Quantitative Phase Imaging VII (BO506)

Conference Chairs: Yang Liu, Univ. of Pittsburgh (USA); Gabriel Popescu, Univ. of Illinois (USA); YongKeun Park, KAIST (Korea, Republic of)

Program Committee: Tatiana Alieva, Univ. Complutense de Madrid (Spain); George Barbastathis, Massachusetts Institute of Technology (USA); Pietro Ferraro, Istituto di Scienze Applicate e Sistemi Intelligenti “Eduardo Caianiello” (Italy); Elena Holden, Executive Strategic Advisory, Biotech and IVD (USA); Björn Kemper, Westfälische Wilhelms-Univ. Münster (Germany); Myung K. Kim, Univ. of South Florida (USA); Jerome Mertz, Boston Univ. (USA); Aydogan Ozcan, Univ. of California, Los Angeles (USA); Demetri Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Monika Ritsch-Marte, Medizinische Univ. Innsbruck (Austria); Peter T. C. So, Massachusetts Institute of Technology (USA); Laura Waller, Univ. of California, Berkeley (USA); Renjie Zhou, The Chinese Univ. of Hong Kong (Hong Kong, China)

SPECIAL ABSTRACT REQUIREMENTS

Submissions to this conference include the following:
- 100-word text abstract (for online program) (REQUIRED)
- 250-word text abstract (for abstract digest) (REQUIRED)
- OPTIONAL: one figure and caption with preliminary results. This must be submitted as a separate PDF document.

All submissions will be reviewed by the Program Committee to determine acceptance. Abstracts and figures will be used only for the purpose of review, and will not be published.

Quantitative phase imaging (QPI) refers to measuring at each point in the field of view the optical path length shift introduced by a specimen. This measurement allows for label-free and quantitative assessment of cells and tissues. The quantitative phase images of specimens are related to their refractive index distribution, an intrinsic optical property, which plays an important role in the study of pathophysiology of many diseases. This rapidly emerging field enables the investigation of cells and tissues in terms of morphology and dynamics with nanoscale sensitivity over temporal scales from milliseconds to days. Accurate determination of intrinsic properties, optical, chemical, and mechanical, is likely to help with both basic understanding of cell function and interpretation of pathophysiological states. Employing the principles of interferometry and holography, QPI provides unique capabilities not only for imaging, but for propagation of optical fields as well. As a result, QPI can be used to improve image quality of instruments affected by aberrations, i.e., QPI provides opportunities for non-iterative adaptive optics. With reliable phase information, an imaging instrument becomes also a powerful device for measuring light scattering. Thus, quantitative phase imaging has recently bridged the gap between the imaging and scattering disciplines. This approach is called Fourier transform light scattering, as it represents the spatial analog to Fourier transform spectroscopy. Using QPI, one can easily measure angular scattering from a single cell, which offers opportunities for label-free cell sorting.

This conference is a forum for disseminating the development of methodologies of QPI and their applications to studying specimens. The multidisciplinary nature of QPI will see this conference bring together technology and application experts in electrical and bioengineering, physics and biophysics, cell biology, analytical chemistry, clinical sciences, medical imaging, optics and photonics, and tissue engineering. We will contribute to the development of interdisciplinary bonds in supporting scientists, engineers, biologists and physicians interested in the broad field of label-free quantitative phase imaging.

Papers are solicited on biomedical optics, biophotonics methodologies and applications in the broad area of QPI. Technology development activities are expected to advance the current state of the art in, for example: spatial phase sensitivity, temporal phase sensitivity, acquisition rate, resolution, tomographic reconstruction, spectroscopic content, throughput, phase reconstruction, phase unwrapping, image processing algorithms, user friendliness, etc. Application activities are expected to target specific biological questions, including: quantifying, monitoring, and functionally assessing the normal and pathological states in live cells and tissues from subcellular to organ scales.

Relevant topics include, but are not limited to:

QPI METHODOLOGIES
- methods for QPI in general
- digital holography for QPI applications
- off-axis interferometric methods
- phase shifting interferometric methods
- common path interferometry for QPI
- QPI using transport of intensity equation or ptychography
- low-coherence interferometry for QPI

www.spie.org/bo506call
#PhotonicsWest
• phase-sensitive optical coherence tomography and microscopy
• multimodal techniques: QPI plus other methods (e.g., fluorescence)
• using QPI to retrieve scattering information from cells and tissues
• Fourier-transform light scattering.
• use QPI for adaptive optics or wavefront shaping techniques
• numerical field propagation and time-reversal applications
• optical manipulation and QPI
• probes for QPI, such as nanoparticles.

ALGORITHMS AND IMAGING PROCESSING IN QPI
• coherence effects in QPI
• image processing methods for QPI
• field and phase retrieval algorithms
• phase unwrapping algorithms
• machine learning algorithms for QPI.

QPI OF CELL & TISSUE STUDIES
• quantitative phase imaging of cells
• quantitative phase imaging of tissues
• cell physiology using QPI
• biomechanics of cells and tissue using QPI
• quantitative phase imaging in neuroscience
• quantitative phase imaging in biophysics
• rheology measurements using QPI techniques
• single cell mechanics, motility, and adhesion study using QPI.

CLINICAL APPLICATIONS OF QPI
• quantitative phase imaging in tissue pathology
• quantitative phase imaging in hematology
• medical diagnosis using refractive index values or QPI in general.

www.spie.org/bo506call
#PhotonicsWest
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

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstracts Submission Deadline</td>
<td>26 August 2020</td>
</tr>
<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>
</tr>
</tbody>
</table>

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.

Publication of Proceedings in the SPIE Digital Library
- Conference Chairs/Editors may require manuscript revision before approving publication and reserve the right to reject for publication any paper that does not meet acceptable standards for a scientific publication.
- Conference Chair/Editor decisions on whether to allow publication of a manuscript are final.
- Authors must be authorized to transfer copyright of the manuscript to SPIE, or provide a suitable publication license.
- Only papers presented at the conference and received according to publication guidelines and timelines will be published in the conference Proceedings of SPIE in the SPIE Digital Library.
- Oral presentations are recorded, and presentation slides are synced with the presenter’s audio. Only those presentations with author permission will be published in the SPIE Digital Library.
- SPIE partners with relevant scientific databases to enable researchers to find the papers in the Proceedings of SPIE easily. The databases that abstract and index these papers include Astrophysical Data System (ADS), EI Compendex, CrossRef, Google Scholar, Inspect, Scopus, and Web of Science Conference Proceedings Citation Index.
- More publication information available on the SPIE Digital Library.

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

www.spie.org/bo506call