Department of
Mechanical Engineering
The University of Hong Kong

DEPARTMENT OF
MECHANICAL ENGINEERING
THE UNIVERSITY OF HONG KONG

SEMINAR

Thermal Management of Electronics: from the Inside Out

Date: 30 April, 2025 (Wednesday)
Time: 2:00 p.m.
Venue: Room 7-34 and 7-35, Haking Wong Building
HKU

Speaker: Professor Ronggui Yang
Chair Professor
College of Engineering
Peking University
China

Abstract:

The surge in heat flux density of electronic chips has posed unprecedented challenges for thermal management. To address the characteristics of multi-physics coupling and cross-scale phenomena in thermal management of electronic chips, our team has conducted research from the hierarchical levels of "material-interface-system". Regarding multi-carrier transport in electronic materials, we developed a computational framework for electron-phonon coupled transport that integrates first-principles calculations with machine learning potentials. For heterogeneous interface thermal transport, we developed approaches including atomic Green's function method and cross-scale interface Monte Carlo simulations, proposing technical solutions such as gradient-composition buffer layers and nanostructured interfaces to reduce interfacial thermal resistance. To extract the heat from electronic systems, we proposed a novel approach to couple bubbles/droplets with a liquid film to enhance phase-change heat transfer, developing various high-conductivity, ultra-thin, and flexible thermal ground planes and active two-phase cooling techniques using micro/nano- hierarchical structures, which have been successfully applied in relevant electronic systems.

Biography:

Dr. Ronggui Yang is currently a Chair Professor in the College of Engineering at Peking University in Beijing, China. He was a Chair Professor in the School of Energy and Power Engineering at Huazhong University of Science and Technology in China (2018-2024) and a faculty member in the Department of Mechanical Engineering at the University of Colorado Boulder (2006-2019). Dr. Yang received his PhD degree with Professor Gang Chen in Mechanical Engineering and Professor Mildred Dresselhaus from MIT in February 2006. His research interests are on the fundamentals of thermal transport (heat conduction, thermal radiation, thermoelectrics, liquid-vapor phase-change heat transfer) and the applications of micro/nanotechnologies for thermal, energy, and information systems. Dr. Ronggui Yang has published ~ 280 journal papers, delivered ~200 invited seminars and is associated with >150 invited and contributed conference talks and posters that garnered numerous best paper/presentation/poster awards. His journal papers are highly cited (listed as a Clarivate Highly Cited Researcher by Clarivate in 2021 - 2024), with an H-index of 83, a total citation >31,000 times as of March, 2025 (an H-Index of 94, a total citation ~40,000 times and an annual citation ~ 6000 times since 2024, per Google Scholar). His innovative research has won him numerous awards including the MIT Technology Review's TR35 Award and the DARPA Young Faculty Award in 2008, the 2010 ASME Bergles-Rohsenow Young Investigator Award in Heat Transfer (one selected annually), an NSF CAREER Award in 2009, and the 2020 Nukiyama Memorial Award in Thermal Science and Engineering (one selected worldwide every two years).

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. X.B. Yin at 3910 2659.