

## **Title: Transport Phenomena in Multi-Scale, Heterogeneous Materials & Systems.**

**Instructor: Prof. Amy Marconnet,**

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### **Description**

This 3 hour course will give a brief overview of thermal transport fundamentals and metrology techniques for understanding heat transfer across length scales. The first portion of the course will introduce fundamentals of thermal energy carriers, as well as methods to predict thermal transport properties. The second portion will introduce thermal transport measurement techniques spanning a range of length and time scales. Throughout, the interconnection between experiments and models to further our understanding of thermal transport will be discussed.

### **Course Outline**

- Part 1: Introduction to Thermal Transport
  - Overview of Thermal Energy Carriers
  - Predicting Thermal Conductivity & Interfacial Thermal Transport
- Part 2: Measuring Thermal Transport
  - Introduction to Metrology Techniques

### **Who Should Attend**

The course is designed for staff members, technical managers, reliability engineers, quality and production manager of electronic and microsystems production, as well as Master of science and PhD students interested in the field.

### **Author Bio**

Amy Marconnet is an associate professor of Mechanical Engineering and a Perry Academic Excellence Scholar at Purdue University. She received a B.S. in Mechanical Engineering from the University of Wisconsin – Madison in 2007, and an M.S. and a PhD in Mechanical Engineering at Stanford University in 2009 and 2012, respectively. Her dissertation focused on thermal phenomena in nanostructured materials. She then worked briefly as a postdoctoral associate at the Massachusetts Institute of Technology, before joining the faculty at Purdue University in August 2013. She was promoted to associate professor with tenure in August 2019. Research in the Marconnet Thermal & Energy Conversion (MTEC) Lab intersects heat transfer, energy conversion, and materials science to enable advances in technologies where energy conversion and thermal transport are key factors in performance. Prof. Marconnet has developed an interdisciplinary research program to evaluate, understand, and control the physical mechanisms governing the multi-functional properties of materials, machines, and systems. This year she is conducting research on thermal transport in battery cells at Karlsruhe Institute of Technology as part of the Humboldt Fellowship program.