

Photonic metamaterials: from zero-index silicon based photonic crystals to nonlinear plasmonic nano- structures

Photonic materials and devices with new functionalities

Dr Nicolae Panoiu's research interests span a series of topics in metamaterials, plasmonics and photonic crystals. He explores the inter-connections between the intrinsic structure of photonic materials and their macroscopic optical properties and how these dependencies can be exploited to design photonic materials and devices with new functionalities. His research approach relies on rigorous theoretical modelling supported by in-house developed high-performance computational tools.

Optical properties of photonic metamaterials can be strongly engineered by nano-patterning at sub-wavelength scale. In particular, by employing advanced theoretical models and numerical methods one can design photonic metamaterials with new, remarkable properties, which can be tailored for specific technological applications and devices.

Other technologies that Dr Panoiu is currently working on include:

- Metamaterials with near-zero index of refraction
- Non-linear pulse propagation in silicon nanowires and photonic crystal waveguides

Dr Panoiu's areas of expertise include:

- Optical properties of photonic metamaterials
- Advanced modelling of silicon devices
- Photonic crystals – theory and applications
- Modelling of linear and non-linear plasmonic nano-structures and devices
- Numerical methods for Electromagnetics and Photonics



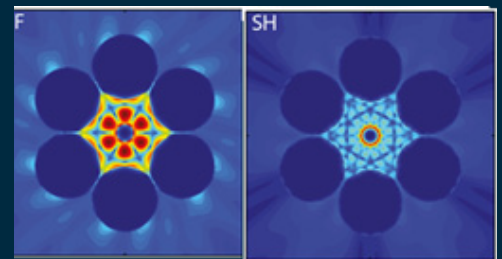
Dr Nicolae Panoiu,
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Applicable to:

- Opto-electronics
- Optical Interconnects
- Ultra-compact sensors and PV devices

Partner Companies:

- Photon Design
- Columbia University



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