

# CAPS COLLOQUIUM

## EARLY CAREER RESEARCHER SERIES

# Daniel Shoemaker

## Inorganic Materials Discovery: What Do We Make, and How?

Uncovering new functional inorganic materials is often an exercise in navigating nature's collection of stable, or near-stable, crystal structures. Our experimental efforts require methods of growing materials at moderate temperatures, measurements to probe the details, and guidance on where to look. We are often guided by theory and computation, while our experimental work utilizes *in situ* x-ray diffraction to watch a wide variety of synthesis reactions. I will present recent results from our searches for new or elusive compounds: the frustrated magnet  $\text{Cu}_4\text{O}_3$ , alkali tin oxides with unique structures, and peritectic-driven reactions. Prospects for probing these reactions with a more diverse set of diffraction and spectroscopy tools will be introduced. The ultimate goal is to explore novel reactions and critically evaluate computational predictions of stability and mechanisms.

Daniel Shoemaker is an Assistant Professor in the Materials Science and Engineering Department at the University of Illinois at Urbana-Champaign. His research focuses on magnetic and electronic materials discovery, with an emphasis on *in situ* characterization. Until 2013, he served as a postdoctoral researcher in the Materials Science Division at Argonne, focusing on flux synthesis of semiconductors and superconductors. His Ph.D. from the University of California, Santa Barbara investigated the crystallography of disordered oxides using synchrotron and neutron pair distribution function techniques. He is the recipient of a Department of Energy Early Career Award, the LANSCE Louis Rosen Thesis Prize, and a MRS Gold Award.

**Wednesday, February 1, 2017 | 3:00 p.m.**

**Bldg. 402 | APS Auditorium | Argonne National Laboratory**