

University of Trento

Civil Environmental Mechanical Engineering

Physics-Based Machine Learning Lab

Seminar Series II, April 15 2025, 11.00-12.00

Aula polifunzionale BUM

<https://unitn.zoom.us/j/89631474799> Passcode: 1234

11:00 -12:00 Presenter: Prof. Maokun LI, Tsinghua Un. - China
Title

Application of Deep Learning to Computational Electromagnetics

ABSTRACT: In recent years, research in deep learning techniques has attracted much attention. With the help of big data technology, massively parallel computing, and fast optimization algorithms, deep learning has dramatically improved the performance of many problems in speech and image research. In electromagnetic engineering, physical laws provide the theoretical foundation for research and development. With the development of deep learning, improvement in learning capacity may allow machines to “learn” from a large amount of physics data and “master” the physical law in certain controlled boundary conditions. In the long run, a hybridization of fundamental physical principles with “knowledge” from big data could unleash numerous engineering applications that are limited by a lack of data information and computation ability.

In this talk, the presenter will share some of his learnings in deep learning techniques and discuss the potential and feasibility of applying deep learning in computational electromagnetics. The presenter hopes to explore the characteristics, feasibility, and challenges of deep learning in the field of computational electromagnetics through some examples, such as solving wave equations, array antenna synthesis, inverse scattering, etc.

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Short Bios



Maokun Li received a B.S. degree in electronic engineering from Tsinghua University, Beijing, China, in 2002 and an M.S. and Ph.D. degrees in electrical engineering from the University of Illinois at Urbana-Champaign, Champaign, IL, USA, in 2004 and 2007, respectively. He then worked as a senior research scientist with Schlumberger-Doll. Research in Cambridge, MA, USA. In 2014, he joined the Department of Electronic Engineering at Tsinghua University, Beijing. He is currently a professor at the Microwave and Antenna Institute.

His research interest is in electromagnetic theory and computational electromagnetics, especially in fast and reliable modeling and inversion algorithms for EM wave propagation in complex environments, with applications to geophysical exploration, biomedical imaging, etc. He is an associate editor of IEEE Transactions on Antennas and Propagation, IEEE Transactions on Geoscience and Remote Sensing, and IEEE Journal on Multiscale and Multiphysics Computational Techniques. He is also a member of the AP-S membership and benefits committee and serves as the IEEE AP-S Distinguished Lecturer (2023-2025). He is a Fellow of IEEE and ACES.