

**MECHANICAL ENGINEERING DEPARTMENT
ME/IE 8773-8774**

**MAIN DEPARTMENT SERIES
Topic: NANOTECHNOLOGY
Host: Joachim V.R. Heberlein**

Nanoscale Heat Conduction in Semiconductor and Data Storage Devices

by

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**Wednesday, January 25, 2006, 2005
3:30-5:00 p.m.
Room 3-180 EECS**

Coffee and refreshments will be available at 3:15 p.m. in Room 3-176 EECS before and after the seminar

ABSTRACT — Advances in microfabrication processes and an ever-increasing demand for faster processing of information have led to a continuous miniaturization of microelectronic and data storage devices. However, as the minimum feature size and design rules for state-of-the-art transistors and data storage devices approach sub 100 nm lengthscales, a variety of nanoscale thermal phenomena as well as thermally induced and/or related problems emerge. A better understanding of energy transport at nanoscales requires both simulations and experimental data on thermal transport properties of nanostructures, which are not available at the present time.

The nanoscale heat transfer research effort at CMU has focused on the three interwoven areas of **thermal design, failure analysis, and metrology** of micro/nano-devices and structures relevant to semiconductor and data storage technologies. In this presentation, underlying physics and fundamentals of heat transport at nanoscale, as well as diagnostic tools and experimental techniques for thermal characterization and thermometry of the nanostructures, will be discussed.

BIO — **Mehdi Asheghi** received his Ph.D. degree from Stanford University and subsequently joined the Mechanical Engineering Department at Carnegie Mellon University in 2000/2001. The study of micro/nano-scale thermal phenomena in microelectronic devices, multilayer structures, data storage devices and MEMS has been the focus of his research in the past 10 years. Prof. Asheghi (PI) and a group of faculty were the recipients of the first nanotechnology grant at CMU from NSF through the Nanoscale Interdisciplinary Research Team (NIRT) initiative to investigate the “Phonon Transport in Nanostructures with Application to Ultra-Thin Silicon-On-Insulator (SOI) Transistors.” He is the author of nearly 100 book chapters, journal publications and fully-reviewed conference papers.

Informal Faculty Luncheon: Wednesday, January 25, 2006, 12:00 noon. Meet in 1100 ME and walk to lunch with other faculty. Prof. Mehdi Asheghi will be able to attend.