

HONG KONG ENGINEERING SCIENCE AND TECHNOLOGY (HKEST) AWARD 2024-25

AWARD CEREMONY CUM DISTINGUISHED LECTURES

Date : Thursday, 22 May 2025

Venue : The Senate Room, 16/F, Li Ka Shing Tower (Core M), PolyU

Time : 10:00 - 17:30

Rundown

09:30	Registration
10:00 - 10:05	Welcome Speech Ir Dr Alex CHAN Siu-kun, SBS <i>President of Hong Kong Academy of Engineering</i>
10:05 - 10:10	Opening Remarks Prof. SUN Dong, JP <i>Secretary for Innovation, Technology and Industry, HKSAR Government</i>
10:10 - 10:45	Award Presentation
10:45 - 10:50	Group Photo
10:50	Break
11:00 - 11:40	Lecture 1 : Navigating the Future: Airport Autonomous Transportation System Ms LU Yuk Ying Nicola, Mr LAI Tsz Fai Jeff, Mr MOK Ying Yiu Tom <i>Airport Authority Hong Kong</i>
11:40 - 12:20	Lecture 2 : Non-cationic bionanomaterials for delivery to challenging diseased sites Prof. CHOI Chung Hang Jonathan <i>Professor and Vice-Chairman (Undergraduate), Department of Biomedical Engineering, The Chinese University of Hong Kong</i>
12:20 - 14:00	Lunch (by invitation only)
14:00 - 14:40	Lecture 3 : Building a Sustainable Future: The Evolution of Intelligent Building Envelope Materials for Achieving Carbon Neutrality Ir Prof. TSO Chi Yan Edwin <i>Associate Dean and Associate Professor, City University of Hong Kong; Co-Founder, i2Cool Limited</i>
14:40 - 15:20	Lecture 4 : Making sense of ultrafast biological microscopy: from instrumentation to AI analytics Prof. TSIA Kin Man Kevin <i>Professor, Department of Electrical and Electronic Engineering, The University of Hong Kong</i>
15:20	Break
15:50 - 16:30	Lecture 5 : Cryptography and Blockchain for Trust and Privacy in the Digital Economy Prof. AU Man Ho Allen <i>Professor and Associate Head (Research and Development), Department of Computing, The Hong Kong Polytechnic University</i>
16:30 - 17:10	Lecture 6 : Emerging Semiconductor Materials for Advanced Microelectronic Chip Manufacturing Prof. WANG Han <i>Professor and Associate Head, Department of Electrical and Electronic Engineering, The University of Hong Kong</i>
17:10	Closing Remarks Ir Dr Humphrey LEUNG Kwong-wai, JP <i>Chair, HKEST Award Selection Committee</i>
18:00	Dinner (by invitation only)

Organiser:



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Distinguished Lecture 1: Navigating the Future: Airport Autonomous Transportation System

Speakers:



Ms LU Yuk Ying Nicola
Manager, Airport Autonomous
Transportation System,
Airport Authority Hong Kong



Mr LAI Tsz Fai Jeff
Project Engineer, Airport
Authority Hong Kong



Mr MOK Ying Yiu Tom
Assistant Engineer, Airport
Authority Hong Kong

Abstract:

The Airport Autonomous Transportation System (AATS) at Hong Kong International Airport represents a pioneering advancement in sustainable intelligent urban mobility. This innovative system provides shuttle services between the Hong Kong-Zhuhai-Macau Bridge and SKYCITY, featuring a fleet of purpose-built autonomous vehicles operating at The Society of Automotive Engineers (SAE) Level 4 autonomy. The system integrates three core technologies: Autonomous Driving System (ADS), Vehicle-to-Everything (V2X) communication, and Central Vehicle Control System (CVS).

AATS demonstrates significant economic viability while prioritizing accessibility, safety, and environmental sustainability. With a capacity of 2,000 passengers per hour per direction and a three-minute transit time, it significantly enhances passenger experience. The designs of scalability and comprehensive safety features set new industry standards for autonomous transportation, positioning Hong Kong International Airport as a leader in smart mobility solutions while providing a blueprint for future intelligent urban transportation development worldwide.

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Distinguished Lecture 2: Non-cationic bionanomaterials for delivery to challenging diseased sites

Speaker:



Prof. CHOI Chung Hang Jonathan

*Professor and Vice-Chairman (Undergraduate),
Department of Biomedical Engineering,
The Chinese University of Hong Kong*

Abstract:

Understanding of how nanoparticles interact with cells is crucial for the intracellular delivery of nanomedicines. Cationic and lipid nanoparticles are classical drug carriers due to their easy penetration of the anionic cell membrane, but they tend to cause cytotoxicity and immune responses. Non-cationic nanoparticles are generally more biocompatible but enter cells less robustly. Intriguingly, some types of non-cationic nanoparticles enjoy high biocompatibility and cellular uptake properties.

Here, Prof. Choi will present the *in vivo* cell-nanoparticle interactions of two classes of non-cationic bionanomaterials and, accordingly, use these insights to achieve cellular delivery in various disease destinations, including (i) nucleic acid nanostructures [miRNA-coated nanoparticles to atherosclerotic plaque cells and worm-like nucleic acid nanoworms to liver hepatocytes] and (ii) small gold nanoparticles (<15-nm) [alkylated gold nanoparticles to psoriatic epidermal cells, folic acid-conjugated gold nanoparticles to fibrotic kidney tubule cells, and polymer-coated gold nanoparticles to neurons in the degenerative brain].

Organiser:



Co-organisers:



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



Policy Research Centre for
Innovation and Technology
科技及創新政策研究中心

Funding Organisation:



π 創新科技署
Innovation and Technology Commission

Distinguished Lecture 3: Building a Sustainable Future: The Evolution of Intelligent Building Envelope Materials for Achieving Carbon Neutrality

Speaker:



Ir Prof. TSO Chi Yan Edwin

*Associate Dean (Internationalisation and Outreach)
and Associate Professor,
School of Energy and Environment,
City University of Hong Kong;
Co-Founder, i2Cool Limited*

Abstract:

With economic development, air-conditioning energy consumption has become a growing concern, especially in regions like Hong Kong, which experiences a hot and humid subtropical climate. Addressing this issue is critical for combating climate change and the global energy crisis. This presentation introduces a novel technology that combines passive radiative cooling with thermochromic smart windows, offering an innovative solution for building energy-saving. By integrating these two technologies, the cooling load of air-conditioning systems can be significantly reduced, resulting in lower energy consumption and carbon emissions. This approach not only contributes to climate change mitigation but also brings new possibilities to the green building industry. It supports sustainable urban development, promotes economic growth, and advances global efforts toward carbon neutrality. The integration of passive and adaptive building technologies represents a forward-looking strategy for creating energy-efficient, environmentally responsible buildings in Hong Kong and beyond.

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Distinguished Lecture 4: Making sense of ultrafast biological microscopy: from instrumentation to AI analytics

Speaker:



Prof. TSIA Kin Man Kevin

Professor, Department of Electrical and Electronic Engineering; Program Director, Biomedical Engineering Program; Associate Dean (Teaching & Learning - UG), Faculty of Engineering, The University of Hong Kong

Abstract:

Pairing up optical microscopy and computer vision becomes a common strategy adopted in a broad spectrum of biological and biomedical screening applications. The common rationale is to generate the characteristic "fingerprint" profiles of cell morphology that could underpin the cell states/functions, but obscured through visual inspection or even in the molecular assay. However, it remains not achievable or affordable with current technologies to record, integrate, and analyze all relevant cell morphological data.

In this talk, I will introduce how the synergism between ultrafast imaging, microfluidics, and deep learning allows us to overcome some of these current limitations. Specifically, I will present a few high-throughput, deep-learning-powered imaging techniques and analytical cytometry pipelines developed in our laboratory over the past few years. These platforms allow us to significantly scale up the single-cell biophysical/ mechanical phenotyping throughput (beyond millions of cells per run); to enrich the phenotyping content by integrating with the biochemical cell-based assay in a single platform.

Indeed, these techniques have achieved biophysical/mechanical phenotyping specificity and sensitivity that were once inconceivable. They are now successfully employed in many biological research and clinical applications, including rare cancer cell detection in mouse blood, cancer and immune-cell sub-typing, targeted-drug sensitivity prediction, and more emerging applications.

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Distinguished Lecture 5: Cryptography and Blockchain for Trust and Privacy in the Digital Economy

Speaker:



Prof. AU Man Ho Allen

*Professor and Associate Head (Research and Development), Department of Computing,
The Hong Kong Polytechnic University*

Abstract:

Prof. Man Ho Allen Au specializes in information security, applied cryptography, and blockchain technology, with a focus on enabling secure, privacy-preserving, and scalable digital infrastructure. His research develops cryptographic protocols that enhance the trustworthiness and usability of blockchain systems, with applications across FinTech, Web3, and digital identity.

In this presentation, Prof. Au will share his experience in advancing cryptographic techniques such as zero-knowledge proofs, quantum-safe systems, and privacy-enhancing blockchain protocols. These innovations contribute to building secure and trusted systems in the digital economy — addressing challenges in payment systems, decentralized applications, and central bank digital currencies. He will also reflect on the importance of bridging cryptographic theory with practical deployment, and how collaboration across academia, industry, and policy is essential to translating cryptographic innovation into real-world impact.

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Distinguished Lecture 6: Emerging Semiconductor Materials for Advanced Microelectronic Chip Manufacturing

Speaker:



Prof. WANG Han

*Professor and Associate Head,
Department of Electrical and Electronic Engineering;
Director, Centre for Advanced Semiconductors and
Integrated Circuits, The University of Hong Kong*

Abstract:

As silicon approaches its physical limits, next-generation semiconductor materials are critical to advancing microelectronics for computing, communication, and power electronics. In this lecture, I will present my research on novel semiconductor technologies - especially engineered low-dimensional materials and wide-bandgap semiconductors - that enable faster, higher-density and more energy-efficient chips. My work on new material synthesis, device innovation and 3D integration have been adopted by industry leaders such as TSMC, Qorvo and Enkris Semiconductors, enhancing performance in computing hardware, high-frequency RF and power electronics. I will discuss key breakthroughs in material and device design and 3D integration technology that address the demands of future chip manufacturing. This lecture will provide insights into how advanced semiconductor materials will shape the next wave of innovation in the global microelectronics industry.

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