

Title **From Nanoscale Surface Engineering to Macroscale Energy Systems**

Speaker Prof. Evelyn N. Wang
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Date & Time Tuesday, November 1, 2016 11:00 a.m.
Place I²CNER Hall, Ito campus, Kyushu University

Abstract

Nanoengineered surfaces and materials have exciting, untapped potential to improve macroscale energy systems. In this talk, I discuss our recent work that harnesses novel surface designs to control and manipulate phase-change processes. We demonstrate the ability to rapidly and reversibly turn nucleate boiling “on and off” and thus alter heat transfer performance up to an order of magnitude through molecular manipulation of the boiling surface. In flow boiling, we show that microstructures can increase flow stability and enhance heat dissipation capability via capillary wicking. Finally, in condensation, jumping droplets are harnessed to increase condensation heat transfer, and can be further manipulated using electric fields. These nanoengineering approaches promise to address many of the pressing challenges in next generation thermal systems.

About the Speaker

Prof. Evelyn N. Wang is an Associate Professor, the Gail E. Kendall Professor, in the Mechanical Engineering Department at MIT. She is the Associate Director of the Solid State Solar Thermal Energy Conversion (S3TEC) Center and an Associate Director of the Microsystems Technology Laboratory (MTL) at MIT. She received her BS from MIT in 2000 and MS and PhD from Stanford University in 2001 and 2006, respectively. From 2006-2007, she was a postdoctoral researcher at Bell Laboratories. Her research interests include fundamental studies of micro/nanoscale heat and mass transport and the development of efficient thermal management, water desalination, and solar thermal energy conversion systems. Her work has been honored with several awards including the 2012 ASME Bergles-Rohsenow Young Investigator Award and the 2016 ASME EPPD Women Engineer Award. She is an ASME Fellow.

Host: Prof. Sivasankaran Harish

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