SEMINAR ANNOUNCEMENT

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

Area: Microwave & Radio Frequency (MWRF)

Host: Prof Zhi Ning Chen

Seminar Jointly Organized by ECE NUS, IEEE Singapore RFID Chapter, IEEE Singapore MTT/AP Joint Chapter

TOPIC	:	**Efficient 2-D Pattern Synthesis for Planar Series-Fed Microstrip Antenna Arrays Using Physics-Informed Graph Convolutional Networks**
SPEAKER	:	**Assoc Prof Zengdi Bao** **School of Information and Electronics, Beijing Institute of Technology**
DATE	:	**Thursday, 20 August 2026**
TIME	:	**4:00PM-5:00PM**
VENUE	:	**Block E4, E4-04-07, E-Cube 3** **Alternatively, Join Zoom Meeting by free registration:** **https://nus-sg.zoom.us/meeting/register/QBD5_WirRX-9xCV9RAXc5Q** **(*Registration is required for both online and onsite)**

ABSTRACT

Compared to parallel-fed antennas, series-fed microstrip antennas (SFMAs) exhibit strong coupling among the series-fed elements, leading to interdependent amplitude and phase distributions. This inherent coupling introduces additional design constraints and increases the computational complexity of SFMA synthesis. To address these challenges, a physics-informed graph convolutional network (PIGCN) framework is proposed to optimize the excitations of SFMAs for specific pattern objectives. By projecting the physical topology of the SFMA onto graph structures, mutual couplings are inherently embedded in the neural network. This projection allows information propagation along transmission paths, eliminating the need for extra learning of interelement dependencies. Furthermore, an attention mechanism calculates the excitation adjustments based on correlation coefficients between pattern errors and element excitations. This integration improves sensitivity to dominant error sources and accelerates convergence. Two numerical experiments for different synthesis scenarios demonstrate that, for SFMAs, the proposed framework offers superior accuracy, efficiency, and flexibility compared to the particle swarm optimization (PSO) and the PINN-based method.

BIOGRAPHY

Prof. Zengdi Bao received the B.Eng. and M.Eng. degrees in electronic engineering from the University of Electronic Science and Technology of China (UESTC), Chengdu, China, in 2011 and 2014, respectively, and the Ph.D. degree in electronic engineering from the National University of Singapore (NUS), Singapore, in 2018. From 2018 to 2021, he was a research fellow with NUS. Since 2021, he has been an Associate Professor with the Beijing Institute of Technology, Beijing, China. His current research interests include antennas and arrays, phased array calibration techniques, and radar signal processing. Dr. Bao received the Student Paper Award at the 2012 Inaugural Asia-Pacific Conference on Antennas and Propagation (APCAP), Singapore, and the 2017–2018 Best Student Paper Competition Award from the IEEE Singapore MTT/AP Joint Chapter. Under his supervision, his student received the Best Student Paper Award at the 2024 IEEE MTT-S International Microwave Workshop Series on Advanced Materials and Processes (IMWS-AMP). He currently serves as an Associate Editor for the IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology (J-ERM).

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