

PROCEEDINGS OF SPIE

Optics, Photonics, and Digital Technologies for Imaging Applications IX

**Peter Schelkens
Tomasz Kozacki**
Editors

**14–16 April 2026
Strasbourg, France**

Sponsored by
SPIE

Cooperating Organisations
EOS—European Optical Society
SIOF—Società di Ottica e Fotonica (Italy)
Photonics21 (Germany)

Published by
SPIE

Volume 14085

Proceedings of SPIE 0277-786X, V. 14085

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *Optics, Photonics, and Digital Technologies for Imaging Applications IX*, edited by Peter Schelkens, Tomasz Kozacki, Proc. of SPIE 14085, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9798902321293

ISBN: 9798902321309 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2026 Society of Photo-Optical Instrumentation Engineers (SPIE).

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE. DIGITAL
LIBRARY**

SPIEDigitalLibrary.org

Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

vii *Conference Committee*

AUGMENTED AND VIRTUAL REALITY

- 14085 03 **Multifunctional metasurfaces for polarisation control and beam shaping in AR/VR light engines** [14085-2]
- 14085 04 **Metagrating design for compact AR waveguide-based architectures** [14085-3]
- 14085 05 **Robust grating coupler design for near-eye displays: kernel-based tolerancing applied to slanted and meta gratings** [14085-4]

HOLOGRAPHIC DISPLAYS

- 14085 06 **Off-axis 3D holographic display with multidepth viewing via beam splitters** [14085-5]
- 14085 07 **Single frame near-eye holographic display with RGB image and on-axis illumination** [14085-6]
- 14085 08 **Wide-angle holographic near-eye display with DOE lens** [14085-7]
- 14085 09 **Resolution enhancement in holographic lithography through photoresist response modeling** [14085-8]
- 14085 0A **Incoherent holographic display system using the generalized Van Cittert-Zernike Schell propagator** [14085-9]

COMPUTATIONAL MICROSCOPY AND TOMOGRAPHY

- 14085 0B **A comparison between use of metasurface and conventional refractive axicons in OCT systems** [14085-10]
- 14085 0C **Beyond Fourier transform imaging: subsurface imaging of agate with complex leader-follower full-field OCT** [14085-11]
- 14085 0E **Polarization-multiplexed full-range optical coherence tomography for artifact-free imaging of multilayer display components** [14085-14]

HOLOGRAPHIC SIGNAL PROCESSING

- 14085 OF **Mipmap-inspired phase-space decomposition for efficient Fresnel diffraction (Invited Paper)** [14085-16]
- 14085 OG **Non-rigid motion estimation for CGH using the chirped cross-ambiguity function** [14085-17]
- 14085 OH **Millibit-per-pixel compression of digital holograms** [14085-18]
- 14085 OI **Comparison of spectrum-based image quality assessment metrics** [14085-19]

COMPUTATIONAL HOLOGRAPHIC MICROSCOPY

- 14085 OL **High-fidelity label-free 3D microscopy via Fourier ptychographic diffraction tomography with adaptive support constraint** [14085-24]

COMPUTER VISION APPLICATIONS

- 14085 ON **Stress-testing medical vision models with images edited by controllable inversion algorithms** [14085-26]
- 14085 OO **Deep learning for robust optical overlay metrology in semiconductor device manufacturing** [14085-27]
- 14085 OP **Raytracing-generated images from surface metrology data for AI training on defect recognition** [14085-28]
- 14085 OQ **Development and evaluation of particle analysis system for the process water of the petrochemical industry using hyperspectral imaging, white-light imaging, and fluorescence imaging** [14085-29]
- 14085 OR **Measurement of deep microholes on PCB using a spectral-domain coherent interferometry system** [14085-66]

MACHINE LEARNING AND IMAGE PROCESSING I

- 14085 OS **Local regression mixture models for compact and adaptive plenoptic representation** [14085-30]
- 14085 OT **ViTCapsNets: hybrid vision transformers and capsule networks architecture for automated building damage assessment using multitemporal satellite imagery** [14085-31]
- 14085 OU **Applications and recent advances of polynomial neural networks in medical imaging** [14085-33]

MACHINE LEARNING AND IMAGE PROCESSING II

- 14085 0W **Unsupervised video denoising for structured noise via Fourier masking (Invited Paper)** [14085-35]
- 14085 0X **Vector optimization for gridding kernels: a Pareto-based framework for NUFFT accuracy control** [14085-36]
- 14085 0Y **Synaptic plasticity based on photo-activated materials for mobile neuromorphic computing** [14085-37]
- 14085 0Z **Content-adaptive face antispoofing for secure vision-based authentication** [14085-38]

COMPUTATIONAL IMAGING

- 14085 11 **Pattern extraction from 3D+t imaging of human sperm flagellar beating (Invited Paper)** [14085-40]
- 14085 12 **Tailoring object-specific light fields for the inspection of transparent materials** [14085-41]
- 14085 14 **From RGB to hyperspectral: a deep learning pipeline approach for accessible biomedical sample analysis** [14085-43]
- 14085 15 **Optical scanning tomography elastography: experimental validation of a novel elastography method** [14085-12]

POSTER SESSION

- 14085 16 **Applications of Raman spectroscopy for electronic-based systems** [14085-44]
- 14085 17 **Advanced RGB laser illumination system for endoscopy** [14085-45]
- 14085 18 **Detection of hot objects in recycling streams for enhanced safety using low-cost IR cameras** [14085-46]
- 14085 19 **Development and evaluation of a new line illumination for hyperspectral imaging systems for industrial applications** [14085-49]
- 14085 1A **Ray tracing for holographic waveguides: image quality prediction in see-through systems** [14085-50]
- 14085 1B **Design and characterization of diffractive lenses based on the aperiodic paperfolding sequence** [14085-51]
- 14085 1C **A lightweight SVM-based framework for breast thermography using statistical descriptors** [14085-52]

- 14085 1D **Tunable spherical aberration in modified kinoform lenses** [14085-53]
- 14085 1G **Scalable AI-driven inspection for inline nuisance filtering and whole wafer pattern classification** [14085-57]
- 14085 1H **Digital holographic profilometry with symmetric structured illumination** [14085-58]
- 14085 1L **Motion detection through scattering media using speckle intensity correlation differences** [14085-65]