CALL FOR PAPERS

Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XIX (BO500)

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This interdisciplinary conference addresses the knowledge continuum from molecular structure and fundamental mechanisms to biological, energy production, and medical applications, focusing on new approaches to imaging, manipulation, and analysis of biomolecules, cells, and tissues, both in vitro and in vivo. The conference will report on the latest developments in functional and multispectral imaging, optogenetics, analysis, algorithms, quantification, separation, sorting, and standards for cells and tissues. The principal aim is to further improve the interdisciplinary dialogue between those who design and implement critical technologies and the primary users who study important problems that drive developments, in order to advance translational research.

Reports of original research contributions are solicited on the following topics:

**FUNCTIONAL IMAGING OF BIOMOLECULES, LIVE CELLS AND TISSUES:**
- light including time-lapse microscopy of living cells and tissues (2D, 3D, 4D)
- spectral and multiphoton imaging of multiple cellular and tissue components
- side, orthogonal, or other angles illumination
- new and automated methods for monitoring biological structure, the effects of pharmacologicals, and physiology
- microscopic imaging of electric potentials and events
- mesoscopic (microporous resolution in vivo) tissue imaging
- multimode and multimodality tissue imaging in vivo.

**BIOPHOTONIC TECHNIQUES FOR REGENERATIVE MEDICINE:**
- stem cell characterization in vitro
- stem cell imaging and tracking in vivo
- in vivo studies of immunologic events
- imaging methods in organ transplantation and graft monitoring
- creation and functional monitoring of tissue engineering constructs
- imaging of tissue oxygenation and vascularization.

**OPTICAL MANIPULATION OF CELLS AND TISSUES:**
- cell micromanipulation using optical trapping (laser tweezers)
- cellular effects of localized energy deposition into micro- and nano-absorbers
- cells and biomolecules in micro- and nano-confined spaces
- scanning probe microscopy of cells and surface-immobilized biomolecules.

**SPECTRAL IMAGING AND MULTIPARAMETER MEASUREMENTS (MICROSCOPIC AND MACROSCOPIC):**
- spectral pathology and endoscopy
- digital imaging and holography for quantitative tissue and cellular pathology
- small animal imaging
- bioenergy applications
- food quality, food defense and food safety applications
- forensic applications
- tools and approaches for combining optical and other measurements
- tools and approaches for combining several optical imaging methods
- advanced registration and visualization, and cell architecture studies.

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ADVANCED QUANTITATIVE CELL (CYTOMICS) AND TISSUE (HISTOMICS) ANALYSIS:
- fluorescence and luminescence imaging including lifetime and two-photon imaging
- Raman, refractive index, polarization, isotope, ultrasonic, photoacoustic and other modalities based imaging instrumentation and technology
- probes, including new dyes, mass (isotopes) tags, bioluminescence, and the presence of oxygen
- nanoparticle based imaging
- imaging in flow of cells
- light-scattering, dark field and light-sheet based imaging
- lens-free microscopy
- high-throughput cytometry
- whole slide imaging
- in situ diagnostic applications
- technologies for multispectral and multiparameter imaging, including acquisition, autofluorescence reduction, segmentation and analysis methods
- new components for cytometry instrumentation, including ultraminiature and nano-systems
- clinical and research applications of cytometry, with emphasis on new and unusual approaches
- new methods for cell separation including high-speed, optical and magnetic-paramagnetic sorting
- rare event detection
- circulating stem, fetal, cancer, colony forming and other rare cells
- mutant selection
- medical problems in need of advanced quantitative cell or tissue analysis
- quality control and other demonstrations of the reliability and quality of measurements
- Microarrays for biomolecules, cells, three-dimensional (3D) cultures (spheroids) and tissues
- printing technologies
- readout methods, including image analysis and quantification
- applications of microarrays in diagnostics and drug discovery.

BIOINFORMATICS, IMAGE AND DATA PROCESSING, QUANTIFICATION, STANDARDS, AND DISPLAY METHODS:
- cell-based high-throughput and high-content screening clustering algorithms
- analytical quantification, including new methods for multiparameter cell and tissue analysis and data manipulation including the application of chemometric analysis techniques
- automated 3D image processing, including tracking of tissue section surfaces, image segmentation, and fluorimetry/densitometry
- software standards including those based upon the web, scientific and/or medical organizations and/or societies and regulatory requirements for spectroscopy, flow cytometry, and digital imaging including pathology
- software for quality control including reproducibility
- image formats, databasing, and retrieval
- advanced image registration and display, including co-display of multimodality image sets
- whole slide imaging.

MONITORING OF PILOT AND INDUSTRIAL CELL AND TISSUE GROWTH AND PRODUCTION FOR:
- biomedical products applications
- tissue engineering
- energy applications.

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**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)

**Important dates**

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

**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.

- 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.