

Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XVII

This conference has an open **call for papers**:

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[Submission guidelines for Authors and Presenters](#)

Important Dates	SHOW HIDE	Additional Conference Information
Abstract Due: 25 July 2018		<i>Chairs Emeritus:</i> Robert C. Leif , Newport Instruments (United States); Dan V. Nicolau , McGill Univ. (Canada)
Author Notification: 1 October 2018		
Manuscript Due Date: 11 January 2019		

Conference Committee

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Call for Papers

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 (cytomics) and tissues (histomics). 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
- oblique back-illumination {Since this is a little limiting, it could be extended to something like" side, orthogonal, or other angles illumination}
- new and automated methods for monitoring biological structure, the effects of pharmaceuticals, and physiology
- microscopic imaging of electric potentials and events
- mesoscopic (microscopic 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
- 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

Advanced Quantitative Cell (Cytomics) and Tissue (Histomics) Analysis:

- fluorescence and luminescence imaging including lifetime and two-photon imaging
- Raman, refractive index, polarization, isotope, ultrasonic, photo-acoustic 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.

JOINT SESSION: Biomedical Imaging and Cell Manipulation using a Digital Micromirror or other Micro-Electro-Mechanical Systems (MEMS) Array Device

This special joint session is in conjunction with OPTO conference OE203: Emerging Digital Micromirror Device Based Systems and Applications X. The utilization of the DMD and other optical MEMS arrays to manipulate light has numerous medical applications ranging from cancer detection to operating room aids to the manipulation of individual cells.

Papers are solicited that address the uses of a DMD and other Optical MEMS arrays with:

- 3D medical visualization
- confocal microscopes
- cytometers
- hyperspectral imaging
- image-guided intervention
- microscopy
- optoelectronic tweezers
- organs on a chip
- oxygenation measurements
- phototherapy
- selectable wavelength light sources
- spectroscopy (including mobile spectroscopy)
- structured light or 3D imaging
- tissue illumination.

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