



Mechanical Engineering Seminar Series

Enhancement of Phase-Change Thermal Management of Microelectronics Using Engineered Surface Structures

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Room 1010 DOW

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4:00 p.m.

[ME Seminar Zoom link](#)

Passcode 309714

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Abstract

The dramatic increase in heat flux in applications such as data centers has resulted in a gradual transition from traditional air cooling paradigms to more aggressive liquid immersion thermal management of microelectronics. As the technology finds its way to commodity applications, extensive knowledge of the effect of critical operational and system parameters on thermal performance becomes essential. The use of dielectric fluids allows the coolant to come in intimate contact with the microelectronics components, allowing the use of even more effective phase-change thermal management strategies. Unfortunately, dielectric fluids suffer from poor thermal properties and are highly-wetting, adversely affecting boiling performance by exacerbating the temperature overshoot hysteresis at nucleation incipience. This seminar will identify the primary challenges and discuss application areas in data centers and in the cooling of microelectronics in microgravity applications. The focus will be on the use of robust mesoscale engineered surface structures.

Bio

Sushil H. Bhavnani holds the Henry M. Burt Chair Endowed in Mechanical Engineering at Auburn University. His primary research area is in liquid cooling of high-powered microprocessors. He is a past recipient of the ASME Electrical and Electronics Packaging Division's Clock Award for sustained contributions to the area of electronics packaging. He has served as the General Chair of the Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm). He has authored 175 refereed journal and conference publications resulting from research sponsored by agencies such as NASA, the National Science Foundation, Southern Company, the U. S. Department of Energy, and the U. S. Department of Defense. His teaching has been recognized with several excellence awards, including the Mortar Board Award, the Walker Award, the Birdsong Award, the Pumphrey Award, and the Leischuck Presidential Award for Excellence in Teaching. He is a Fellow of the American Society of Mechanical Engineers.