MECHANICAL ENGINEERING DEPARTMENT

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Thermal Microsystems for Electronics Thermal Management across Multiple Scales

by

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Wednesday, December 6, 2006
3:30-4:30 p.m.
Room 1130 ME
Refreshments will be available at 3:15 p.m. in Room 1130 ME before the seminar

ABSTRACT — Electro-thermal co-design at the micro- and nano-scales is critical for achieving desired performance and reliability in microelectronic circuits and other microsystems. Emerging thermal microsystems technologies for this application area will be discussed, with specific examples including a novel micromechanical electrohydrodynamic micropump, electrowetting for fluidic actuation and site-specific thermal control, ion-driven airflow, and miniature piezoelectrically actuated cantilevers for cooling and sensing. Fundamental research into enabling technologies for such microsystems, conducted by the speaker's group under the framework of the National Science Foundation Compact, High-Performance Cooling Technologies Research Center (www.ecn.purdue.edu/CTRC), will be presented. This includes single- and two-phase microchannel transport, thin-film evaporation, transport in porous metal foams and wicks, and enhancement of interface contact conductance.

BIO — Suresh Garimella is the R. Eugene and Susie E. Goodson Professor of Mechanical Engineering at Purdue University. He received his PhD from the University of California at Berkeley in 1989. He is Director of the NSF Cooling Technologies Research Center, the Electronics Cooling Laboratory and the Solidification Heat Transfer Laboratory. His research interests include thermal microsystems, high-performance compact cooling technologies, electro-thermal co-design and electronics packaging, micro- and nano-scale thermal phenomena, and materials processing. Dr. Garimella has worked with 26 PhD and 28 MS students and 13 visiting scholars and post-docs, and has co-authored over 225 refereed journal and conference publications, besides editing or contributing to a number of books. He serves on the Editorial Boards of *ASME Journal of Heat Transfer* and *Experimental Heat Transfer*, and has served as Editor of *Heat Transfer-Recent Contents* and on the Editorial Board of *Experimental Thermal and Fluid Science*. He is a Fellow of the ASME. His efforts in research and engineering education have been recognized with the 2004 ASME Gustus L. Larson Memorial Award; K16 Clock Award from the ASME; Graduate School/UWM Foundation Research Award in recognition of Outstanding Research and Creative Activity, 1995; UWM Distinguished Teaching Award in recognition of Demonstrated Dedication to Excellence in Undergraduate Instruction, 1997; and Society of Automotive Engineers' Ralph R. Teetor Educational Award, 1992.

Informal Faculty Luncheon: Wednesday, December 6, 2006, 12:00 noon. Meet in 1100 ME and walk to lunch with other faculty. Prof. Suresh Garimella will be able to attend.