Professor Bo Liu
Bo.Liu@glasgow.ac.uk

Title: Artificial intelligence techniques for design optimization of microwave antennas

Abstract:

Design parameter exploration/optimization is essential in many microwave antenna design problems. The commonly used solution methods are: (1) using the "trial and error" method based on design experience, (2) using a local optimizer from a starting point derived from analytical models, and (3) using evolutionary algorithms to perform global optimization. The first two methods are facing significant challenges in design quality, while the third method may cost very long or even intractable optimization time when embedding computationally expensive full-wave EM simulations.

This presentation will introduce state-of-the-art efficient antenna global optimization methods based on machine learning and evolutionary computation techniques, with the advantages of optimization quality, efficiency, and generality. The following topics will be included: (1) a brief review of optimization methods for microwave design; (2) evolutionary computation, machine learning, and surrogate model-assisted evolutionary algorithm (SAEA); (3) efficient antenna design automation methods based on novel SAEAs and case studies.

Biography: Bo Liu received the B.Eng. degree from Tsinghua University, China, in 2008 and the Ph.D. degree from University of Leuven (KU Leuven), Belgium, in 2012. Currently, he is a Professor of Electronic Design Automation at University of Glasgow. He is a Fellow of IET and a Senior Member of IEEE. His research focuses on novel data-driven optimization and machine learning

algorithms for electronic (analog ICs and systems, microwave devices, and micro-electromechanical systems) design and their real-world applications.

In terms of AI-driven antenna design, he is the inventor of the SADEA series. The SADEA series is the first to address the bottleneck of computationally expensive electromagnetic simulations together with poor or no initial design in antenna design exploration – this makes the AI-driven antenna design approach suitable for industrial requirements.

More information can be found via https://www.gla.ac.uk/schools/engineering/staff/boliu/