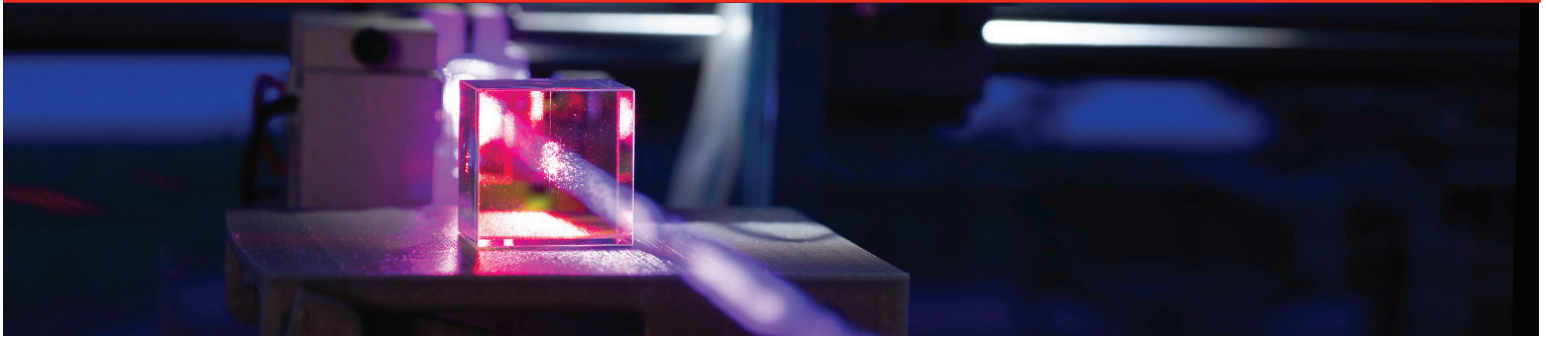


# LASE

Part of SPIE Photonics West

17-22 January 2026  
The Moscone Center  
San Francisco, California, USA

Submit abstracts by  
9 July 2025



## Photonic Technologies in Plant and Agricultural Science III (LA404)

*Conference Chairs:* **Dag Heinemann**, Hannoversches Zentrum für Optische Technologien (Germany); **Gerrit Polder**, Wageningen Univ. & Research (Netherlands)

*Program Committee:* **Giles Blaney**, Tufts Univ. (United States); **Kareem Elsayad**, Medizinische Univ. Wien (Austria); **Tobias Kreklow**, HAIP Solutions GmbH (Germany); **Michael W. Kudenov**, North Carolina State Univ. (United States); **Wouter Saeys**, KU Leuven (Belgium); **Hedde Van Hoorn**, The Hague Univ. of Applied Sciences (Netherlands); **Merve Wollweber**, Laser Zentrum Hannover e.V. (Germany)

The demands on modern plant and food production have increased significantly in recent years. On the one hand, the framework conditions are becoming increasingly difficult due to climate change and various regulations, and on the other hand, the expectations are growing steadily due to the Sustainable Development Goals of the United Nations and international bioeconomy strategies. Photonic technologies are a key component in closing this gap due to their wide range of applications and thus a major driver for improving overall sustainability in agriculture. The applications of photonic technologies range from basic research in plant sciences to practice-oriented agronomic applications in the field: Modern microscopic techniques allow the investigation of morphogenetic processes and thus help to understand in detail the relationship between genotypes and phenotypes of plants. Plant phenotyping and precision farming primarily depend on characteristics assessed using optical sensors, including Lidar, chlorophyll fluorescence, and imaging spectroscopy (multi- or hyperspectral imaging). Laser-micromanipulation provides a tool for manipulating plant tissues on a microscopic scale. Optical screening methods identify optimal candidates for resistance breeding. Spectroscopic methods detect constituents and allow contactless evaluation of nutritional values and quality of food. Laser speckle imaging serves as a valuable tool for measuring sap flow in plants, a crucial parameter for autonomous greenhouse control. In addition, there are laser-based methods for weed control and pest management. The different sensor data are increasingly complemented by methods of automatic data evaluation from the AI domain which allow rapid evaluation and interpretation, for example for analyzing imaging spectrometer data or detection of weeds and plant diseases.

This conference aims at bringing together these different aspects of photonic technologies in the field of plant sciences, agricultural research and the food chain from a technical perspective. Publications from the following and related topics are sought:

### UTILIZATION OF COHERENT AND INCOHERENT LIGHT FOR MANIPULATION OF PLANTS:

- laser weeding
- micro-manipulation of plants, e.g., for molecular delivery of ablation studies
- laser processing of plant materials
- optical disinfection within the food chain
- lasers for pest management
- desolation and thinning of plant components using lasers.

### OPTICAL IMAGING AND SPECTROSCOPIC SENSING OF PLANTS:

- spectral imaging of plants and canopies, phytomonitoring
- spectroscopic evaluation of nutrition values, food quality and ripening
- optical biomechanics of plants, e.g., via OCE and Brillouin spectroscopy
- 3D acquisition of plants and plant organs using optical methods such as OCT, LIDAR, stereo cameras, TOF
- remote sensing of plant stocks.

### DIGITAL METHODS FOR DATA PROCESSING IN PLANT AND AGRICULTURAL SCIENCE:

- image recognition of agricultural pests and abiotic stress
- allocation and component analysis of spectroscopic data
- machine vision, e.g., for detection of weeds
- quantification of plant/vegetation indices.

### ASSOCIATED SUBJECTS:

- carrier systems
- integration of optical systems
- laser safety
- plant (in vitro) culture systems for optical sensing
- optical sensing techniques in vertical farming
- optical sensing technologies for safe food production in space.

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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  | 9 July 2025       |
| Registration opens                                       | October 2025      |
| Authors notified and program posts online                | 29 September 2025 |
| Submission system opens for manuscripts and poster PDFs* | 17 November 2025  |
| Poster PDFs due for spie.org preview and publication     | 22 December 2025  |
| Manuscripts due  | 29 December 2025  |
| Advance upload deadline for oral presentation slides**   | 15 January 2026   |

\*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 (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., special abstract requirements 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/LA404](http://www.spie.org/LA404)
- » You may submit more than one abstract, but submit each abstract only once
- » Submit by clicking the "Submit an Abstract" button on that 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. An application track is a grouping of presentations on a topic of interest across all conferences. During submission of the abstract, the submitting author should select an application track if it is relevant to their research.

- » **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
- » **3D printing:** Papers that highlight the innovative use of optics and photonics in multidisciplinary applications for multidimensional manufacturing
- » **Photonic chips:** Papers that highlight advances in materials, design, fabrication, integration, testing and packaging of photonic components at the chip level

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### QUESTIONS?

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For questions about publication or the SPIE Digital Library, contact your proceedings coordinator.

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