



Optics and Photonics for Information Processing XVIII (OP331)

Conference Chairs: **Khan M. Iftekharuddin**, Old Dominion Univ. (United States); **Abdul A. S. Awwal**, Lawrence Livermore National Lab. (United States); **Victor Hugo Diaz-Ramirez**, Ctr. de Investigación y Desarrollo de Tecnología Digital (Mexico)

Conference Co-Chair: **Andrés Márquez**, Univ. de Alicante (Spain)

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This conference is intended to provide a forum for interchange on various algorithms, systems, sensors, and architectures for novel applications in optics and photonics in information processing. Original unpublished contributions reporting recent advances in analog and hybrid optical information systems and techniques are solicited. In addition, papers related to curriculum development, review papers, and teaching in a cross-disciplinary setting in any of the following topics are welcome. All abstracts will be reviewed by the program committee for originality and merit. Topics of interest include, but are not limited to, the following:

ALGORITHMS

- optical pattern recognition, devices, optical correlation hardware, nonlinear techniques for pattern recognition
- optical image processing algorithms
- optical encryption, information security, security of digitally stored medium
- neural networks including deep learning networks
- transforms for optical imaging systems, including Fourier and wavelets transforms
- algorithms for quantum computing, large scale data (Big Data) processing and deep learning
- algorithms for robot vision and autonomous vehicle navigation
- adaptive algorithms for optical image restoration and enhancement
- algorithms for optical metrology, camera calibration, and 3D object digitization.

NEW ARCHITECTURE AND SYSTEMS

- quantum computing, cyber-physical systems and IoTs for optical information processing
- spatial light modulators (SLMs), photorefractive materials for optical information systems
- holographic techniques in information processing, and information display systems
- optical storage/memory systems for information processing
- optical systems for 3D pattern recognition, 3D imaging, and Big Data image processing
- applications of novel optical materials for information processing

- novel diffractive optics structures and devices
- nano photonics for optical computing
- metasurfaces
- calibration of optical systems.

OPTICAL SWITCHING AND INTERCONNECTS

- optical interconnects and supercomputing
- waveguide, optical-fiber-based, polarization, and intensity switching, optical limit switches, optical multiplexing
- implementation of interconnects
- optical back bones for conventional computers, optical/hybrid interconnects for electronic computers.

DIGITAL OPTICAL PROCESSING AND ARCHITECTURE

- high-speed opto-electronics computation
- signed-digit based computing, multi-valued logic, linear algebra processor, system demonstrations, fault-tolerant computing, optical logic and memory.

WAVEFRONT-BASED COMPUTATION

- holographic memory-based computing, integrated optics, and soliton-based and semiconductor devices for optical computing
- modeling of holographic elements, joint optimization
- digital holography applications.

APPLICATIONS IN BIOPHOTONICS

- optical processing for biophotonics
- applications of optical systems to information security
- optical systems for biometrics sensing and recognition.

IMAGE FORMING AND PROCESSING APPLICATIONS

- imaging: 2D, 3D, integral, holographic, optical, digital, polarimetric
- novel x-ray-based image processing, algorithms and systems, noise processing, applications in medical, EUV, modeling, etc.
- image processing of optical images for large scale systems such as laser fusion facilities, applications in optical alignment, optics inspection, off-normal detection

- optical systems and algorithms for Big Data SAR/IR/visible/medical image processing and recognition
- computational sensing, computational imaging for Big Data processing
- 3D printing for optics.

OPTICAL INFORMATION PROCESSING AROUND THE GLOBE

- review of optical information processing research over decades in different countries around the globe.

OPTICS AND PHOTONICS WITH A FOCUS ON SUSTAINABILITY

- algorithms and photonics systems for efficient energy management of information processing
- application of novel sustainable materials for photonics systems.

Present your research at SPIE Optics + Photonics

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

Abstracts due	7 February 2024
Registration opens	April 2024
Authors notified and program posts online	29 April 2024
Submission system opens for manuscripts and poster PDFs*	17 June 2024
Poster PDFs due for spie.org preview and publication	24 July 2024
Manuscripts due	31 July 2024
Advance upload deadline for oral presentation slides**	16 August 2024

*Contact author or speaker must register prior to uploading

**After this date slides must be uploaded onsite at Speaker Check-In

What you will need to submit

- Title
- Author(s) information
- Speaker biography (1000-character max including spaces)
- Abstract for technical review (200-300 words; text only)
- Summary of abstract for display in the program (50-150 words; text only)
- Keywords used in search for your paper (optional)
- Check the individual conference call for papers for additional requirements (i.e. extended abstract PDF upload for review or 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/op331call
- You may submit more than one abstract but submit each abstract only once
- 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 completed

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
- Oral presenters: recording and publication of your onsite presentation (slides synched with voice) for publication in the Proceedings of SPIE in the SPIE Digital Library
- Poster presenters: submit a poster PDF by the advertised due dates for publication in the Proceedings of SPIE in the SPIE Digital Library; poster PDFs may also be published and viewable in the spie.org program during and immediately after the event. Each poster must have a unique presenter; one person may not present more than one poster per session
- Email messaging for the conference series
- Submit a manuscript by the advertised due date for publication in the Proceedings of SPIE in the SPIE Digital Library
- Obtain funding for registration fees, travel, and accommodations
- 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
- 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 chair discretion

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- Only manuscripts, presentations, and posters presented at the conference and received according to publication guidelines and due dates will be published in the Proceedings of SPIE in the SPIE Digital Library
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- More publication information available on SPIDigitalLibrary.org

Contact information

For questions about your presentation, submitting an abstract, or the meeting, contact your [Conference Program Coordinator](#).

OPTICAL ENGINEERING + APPLICATIONS 2024 PROGRAM TRACK CHAIRS

Optical Design

José Sasián, Wyant College of Optical Sciences (USA)

Optical Alignment, Testing, and Fabrication

H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

Signal, Image, and Data Processing

Khan Iftekharuddin, Old Dominion Univ. (USA)

Photonic Devices and Applications

Ruyan Guo, The Univ. of Texas at San Antonio (USA)

Remote Sensing and Atmospheric Propagation

Stephen Hammel, Naval Information Warfare Ctr. Pacific (USA)

Alexander M. J. van Eijk, TNO Defence, Security, and Safety (Netherlands)

X-Ray, Gamma-Ray, and Particle Technologies

Ali Khounsayr, Illinois Institute of Technology (USA)

Ralph James, Savannah River National Lab. (USA)

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