

Carnegie Mellon University
Materials Science & Engineering

presents

Atomistic Modeling of Thermal Transport

Dr. Alan McGaughey

Professor of Mechanical Engineering & Materials Science and Engineering (Courtesy)
Carnegie Mellon University

ABSTRACT:

In this seminar, I will describe how atomistic modeling can be used to predict the thermal transport properties of semiconductors, metals, and organic-inorganic heterostructures. After an introduction of thermal transport by phonons, molecular dynamics simulations, and lattice dynamics calculations, three projects will be discussed. First, tuning the thermal conductivity of silicon thin films by introducing periodic holes. Second, predicting the electronic and phononic transport properties of metals. And third, controlling thermal transport through a binary self-assembled monolayer. In all cases, the predictions are validated against experimental measurements and are used to gain a deeper understanding of the underlying transport physics.

BIOGRAPHY:

Alan McGaughey is a Professor of Mechanical Engineering at Carnegie Mellon University (CMU) with a courtesy appointment in Materials Science & Engineering. He holds B.Eng., M.A.Sc., and Ph.D. degrees in mechanical engineering from McMaster University, the University of Toronto, and the University of Michigan. His research group has been supported by NSF, DOE, AFOSR, and DARPA. He was the Struminger Junior Faculty Fellow in 2009, won a Air Force Office of Scientific Research Young Investigator Program award, was a Harrington Faculty Fellow at the University of Texas at Austin, and won the Teare Teaching Award at CMU. He was voted "Professor of the Year" by the CMU mechanical engineering senior class in 2012, 2015, and 2017. He has given invited talks and seminars on modeling atomistic transport across the United States and in Canada, Chile, China, France, Japan, Korea, and Singapore.

Doherty Hall 2210, 11:30AM
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