

## Special Issue

# Recent Advances in Optical Metamaterials: Numerical Methods, Modeling, and AI Techniques

### Message from the Guest Editor

The field of optical metamaterials has matured beyond the initial demonstration of exotic properties, such as negative refraction and electromagnetic cloaking, into a phase focused on practical application and scalable fabrication. This evolution has been critically enabled by parallel advancements in computational electromagnetics and, more recently, the emergence of sophisticated artificial intelligence (AI) and machine learning (ML) techniques. This Special Issue aims to capture the state-of-the-art at this intersection of disciplines. We seek to highlight pioneering research that leverages advanced numerical methods, multi-physics and multi-scale modeling, and data-driven AI approaches to overcome the longstanding challenges in the design, analysis, and optimization of optical metamaterials and metasurfaces. By bringing together contributions from computational physics, photonics, and computer science, this issue will serve as a foundational reference for researchers developing the next generation of metamaterial-based devices for applications in imaging, sensing, communications, and quantum photonics.

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### Guest Editor

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### Deadline for manuscript submissions

closed (20 April 2026)



## Photonics

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