

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING
Website: <https://cde.nus.edu.sg/ece>

Area: Microelectronics Technologies and Devices (MTD)

Host: Prof Ang Kah Wee

TOPIC	:	Computation-enabled Light-field Detection
SPEAKER	:	Prof Tawfique Hasan Professor of NanoEngineering, University of Cambridge
DATE	:	Wednesday, 29 July 2026
TIME	:	3:00PM-4:00PM
VENUE	:	E5-03-20 SEMINAR ROOM

ABSTRACT

Optical instruments are usually judged by how much information they can separate, resolve and measure. Conventional systems achieve this through carefully arranged optical components, including lenses, filters, gratings and scanning elements. Miniaturised light-field detectors and spectrometers challenge this model. By replacing part of the optical complexity with engineered materials, device physics and computational reconstruction, they offer a route towards compact instruments that can measure rich optical information outside the controlled environment of the laboratory.

After a brief overview on our sensor-related work on other application domains, I will discuss this emerging design philosophy for miniaturised computational light detection. The central idea is to use constrained hardware not as a limitation, but as a physical encoder of optical information. Computation is then used to reconstruct the underlying spectral, spatial or other light-field content from the resulting measurements. This approach shifts the emphasis from simply shrinking conventional instruments to co-designing the material response, device architecture and reconstruction algorithm. In doing so, it points towards optical systems that are not only smaller, but also more manufacturable, task-specific and suitable for real-world sensing and portable spectroscopy.

BIOGRAPHY

Tawfique Hasan is Professor of NanoEngineering in the Department of Engineering at the University of Cambridge. His research group develops nanomaterials, printable electronics, optoelectronic devices and computational sensing systems. His work spans gas sensors, tactile sensors, flexible and recyclable electronics, photodetectors and miniaturised computational spectrometers, with a central interest in structuring materials and device architectures, then using computation to extract information from complex electrical and optical responses.

Tawfique is an Editor of Advanced Photonics, has served as a Distinguished Lecturer of the IEEE Photonics Society and is a Fellow of Optica.

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