High Contrast Metastructures XI (OE303)

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A completely new class of planar optics has emerged using subwavelength metastructures and metasurfaces with a large contrast in dielectric constants. “High-contrast metastructure” refers to this type of optical material which is formed by a planar array of coupled-resonance structures, which are defined by high refractive index contrast boundaries that have dimensions comparable to the wavelength of interest. This metastructure allows very strong light-matter interaction within the thin planar material which provides a new platform to efficiently manipulate photons. Both 1D and 2D, uniform and chirped high-contrast gratings (HCGs), metastructures and metasurfaces are demonstrated to create mirrors, lenses, filters, polarizations, birefringent elements, 3D display and many traditional bulk optical components. This has enabled simple fabrication of long-wavelength vertical-cavity surface-emitting lasers (VCSELs), dynamically tunable all-pass filters (APF) for fast optical beam steering, high-Q resonators with surface-normal and arbitrary angle output, enabling massive wafer-scale semiconductor lasers and optical filters. They are used to form hollow core waveguide for chip-scale ultra-low loss photonic delays. Vertical to in-plane waveguide coupler can be made with high efficiency for easy integration with Si-photonic circuits. Chirped HCGs are shown as excellent focusing reflectors and lenses with very high numerical apertures. Finally, simple but rigorous theoretical studies lead to intuitive device designs. The field has seen rapid advances in exciting experimental demonstrations and theoretical results. This conference aims to provide an international forum for presenting the latest results and reviewing technologies relevant to new physics and devices using high contrast subwavelength metastructures. Prospective authors are invited to submit original experimental and theoretical papers dealing with enabling technology for optoelectronic device integration either on Si, or III-V-based platforms. Topics of particular interests include incorporation of high-contrast metastructures in the following:

- metasurface optical phase masks for phase and polarization control: new concepts and applications
- 3D display and hologram: design, fabrication and applications
- optomechanics: physics and devices
- sensors and high-Q resonators
- VCSELs, tunable VCSELs and membrane lasers
- broadband mirrors, lenses, and focusing mirrors
- filters, tunable filters, WDM multiplexer and de-multiplexers
- all-dielectric dissipation-less metamaterials
- zero-index metamaterials and anisotropic metamaterials
- bound states in the continuum
- photonic topological insulator
- response to both the electric and magnetic fields of light
- support of large optical chirality and anisotropy
- dispersion engineering
- spectral tailoring and management for solar photovoltaic and solar thermal applications
- slow light, fast light, and stop light devices
- optical switches and modulators
- metastructure waveguides
- nonlinear optics; coherent optical mixers
- optical amplifiers
- omni mirrors and spatial-mode filtering
- subwavelength plasmonics
- manipulation of polarization
- beam-steering devices
- novel fabrication techniques and materials
- photonic crystal devices, guided mode and leaky mode resonances.

www.spie.org/oe303call
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Below are abstract submission instructions, the accompanying submission agreement, conference presentation guidelines, and guidelines for publishing in the Proceedings of SPIE on the SPIE Digital Library. Submissions subject to chair approval.

**Important dates**

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<td>Abstract submission deadline</td>
<td>11 August 2021</td>
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<td>Author notification</td>
<td>11 October 2021</td>
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<td>Manuscript submission deadline</td>
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<td>Oral presentation due</td>
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*Authors must register prior to uploading.

**What you will need to submit**

- Title
- Author(s) information
- 250-word abstract for technical review
- 100-word summary for the program
- Keywords used in search for your paper (optional)
- 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 award competitions)

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.

**How to submit your abstract**

- Visit the conference page: [www.spie.org](http://www.spie.org)
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- Click the "Submit An Abstract" button on the conference page.
- Sign in to your SPIE account or create an account if you do not already have one.
- Follow the steps in the submission wizard until the submission process is complete.
- If your submission is related to an application track below, indicate the appropriate track when prompted during the submission process.

**Application track**

- **Brain:** Papers that describe the development of innovative technologies that will increase our understanding of brain function.
- **Translational Research:** Papers that showcase the latest photonics technologies, tools, and techniques with high potential to impact healthcare.
- **3D Printing:** Papers that showcase innovative ways to apply this multidimensional/multidisciplinary technology.
- **COVID-19 Research:** Papers that illustrate the creativity and breadth of the optics and photonics community’s response to the COVID-19 pandemic.

**Submission agreement**

All 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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- Submit a 4-page minimum manuscript by the advertised due date, for online conference viewing during the event and publication in the Proceedings of SPIE on the SPIE Digital Library.
- Obtain funding for registration fees, travel, and accommodations, independent of SPIE, through their sponsoring organizations.
- Ensure that all clearances, including government and company clearances, have been obtained to present and publish.
- If you are a DoD contractor in the USA, allow at least 60 days for clearance.
- Attend the meeting.
- Present at the scheduled time.

**Review and program placement**

- To ensure a high-quality conference, all submissions will be assessed by the Conference Chair/Editor for technical merit and suitability of content.
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- Final placement in an oral or poster session is subject to Chair discretion.

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