IEEE AWPL Special Cluster 2025 on
"Reconfigurable and Multifunctional Electromagnetic Surfaces for Emerging Wireless Systems"

Radically new technologies are foreseen to be needed in the next generation wireless systems with advanced functionalities in applications such as communication, sensing, localization and imaging. Advanced multifunctional EM surfaces/apertures (e.g. anomalous transmission and reflection, multi-band, multi-beam, spatio-temporal, information EM, analog computing, etc.) and the need for reconfiguration technologies and multifunctionality in these surfaces necessitate the establishment of new concepts, designs, models and methodologies in fabrication and evaluation. In addition to that, implementing these advancements in reconfiguration technologies may also require the introduction of new innovative materials, high precision fabrication, intelligent design/optimization algorithms and measurement techniques.

This special issue aims to explore **new concepts, materials, design/optimization algorithms and evaluation methods** throughout the process of developing and evaluating novel electromagnetic surfaces and apertures. Invitations are extended for innovative contributions from the following areas of interest (but not limited to):

- New methods for efficient design of reconfigurable surfaces/apertures (including new formulations and AI-based algorithms)
- New concepts and functionalities in EM surfaces (e.g., spatio-temporal surfaces, information electromagnetic theory, EM analog computing)
- New multifunctional design and hardware implementation for reconfiguring EM surfaces (e.g., multi-band, reflective-transmissive etc.)
- New reconfigurable materials and technologies for enabling multifunctional smart surfaces/apertures (e.g., superconducting materials, 2D and phase-change materials, phase change materials, microfluidics, electronics etc.)
- New fabrication technologies for EM surfaces/apertures
- New techniques for assessment and characterization of reconfigurable/ multifunctional metasurfaces.
- Proof-of-concept demonstrations of new functionalities of wireless systems (e.g., ISAC utilizing reconfigurable antennas/surfaces and novel wireless signal processing approaches such as machine learning (ML).
- Novel optimization algorithms for EM surfaces

The **Guest Editors** of this Special Cluster are:

- Prof. Ping Jack Soh, University of Oulu, Finland — pingjack.soh@oulu.fi
- Dr. Duy Tung Phan, University of Oulu, Finland — duy.phan@oulu.fi
- Prof. Qi Luo, University of Hertfordshire, UK — q.luo2@herts.ac.uk
- Prof. Sergio Matos, University of Lisbon, Portugal — sergio.matos@iscte-iul.pt
- Dr. Antonio Clemente, CEA-Leti, France — antonio.clemente@cea.fr
- Prof. Marco Di Renzo, Paris-Saclay University–CNRS and Centrale Supelec, France — marco.direnzo@l2s.centralesupelec.fr

Prospective authors are encouraged to contact the Guest Editors for any questions or to determine the suitability of their contribution for this special cluster. Papers should be prepared following the same submission instructions as for regular IEEE AWPL manuscripts (four-pages technical content maximum and one reference page, double-column, IEEE format), available via the Information for Authors website. The authors should indicate in the cover letter to the Editor-in-Chief that the manuscript is being submitted in response to the Call for Papers for the focused cluster. Prospective authors should refer to the timeline below:

Key dates:

- Submission deadline: **March 31, 2025**
- First decision: May 15, 2025
- Revised manuscripts deadline: June 15, 2025
- Final decision: July 30, 2025
- Final manuscripts due by: September 1, 2025
- Online publication: Shortly after final manuscript submission
- Cluster publication: November/December 2025