Optogenetics and Optical Manipulation 2021 (BO202)

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SPECIAL ABSTRACT REQUIREMENTS
Submissions to this conference must include:
• 100-word text abstract (for online program)
• 250-word text abstract (for abstract digest)
• 2-page extended abstract (for committee review only). The extended abstract must be submitted as a separate PDF document limited to two pages, including tables and figures. Include author names and affiliations; text; any figures, tables, or images; and sufficient data to permit committee review.

By combining genetic and optical methods, “optogenetics” has allowed control (stimulation or silencing) of electrically-activatable, genetically-targeted cells with high temporal precision. This has heavily impacted neuroscience research by allowing dissection of functioning of neuronal circuitry. Since its first in-vivo demonstration, optogenetics technology has been applied to freely moving mammals and could eventually form the basis of treatments of neurological disorders such as for vision restoration, psychiatric treatment and pain-control. Optogenetic technology is also impacting other biomedical research areas such as for control of cardiac function, stem cell differentiation and reprogramming of metabolic activities in mammalian cells. In all of these settings, optics is playing a crucial role in both delivering light for cellular control, and in some cases for imaging the consequences of this control. The introduction of non-linear optics has further allowed very precise and in-depth spatial control of optogenetic stimulation. Though fiber optic and waveguide technology is enabling delivery of light to targeted tissue regions, other photonic imaging technologies have the potential to significantly contribute to imaging read-outs of neural/cellular activities during optogenetic stimulation (e.g. intravital microscopy, diffuse-reflectance, fluorescence, and SHG etc.). While a detailed understanding of tissue optics is essential for delivery of stimulation light, use of crystallography and spectroscopic methods will enhance the understanding of the interaction processes between light and optogenetic molecules.

Innovative schemes for delivery and control of light irradiation, including miniaturized light source, fiber optics, waveguides and special beams can potentially improve optogenetic therapy. Optical microscopy, spectroscopy, and imaging techniques hold significant promise for characterizing optogenetic probes and submissions in these areas are especially welcome. New therapeutic applications, including control of central and peripheral nervous system, cardiac system, stem cells as well as control of metabolic activities will also be topics of interest for this conference. Contributions from all biomedical specialties and basic sciences are encouraged. Technical and scientific papers related to advancement in development of optogenetics probes, their characterization, and applications, as well as other emerging hybrid optical technologies, coupled with new imaging and detection modalities are solicited. These include:

APPLICATIONS OF OPTOGENETIC MODULATION
• neural modulation for medical applications
• controlling stem cell activity and their differentiation
• manipulation of cardiac and other excitatory cellular systems
• reprogramming of metabolic activities
• dissection of neural circuitry: functional connectomics
• modulation of other cellular functions.

BIOPHYSICS AND SPECTROSCOPIC CHARACTERIZATION OF OPSINS
• characterization of opsins by FTIR, Raman and other optical spectroscopic methods
• elucidation of the molecular structure of opsins by crystallography
• novel electrophysiological evaluation methods
• modeling of opsin-photocycle.

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#PhotonicsWest
NOVEL SOURCES FOR OPTOGENETIC STIMULATION
• two-photon optogenetics
• spatially and temporally modulated beams
• waveguides and light delivery methods for in-vivo applications
• µLED array based devices for prosthetic applications
• modeling propagation of stimulating light in tissue.

NEW OPSINS AND DELIVERY METHODS FOR OPTOGENETICS
• functionally-improved opsin with enhanced spectral and electrical properties
• viral vectors and new expression strategies
• optically-controlled delivery and gene expression
• advanced combinatorial optogenetic probes.

OTHER EMERGING HYBRID OPTICAL TECHNOLOGIES
• photochemical stimulation
• optoelectric activation
• optofluidic manipulation
• photothermal stimulation.

BIOPHYSICAL MECHANISMS OF INFRARED STIMULATION AND INHIBITION
**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.

**How to submit an abstract**

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**

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<td>Abstracts Submission Deadline</td>
<td>15 July 2020</td>
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<td>Acceptance Notification Sent to Contact Author</td>
<td>21 September 2020</td>
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<td>Manuscripts Due (Conferences OES06, and OEB01-OEB03 Only)</td>
<td>9 December 2020</td>
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<td>Manuscripts Due (All Conferences EXCEPT OES06, and OEB01-OEB03)</td>
<td>5 January 2021</td>
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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
- Attend the meeting
- Present at the scheduled time
- Publish their manuscript in 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 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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- To ensure a high-quality conference, all submissions will be assessed by the Conference Chair/Editor for technical merit and suitability of content.
- Conference Chairs/Editors reserve the right to reject for presentation any paper that does not meet content or presentation expectations.
- Final placement in an oral or poster session is subject to Chairs’ discretion.

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**Contact information**

For questions about submitting an abstract, or the meeting, contact the Conference Program Coordinator.

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