. His doctoral work focused on using neutron scattering and real-space modeling to understand the structure-property relationships of disordered magnetic and electronic oxides. In 2011 he began a postdoctoral appointment in the Materials Science Division of Argonne National Laboratory where he investigated the synthesis of superconductors and semiconductors with a focus on *in situ* spectroscopy and x-ray diffraction. He joined the Department of Materials Science and Engineering at the University of Illinois at Urbana-Champaign as an Assistant Professor in August 2013. His awards include an MRS Graduate Student Gold Award, the Los Alamos Neutron Science Center Louis Rosen Thesis Award, and an Early Career Award from the US Department of Energy.

http://shoemaker.matse.illinois.edu/

Hosted by Ram Seshadri.