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

SEMINAR

Title : Nanodevice Intelligence for New-Paradigm Machine Vision

Date: February 3, 2026 (Tuesday)

Time: 9:30am

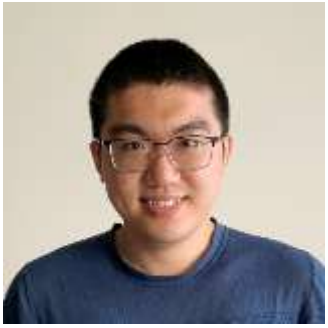
Speaker: Dr. Dehui Zhang
Postdoctoral Researcher
Electrical Engineering and Computer Sciences
University of California, Berkeley
USA

Join Zoom Meeting
https://hku.zoom.us/j/98478679423?pwd=7mx9T0RBUjFsjXCE03RgbaaUbQX87l.1
Meeting ID: 984 7867 9423
Password: 516539

Abstract:

Machine vision holds immense promise for transforming how we interact with the world, from autonomous vehicles to robots and AR/VR. Yet current systems overlook much of the hidden richness in optical signals—spectral features, polarization states, and photonic quantum statistics—resulting in inefficient computation and compromised performance. My research tackles these shortcomings by embedding intelligence directly into nanomaterial-based photodetectors. By co-designing nanophotonic devices with real-time learning algorithms, we analyze high-dimensional optical information within the sensor itself - thereby eliminating extensive post-processing. This approach harnesses "sniff-and-seek" training, allowing devices to adapt rapidly to new tasks, much like a retriever dog learns from trials and errors. The so-called spectral kernel machines offer orders of magnitude higher speed and power efficiency for hyperspectral imaging and adapts to complex field-test environments. I will also highlight recent breakthroughs in optoelectronic neurons, where integrated light-field processing can expand human perception and wearable AR/VR optics. These nanodevice-based intelligence strategies promise to push machine vision beyond current hardware limits, enabling fast, efficient, and adaptive sensing for the next wave of technological progress.

Biography:



Dehui Zhang is a postdoctoral researcher in Electrical Engineering and Computer Sciences at the University of California, Berkeley, and a research affiliate in the Materials Science Division at Lawrence Berkeley National Laboratory. He received a Ph.D. in Electrical and Computer Engineering from University of Michigan, Ann Arbor in 2021, and was a postdoctoral researcher at University of California, Los Angeles in 2021-2023. His research lies at the interface of nanomaterials, nanophotonics, and machine learning, with multiple first-authored papers published on Science, Nature Biomedical Engineering (accepted), and Nature Communications. He also worked as an Intern Photonic Engineer in Lightelligence.ai to develop photonic neural network accelerators in Summer 2020. He was awarded the Rackham Predoctoral Fellowship of the University of Michigan (2020-2021).

ALL INTERESTED ARE WELCOME
For further information, please contact Prof. Mingxin Huang at mxhuang@hku.hk.