



Emerging Digital Micromirror Device Based Systems and Applications XVI (OE403)

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Conference Co-Sponsors



The Digital Micromirror Device (DMD) was conceived at Texas Instruments in 1987, following a decade of work on analog deformable-mirror and cantilever-mirror devices. This particular optical MEMS or MOEMS device has been applied most famously to digital cinema projection systems, enterprise projectors and highly portable personal displays, all of which were enabled by DLP® technology. The DMD has been commercially available since 1996 leading to hundreds of products and innovative research projects spanning consumer, industrial, medical and automotive markets.

As was evident by this well-attended conference at Photonics West 2023, the DMD and associated evaluation modules are enabling many exciting new applications and equipment beyond traditional display systems. By bringing together scientists, technologists, and developers, the goal of this conference is to highlight new and interesting means of applying DLP technology to solve problems across various markets.

Technical areas of particular interest include, but are not limited to:

PROGRAMMABLE PATTERNING AND ADVANCED IMAGING SOLUTIONS

- 3D metrology, machine vision, and factory automation
- compressive sensing
- computational imaging
- hyperspectral imaging
- security and surveillance
- spectroscopy (including mobile spectroscopy)
- volumetric scanning.

DISPLAY SOLUTIONS

- 3D displays (light-field, autostereoscopic, volumetric, multi-views, and holographic)
- augmented reality, virtual reality, and mixed reality
- automotive interior (head-up displays, interior displays, interior lighting)
- automotive exterior (headlight illumination, exterior lighting)
- intelligent lighting or displays.

MANUFACTURING SOLUTIONS

- additive manufacturing / 3D printing
- coding and marking
- direct imaging lithography
- industrial printers and exposure systems.

MEDICAL DEVICES

- biochemical visualization
- microscopy
- ophthalmology
- endoscopic imaging
- 3D bioprinting.

LIGHT MANIPULATION

- beam steering / wave-front shaping
- optical micromanipulation
- spectrally tunable light sources
- phase light modulator applications.

OTHER

- NIR applications
- optical telecommunications
- UV applications.

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JOINT SESSION WITH BIOS B0500 AND OE403

Biomedical Imaging and Cell Manipulation using a Digital Micromirror Device or MEMS Array

This special joint session is in conjunction with BiOS conference B0500: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues. 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
- ophthalmology
- organs on a chip
- oxygenation measurements
- phototherapy
- selectable wavelength light sources
- spectroscopy (including mobile spectroscopy)
- structured light or 3D imaging
- tissue illumination.

JOINT SESSION WITH OE401 AND OE403

Advanced Fabrication using a Digital Micromirror Device or MEMS Array

Active research in the fields of advanced fabrication and MEMS Arrays, such as the digital micromirror device, have shown application and promise for implementing lithography and other forms of high precision printing. The purpose of this joint session is to explore the relationships between MEMS technology and fabrication as they relate to:

- 3D printing
- additive manufacturing
- lithography.

JOINT SESSION WITH OE702 AND OE403

AR/VR Displays using DMDs or other SLM Devices

AR/VR is an exciting area of development. Much progress hinges on the capabilities of light modulators. The purpose of this joint session is to explore and demonstrate the capabilities of different light modulators.

BEST PAPER AWARDS

We are pleased to announce that cash prizes, sponsored by Texas Instruments DLP Products and ViALUX GmbH, will be awarded to the best paper and best student paper in Emerging DMD-Based Systems and Applications. Qualifying papers will be evaluated by the awards committee. Manuscripts will be judged based on scientific merit, impact, and clarity. The winners will be announced during the conference and the presenting authors will be awarded a cash prize.

To be eligible for the Best Paper Award, you must:

- be listed as the speaker on an accepted paper within this conference
- have conducted the majority of the work to be presented
- submit your manuscript online by the deadline
- present your paper as scheduled.

To be eligible for the Best Student Paper Award, you must:

- be a student without a doctoral degree (undergraduate, graduate, or PhD student)
- submit your abstract online, select “Yes” when asked if you are a full-time student, and select yourself as the speaker
- when submitting your abstract, under TOPIC selection, choose “Consider for Best Student Paper Award”
- be listed as the speaker on an accepted paper within this conference
- have conducted the majority of the work to be presented
- submit your manuscript online by the deadline
- present your paper as scheduled.

Nominations

All submitted papers will be eligible for the awards if they meet the above criteria.

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Present your research at SPIE Photonics West

Follow the instructions below to develop a successful abstract for submission to a conference and review policies for publication in the Proceedings of SPIE in the SPIE Digital Library. Submissions subject to chair approval.

Important dates

Abstracts due	19 July 2023
Registration opens	October 2023
Authors notified and program posts online	9 October 2023
Submission system opens for manuscripts and poster PDFs*	27 November 2023
Poster PDFs due for spie.org preview and publication	3 January 2024
Manuscripts due	10 January 2024
Advance upload deadline for oral presentation slides**	25 January 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

- Presentation title
- Author(s) information
- Speaker biography
- 250-word abstract for technical review
- 100-word summary of abstract for display in the program
- Keywords used in search for your paper (optional)
- 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 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/oe403call
- You may submit more than one abstract, but submit each abstract only once
- Submit by clicking 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
- If your submission is related to an application track below, indicate the appropriate track when prompted during the submission process

Application track

Listed below are the application tracks available for this meeting. Application tracks aggregate presentations and focus on emerging technical and societal needs that require a multidisciplinary approach.

- **AI/ML:** Papers that highlight the use of artificial intelligence, machine learning, and deep learning to create and implement intelligent systems across multiple sectors, technologies, and applications
- **Sustainability:** Papers that highlight the use of optics and photonics for renewable energy, natural resource management, sustainable manufacturing, and greenhouse gas mitigation in support of the UN Sustainable Development Goals
- **Brain function:** Papers that highlight the development of innovative optics and photonics technologies that increase our understanding of brain physiology and function
- **Translational research:** Papers that highlight the transition from bench to bedside using the latest photonics technologies, tools, and techniques for healthcare
- **3D printing:** Papers that highlight the innovative use of optics and photonics in multidisciplinary applications for multidimensional manufacturing

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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