Το Πρόγραμμα Μεταπτυχιακών Σπουδών
ΗΛΕΚΤΡΟΝΙΚΗ ΦΥΣΙΚΗ (ΡΑΔΙΟΗΛΕΚΤΡΟΛΟΓΙΑ)

σας προσκαλεί στη **διάλεξη** του

Καθηγητή του South China University of Technology
και Ομότιμου καθηγητή του Πανεπιστημίου του Loughborough, ΗΒ,

Prof. Yannis Vardaxoglou

με θέμα

Engineering Periodic Surfaces: Theory, Fabrication, and Future Directions

Πέμπτη 28/5/2026, 11:00 - 12:00, Αίθ. διδασκαλίας ΠΜΣ ΗΦ-ΡΗ, 4ος όρ. του κτιρίου της ΣΘΕ

Abstract

Surfaces of periodic arrays have evolved from spectral filters into powerful platforms for high-gain and adaptive antennas. This keynote will revisit the foundational principles of Frequency Selective Surfaces (FSS) and Partial Reflective Surfaces (PRS), outlining how their geometric periodicity, impedance control, and dispersion properties led to transformative advances in reflector and low-profile resonant cavity antennas. Classical PRS implementations, enhanced with Artificial Magnetic Conductor (AMC) boundaries and sub-wavelength cavity engineering, enabled order-of-magnitude gain improvements and compact form factors suitable for satellites, base-stations, and emerging 5G/6G infrastructure. The talk then transitions to next-generation surfaces: reconfigurable FSS/PRS architectures, and programmable metasurfaces capable of real-time beam shaping, coverage tailoring, and adaptive interference mitigation, traditionally achievable only with phased arrays.

Recent breakthroughs in fabrication will be highlighted, including multi-material additive manufacturing for 3D meta-atoms, gradient-index volumetric inclusions, and bistable auxetic architectures that enable mechanically reconfigurable electromagnetic responses. These developments point toward surfaces that are not only electrically adaptive but structurally tunable, merging mechanics with electromagnetics for wearable, aerospace, biomedical, and in-situ smart environments.

The keynote concludes with open challenges and research pathways that will define the next decade, metasurface sensing and scaling, AI-assisted synthesis, and integrated packaging for adaptive beam control systems.

Professor **Yiannis Vardaxoglou** FREng, FIET, Life FIEEE is Academic Dean in the Microelectronics School at South China University of Technology and Emeritus Professor at Loughborough University, UK. He founded the Wireless Communications Research (WiCR) group and the Centre for Mobile Communications Research, and served as Dean of Electronic, Electrical and Systems Engineering at Loughborough from 2006 to 2012. He led the EPSRC SYMETA Grand Challenge on 3D metamaterials for RF, microwave, and THz applications, and has pioneered research in additive manufacturing for advanced wireless systems.

Professor Vardaxoglou has published over 500 papers, holds six patents, and has secured 18 EPSRC grants alongside significant industry funding. He has chaired major international conferences including EuCAP 2007, founded the Loughborough Antennas & Propagation Conference (LAPC), and served in leadership roles within the IET and IEEE Antennas and Propagation communities. His work continues to shape the future of RF engineering, antenna design, and metamaterial technologies.