Photonic and Phononic Properties of Engineered Nanostructures XI (OE301)

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Engineered nanostructures (e.g., photonic crystals, metamaterials) offer the possibility of controlling and manipulating the propagation of electromagnetic (or acoustic) waves within a given frequency range. The existence of photonic (and phononic) bandgaps in such nanostructures makes it possible to fabricate ultrasmall optical (and acoustic) devices like lasers and cavities. These cavities find applications in several novel fields including cavity quantum electrodynamics (QED) and quantum computations.

Optical and acoustic metamaterials offer unique material platform in which the geometrical engineering of the nanostructure allows for novel properties (e.g., negative refraction) that cannot be found in conventional bulk materials.

Plasmonic structures are another set of structures that have recently demonstrated unique capabilities to control the propagation of light. Such structures are formed by engineering the metallic structures either separately or when combined with dielectric materials. Plasmonic structures provide unique capabilities that cannot be matched by conventional bulk materials.

The ability to control the propagation of electromagnetic (or acoustic) waves using engineered nanostructures (e.g. metamaterial and metasurfaces) makes them very attractive for the development of new set of devices that take advantage of the novel optical (or acoustic) properties of these structures. The ability for custom designing the electromagnetic mode patterns, frequencies and numbers opens up the possibility of novel devices (imaging systems, miniature lasers and detectors at different frequencies, switches, filters, interconnects, etc.) and interesting physics. The outstanding potentials of such meta-devices to revolutionize communications, sensing, information, and energy technologies along with the existence of several challenges in design, optimization, fabrication, and characterization of such structures have inspired extensive research activities in the field of engineered nanostructure materials and devices.

The number of design parameters in engineered nanostructures like metasurfaces have necessitated new inverse design techniques to take maximum advantage of their unique capabilities. While mathematically rigorous approaches have been developed in the last two decades, new approaches based on machine learning and deep learning algorithms for both knowledge discovery and design of engineered nanostructures have emerged in the last few years. These techniques can potentially result in new classes of structures for practical applications.

It is the aim of this conference to bring together scientists and engineers worldwide to review and discuss state-of-the-art developments and future trends of engineered nanostructure materials and devices. Among such structures, photonic and phononic crystals, metamaterials, and plasmonic structures will be extensively covered.

We encourage authors to submit abstracts and manuscripts demonstrating their research achievements concerning, but not limited to, the following topical areas:
- fabrication of 2D and 3D structures (photonic and phononic crystals, plasmonic structures, metasurfaces, and metamaterials)
- numerical methods for the analysis of engineered nanostructure materials and devices
- deep-learning and machine-learning techniques for inverse design and knowledge discovery in engineered nanostructures
- photonic and phononic crystal waveguides, cavities, and active devices
- novel plasmonic devices and their characterization
- new metasurface-based structures for imaging and computing applications
- novel photonic and optoelectronics materials (e.g., 2D materials, phase-change materials, graphene, diamond)
• hybrid CMOS-compatible material platforms through integration/bonding of active, nonlinear, or other materials with CMOS-compatible substrates
• active and reconfigurable nanostructures and metamaterials
• nonlinear effects in plasmonic structures, photonic crystals, and metamaterials
• novel phenomena in engineered nanostructures
• acoustic metamaterials
• negative index properties
• super-dispersive nanostructures for wavelength demultiplexing and spectroscopy
• dispersion engineering in photonic and phononic nanostructures
• novel applications of plasmonic and dielectric metamaterial/metasurface devices (e.g., sensing, communications)
• applications of resonance effects in engineered nanostructures for lasing, cavity QED, and quantum computation
• photonic crystal fibers; supercontinuum generation
• integration of photonic, phononic, plasmonic, fluidic, and/or electronic functionalities on a single substrate.
Present your research at SPIE Photonics West

Follow these instructions to develop a successful abstract and accompanying manuscript for the conference and for publication in the Proceedings of SPIE in the SPIE Digital Library.

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1. Browse the conference program and select the conference(s) that most closely matches the topics of the research you wish to present. Important: each abstract may be submitted to one conference only.
2. Click “Submit an Abstract” from within the conference you’ve chosen, and you’ll be prompted to sign in to your spie.org account to complete the submission wizard.
3. If your submission is related to an application track, indicate the appropriate track when prompted during the submission process.

What you will need to submit

A completed electronic submission should include the following:

- Title
- Author(s) information
- 250-word abstract for technical review
- 100-word summary for the program
- Keywords used in search for your paper (optional)
- Your decision on publishing your presentation recording to the SPIE Digital Library (slide capture and audio)
- Check the individual conference Call for Papers for additional requirements (for example, some conferences require 2- to 3-page extended summary for technical review, or have instructions for competing for awards)

Note: Only original material should be submitted. Commercial papers, papers with no new research/development content, and papers with proprietary restrictions will not be accepted for presentation.

Important dates

<table>
<thead>
<tr>
<th>Abstracts Submission Deadline</th>
<th>26 August 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance Notification Sent to Contact Author</td>
<td>2 November 2020</td>
</tr>
<tr>
<td>Manuscripts Due (Conferences OE506, and OE801-OE803 Only)</td>
<td>20 January 2021</td>
</tr>
<tr>
<td>Manuscripts Due (All Conferences EXCEPT OE506, and OE801-OE803)</td>
<td>16 February 2021</td>
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</tbody>
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Submission agreement

Presenting authors, including keynote, invited, oral, and poster presenters, agree to the following conditions by submitting an abstract:

- Register and pay the author registration fee
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- Present at the scheduled time
- Publish their manuscript in the SPIE Digital Library
- 6-page manuscript minimum for LASE and OPTO; 4-page minimum for BIOS; 20-page maximum
- Obtain funding for registration fees, travel, and accommodations, independent of SPIE, through their sponsoring organizations
- Ensure that all clearances, including government and company clearance, have been obtained to present and publish. If you are a DoD contractor in the USA, allow at least 60 days for clearance.

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1. Select a conference online, click “Submit an Abstract,” and follow the instructions.
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Accepted presentations will be listed in both the conference and application track listing in the program.