

THE DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING SPEAKER SERIES

PRESENTS

Physical-Insight Assisted Machine Learning in Microwave Imaging



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Monday, October 5th, 2020, 9:55am CT

Zoom link: <https://zoom.us/j/5222245945>

LECTURE ABSTRACT

This talk addresses microwave imaging problems using physical-insight-assisted machine learning (ML). Solving wave imaging problems using ML has attracted researchers' interests in recent years. However, most existing works in this direction directly adopt ML as a black box. ML approaches have not yet had the profound impact on scientific computation problems as they have had for object classification. In fact, researchers have gained, over several decades, much insightful domain knowledge on wave physics and in addition some of these physical laws present well-known mathematical properties (even analytical formulas), which do not need to be learnt by training with a lot of data. This talk demonstrates that it is of paramount importance to address the problem of how profitably combining ML with the available knowledge on underlying physics of electromagnetics.

SPEAKER BIOSKETCH

Prof. CHEN Xudong received the B.S. and M.S. degrees in electrical engineering from Zhejiang University, Hangzhou, China, in 1999 and 2001, respectively, and the Ph.D. degree in EECS from Massachusetts Institute of Technology, Cambridge, MA, USA, in 2005. Since 2005, he has been with the National University of Singapore, Singapore, where he is currently a Professor. His research interests include mainly electromagnetic wave theories and applications, with a focus on inverse problems and computational imaging. He has published 160 journal papers on inverse scattering problems, sensing and data fusion, material parameter retrieval, microscopy, and optical encryption. He has authored the book *Computational Methods for Electromagnetic Inverse Scattering* (Wiley-IEEE, 2018). Dr. Chen is a Fellow of IEEE and Fellow of Electromagnetics Academy. He was a recipient of the Young Scientist Award by the Union Radio Scientifique Internationale in 2010 and a recipient of the Ulrich L. Rohde Innovative Conference Paper Award at ICCEM conference in 2019. He was an Associate Editor of the IEEE Transactions on Microwave Theory and Techniques during 2015-2019 and has been the Associate Editor of the IEEE Journal of Electromagnetics, RF and Microwave in Medicine and Biology since 2020. He has been members of organizing committees of more than 10 conferences, serving as General Chair, TPC Chair, Award Committee Chair, etc. He was the Chair of IEEE Singapore MTT/AP Joint Chapter in 2018.

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