香港大學 機械工程系
Department of Mechanical Engineering
THE UNIVERSITY OF HONG KONG

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Scalable patterning by R2R nanoimprinting, photoacoustic generation by CNT nanocomposite, and flexible conductors by nanothick metal thin film

Date: 13 February, 2026 (Friday)
Time: 11:00 a.m. - 12:30 p.m.
Venue: Room 7-34 and 7-35
Haking Wong Building
HKU

Speaker: Professor L. Jay Guo
Department of Electrical Engineering
and Computer Science
The University of Michigan
USA

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Abstract:

This presentation highlights a series of research contributions led by former Mechanical Engineering PhD students in my laboratory, spanning scalable nanomanufacturing, photo–thermal interactions, and flexible electronic materials. The talk begins with early work on roll-to-roll nanoimprinting and nanoinscribing techniques developed to address the critical need for scalable and cost-effective nanofabrication. It then explores the unique optical absorption and nanoscale thermal transport properties of multiwall carbon nanotubes, which enable rapid and efficient conversion of pulsed optical excitation into localized heating within polymer matrices. This effect is leveraged for photoacoustic generation, producing laser-generated focused ultrasound capable of inducing strong mechanical disruption in cells, polymers, and tissue-mimicking gels through cavitation-driven shock waves—suggesting potential biomedical applications as a noninvasive "sound scalpel." The wave nature of both the optical excitation and the generated ultrasound is further exploited to achieve efficient photoacoustic conversion and to observe phase-related phenomena such as the Gouy phase shift. Finally, the talk presents work on flexible transparent conductors, demonstrating that an ultrathin silver film sandwiched between indium tin oxide (ITO) layers significantly enhances mechanical durability under repeated bending compared to ITO alone, positioning this multilayer structure as a promising candidate for flexible optoelectronic applications.

Biography:

Professor L. Jay Guo is the Emmett Leith Collegiate Professor of Electrical and Computer Engineering at the University of Michigan. He currently serves as the director of the Macromolecular Science and Engineering program, and holds courtesy appointment in Mechanical Engineering, and Applied Physics. He is a fellow of the IEEE, Optica, and the National Academy of Inventors. Professor Guo's lab is involved in interdisciplinary research, with activities ranging from polymer-based photonic devices and sensor applications, flexible transparent conductors, nanophotonics, structural colors and AI assisted design, hybrid photovoltaics and photodetectors, to nanomanufacturing technologies. Professor Guo has ~300 journal publications; with citation more than 35,000 times, and an H-index of 94 (by google scholar). He serves as the Editor-in-Chief of Optics and Photonics Research, co-Editor-in-Chief of Micro and Nano Manufacturing, and member of the Editorial Advisory Board of Advanced Optical Materials, and Opto-electric Science.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. W.D. Li at 3917 8982.