

# Upcoming Seminar

## Department of Materials Science and Engineering

**2:30 pm – 3:30 pm February 9, 2018 at Discovery Park B-155**

### **In-situ Imaging of Metallic Alloy Solidification Dynamics for Advanced Manufacturing**

**Amy J. Clarke**

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#### **Abstract:**

Solidification is critical to processes like casting and additive manufacturing and the manufacture of metallic alloy components we use in our everyday lives. State-of-the-art characterization techniques, now available at U.S. DOE User Facilities and in the laboratory, are not only enabling fundamental studies of metallic alloy solidification dynamics, but also in-operando, in-situ deformation, and manufacturing studies. Here we use x-ray, proton, and electron imaging to study solidification dynamics from the micro-scale to the macro-scale, at times ranging from microseconds to minutes. Our experimental results are used to inform, develop, and validate computational models at the same length and time-scales. Integrating in-situ characterization and modeling will yield the prediction and control of metallic alloy solidification dynamics and the creation of microstructures and properties by design with advanced manufacturing. This work was supported by the U.S. Department of Energy, Office of Science, Basic Energy Sciences, Materials Sciences and Engineering Division.

**About the speaker:** Amy J. Clarke is an Associate Professor in the George S. Ansell Department of Metallurgical and Materials Engineering, Site Director for the Center for Advanced Non-Ferrous Structural Alloys (CANFSA), and an affiliate of the Advanced Steel Processing and Products Research Center (ASPPRC) at the Colorado School of Mines (CSM). She is also a Guest Scientist at Los Alamos National Laboratory (LANL). Her current research focuses on making, measuring, and modeling metallic alloys during processing, including x-ray, proton, and electron imaging of multi-scale solidification dynamics at national user facilities, the study of phase transformations and microstructural evolution, and non-ferrous and ferrous physical metallurgy. Amy earned her B.S. degree from Michigan Technological University (MTU) and her M.S. and Ph.D. from CSM in Metallurgical and Materials Engineering. Prior to joining CSM, she was a Scientist and Seaborg Institute Postdoctoral Fellow at LANL and Senior Engineer – Development/Research at Caterpillar Inc. Amy has received a U.S. DOE Office of Science Early Career Research Program Award and a Presidential Early Career Award for Scientists and Engineers (PECASE). Amy serves on the TMS Board of Directors, is Chair of Argonne National Laboratory's Advanced Photon Source Users Organization Steering Committee, and is an Editor for Metallurgical and Materials Transactions A. She has also served on the Association for Iron and Steel Technology (AIST) Board of Directors.

