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Multiscale and Multiphysics Computation for Sensing and Super-Resolution Imaging

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Electromagnetic and acoustic/elastic waves have widespread applications in communications, sensing and imaging. In these applications, often the problems of understanding the underlying wave phenomena, designing the devices and systems, and performing data processing and image reconstruction require multiscale computation in electromagnetics and acoustics. It is very challenging to solve such problems with the traditional finite difference and finite element methods. In this presentation, several high-performance computational methods and super-resolution imaging in electromagnetics and acoustics will be discussed along with their applications.

Biography

Qing H. Liu received his B.S. and M.S. degrees in physics from Xiamen University, China, and Ph.D. degree in electrical engineering from the University of Illinois at Urbana-Champaign, USA. His research interests include computational electromagnetics and acoustics, inverse problems, and their applications in geophysics, nanophotonics, and biomedical imaging. He has published over 500 refereed journal papers and 500 conference papers in conference proceedings. He was a Research Scientist and Program Leader with Schlumberger-Doll Research before moving to academia. Since 1999 he has been with Duke University where he is a Professor of Electrical and Computer Engineering.

Dr. Liu is a Fellow of the IEEE, Fellow of the Acoustical Society of America, Fellow of Electromagnetics Academy, and Fellow of the Optical Society of America. From 2015-2018 he served as the founding Editor in Chief of the *IEEE Journal on Multiscale and Multiphysics Computational Techniques*. He received the 1996 Presidential Early Career Award for Scientists and Engineers (PECASE) from the White House, the 1996 Early Career Research Award from the Environmental Protection Agency, and the 1997 CAREER Award from the National Science Foundation. He serves as an IEEE Antennas and Propagation Society Distinguished Lecturer. He is the recipient of the 2017 Technical Achievement Award and 2018 Computational Electromagnetics Award from the Applied Computational Electromagnetics Society, and the 2018 Harrington-Mittra Award in Computational Electromagnetics from IEEE Antennas and Propagation Society. In 2018, he also received the Distinguished Alumni Award from the ECE Department, University of Illinois at Urbana-Champaign.