Mechanical Engineering Department Seminar

3:35pm February 19, 2014
1130 Mechanical Engineering

Thermal Phenomena in Nanostructured Devices & Materials

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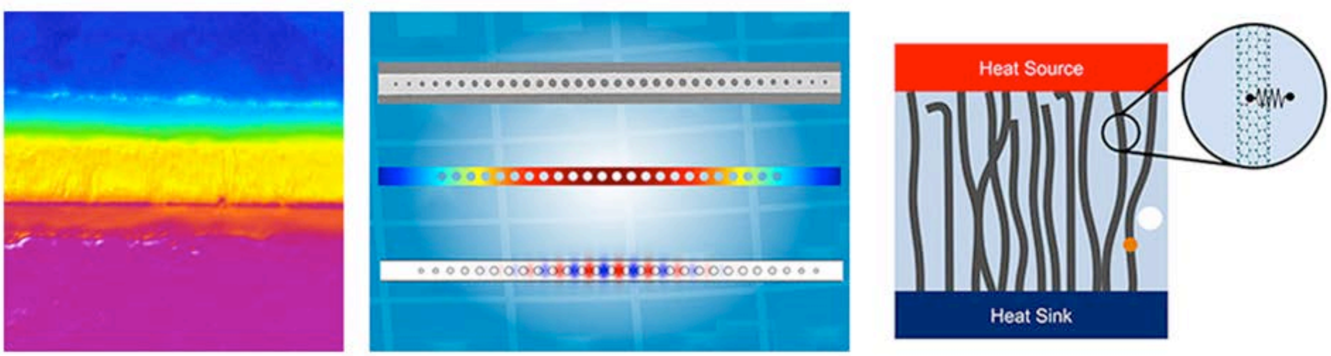
Nanostructuring leads to unique material properties and combinations of properties not naturally available in bulk materials. In this seminar, I will discuss our efforts to push the thermal conductivity of nanostructured materials to the extremes: the thermal conductivity of carbon nanotubes and nanotube-based materials can exceed that of metals, while the introduction of nanoscale boundaries (e.g. nanoscale features including pores) yields extremely low thermal conductivity materials. In addition to the ability to control thermal transport properties, nanostructuring leads to unique combinations of properties not found in natural or bulk materials. For example, porous silicon nanowires are a step towards the desired electron-crystal, phonon-glass combination ideal for thermoelectric applications, while thermally-conductive, mechanically-compliant carbon nanotube films are promising for electronics packaging.



Bio: Amy Marconnet is an assistant professor of Mechanical Engineering 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. Research in the Marconnet Thermal and Energy Conversion Lab (M-TEC) integrates metrology and analysis of underlying transport mechanisms with design and development of nanostructured materials for heat transfer and energy conversion applications.