

Seminar On

Enormous Fluid Antenna Systems (E-FAS): Rethinking the Future of Wireless Communications

Professor Kai-Kit Wong

University of College London, The United Kingdom

Date : 18 August 2025 (Monday)

Time : 11:00 am – 12:00 nn

Venue : Room 15-202, 15/F, State Key Laboratory of Terahertz and Millimeter Waves,
Lau Ming Wai Academic Building, City University of Hong Kong

Abstract

For decades, wireless communication embodied the promise of ubiquitous connectivity—radio waves weaving invisible paths through obstacles to connect distant nodes. However, as nextgeneration mobile systems increasingly shift toward higher frequency bands to meet escalating data demands, the wireless channel has become more fragile—exhibiting reduced penetration, limited coverage, and heightened sensitivity to environmental conditions. Concurrently, with the majority of mobile services now taking place indoors, it is both timely and imperative to rethink how wireless connectivity is delivered to achieve greater performance and efficiency. In this talk, we address this challenge by presenting a novel concept that reimagines intelligent surfaces—not merely as passive smart reflectors, as in conventional reconfigurable intelligent surfaces (RIS)—but as multifunctional electromagnetic (EM) interfaces capable of both signal routing and emission. This expanded functionality introduces a fundamentally new degree of control over signal propagation. We define the concept of the enormous fluid antenna system (E-FAS), which conceptualizes a distributed ensemble of intelligent surfaces as a single, massive, reconfigurable antenna embedded within the environment itself. E-FAS enables signal propagation to predominantly occur along surfaces, thereby enhancing energy efficiency, reducing interference, and ensuring reliable service delivery. Crucially, it guarantees that users are served with a line-of-sight (LoS) path—either through direct contact with the surface itself or via short-range wireless links radiated from nearby surface elements. We further explore the potential of deploying E-FAS on building exteriors to guide radio waves around structural obstructions, enabling the restoration of LoS connectivity for users located behind buildings. This vision positions E-FAS as a transformative architectural paradigm for future wireless systems.

Biography

(Kit) Kai-Kit Wong was born in Hong Kong and received the BEng, the MPhil, and the PhD degrees, all in Electrical and Electronic Engineering, from the Hong Kong University of Science and Technology, Hong Kong, in 1996, 1998, and 2001, respectively. He is Chair Professor of Wireless Communications at the Department of Electronic and Electrical Engineering, University College London after taking appointments at University of Hong Kong and University of Hull and visiting positions at Lucent Technologies, Bell Labs and Stanford University. His current research centers around 6G and beyond mobile communications. He is one of the early researchers who proposed multiuser MIMO. His first paper on multiuser MIMO was published in WCNC 2000 which appeared to be the first ever research paper on this topic. He is Fellow of IEEE and IET. He served as the Editor-in-Chief for IEEE Wireless Communications Letters between 2020 and 2023.

*** ALL ARE WELCOME ***

Enquiries:

Prof. Kwai Man Luk, Department of Electrical Engineering, City University of Hong Kong

Email: eeckmluk@cityu.edu.hk