

From ENGINEERING ELECTROMAGNETICS to ELECTROMAGNETIC ENGINEERING:

Teaching/Training Next Generations

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Abstract

The role of Electromagnetic (EM) fields in our lives has been increasing. Communication, remote sensing, integrated command/ control/surveillance systems, intelligent transportation systems, medicine, environment, education, marketing, and defense are only a few areas where EM fields have critical importance. We have witnessed the transformation from *Engineering Electromagnetics* to *Electromagnetic Engineering* for the last few decades after being surrounded by EM waves everywhere. Among many others, EM engineering deals with broad range of problems from antenna design to EM scattering, indoor–outdoor radiowave propagation to wireless communication, radar systems to integrated surveillance, subsurface imaging to novel materials, EM compatibility to nano-systems, electroacoustic devices to electro-optical systems, etc. The range of the devices we use in our daily life has extended from DC up to Terahertz frequencies. We have had both large-scale (kilometers-wide) and small-scale (nanometers) EM systems. A large portion of these systems are broadband and digital and must operate in close proximity that results in severe EM interference problems. Engineers must take EM issues into account from the earliest possible design stages. This necessitates establishing an intelligent balance between strong mathematical background (theory), engineering experience (practice), and modeling and numerical computations (simulation).

This Distinguished/keynote lecture aims at a broad-brush look at current complex EM problems as well as certain teaching / training challenges that confront wave-oriented EM engineering in the 21st century, in a complex computer and technology-driven world with rapidly shifting societal and technical priorities.

BIO



Prof. Dr. Levent Sevgi is a Fellow of the IEEE (since 2009) and the recipient of IEEE APS Chen-To Tai Distinguished Educator Award (2021). He was with Istanbul Technical University (1991–1998), TUBITAK-MRC, Information Technologies Research Institute (1999–2000), Weber Research Institute / NY Polytechnic University (1988–1990), Scientific Research Group of Raytheon Systems Canada (1998 – 1999), Center for Defense Studies, ITUV-SAM (1993 –1998 and 2000–2002) and with University of Massachusetts, Lowell (UML) MA/USA as a full-time faculty (2012 – 2013), DOĞUS University (2001-2014), Istanbul OKAN (2014 - 2021), and ATLAS (2022-2024) Universities.

He served four years (2020-2023) as an IEEE AP-S Distinguished Lecturer. Since Jan 2024 he has been the chair of the IEEE AP-S DL Committee. He served one-term in the IEEE AP-S AdCom (2013-2015) and one-term and as a member of IEEE AP-S Field Award Committee (2018-2019). He had been the writer/editor of the “Testing ourselves” Column in the IEEE AP Magazine (2007-2021), a member of the IEEE AP-S Education Committee (2006-2021), He also served in several editorial boards (EB) of other prestigious journals / magazines, such as the IEEE AP Magazine (2007-2021), Wiley’s International Journal of RFMiCAE (2002-2018), and the IEEE Access (2017-2019 and 2020 - 2022). He is the founding chair of the EMC TURKIYE International Conferences (www.emcturkiye.org).

He has been involved with complex electromagnetic problems for nearly four decades. His research study has focused on electromagnetic radiation, propagation, scattering and diffraction; RCS prediction and reduction; EMC/EMI modelling, simulation, tests and measurements; multi-sensor integrated wide area surveillance systems; surface wave HF radars; analytical and numerical methods in electromagnetics; FDTD, TLM, FEM, SSPE, and MoM techniques and their applications; bio-electromagnetics. He is also interested in novel approaches in engineering education, teaching electromagnetics via virtual tools. He also teaches popular science lectures such as Science, Technology and Society.

He has published many books / book chapters in English and Turkish, over 180 journal/magazine papers / tutorials and attended more than 100 international conferences / symposiums. His three books *Complex Electromagnetic Problems and Numerical Simulation Approaches*, *Electromagnetic Modeling and Simulation* and *Radiowave Propagation and Parabolic Equation Modeling* were published by the IEEE Press - WILEY in 2003, 2014, and 2017, respectively. His fourth and fifth books, *A Practical Guide to EMC Engineering* (Sep 2017) and *Diffraction Modeling and Simulation with MATLAB* (Feb 2021) were published by ARTECH HOUSE.

His *h-index* is **38**, with a record of 5200+ citations (source: *Google Scholar*, Feb 2025).