

PROCEEDINGS OF SPIE

Holography, Diffractive Optics, and Applications X

**Yunlong Sheng
Changhe Zhou
Liangcai Cao**
Editors

**12–16 October 2020
Online Only, China**

Sponsored by
SPIE
COS—Chinese Optical Society

Cooperating Organizations

Tsinghua University (China) • Peking University (China) • University of Science and Technology of China (China) • Zhejiang University (China) • Tianjin University (China) Beijing Institute of Technology (China) • Beijing University of Posts and Telecommunications (China) • Nankai University (China) • Changchun University of Science and Technology (China) • University of Shanghai for Science and Technology (China) • Capital Normal University (China) • Huazhong University of Science and Technology (China) • Beijing Jiaotong University (China) • China Jiliang University (China) • Shanghai Institute of Optics and Fine Mechanics, CAS (China) • Changchun Institute of Optics, Fine Mechanics and Physics, CAS (China) • Institute of Semiconductors, CAS (China) • Institute of Optics and Electronics, CAS (China) • Institute of Physics, CAS (China) • Shanghai Institute of Technical Physics, CAS (China) • China Instrument and Control Society (China) • Japan Optical Society (Japan) • Korea Optical Society (Korea, Republic of) • Australia Optical Society (Australia) • Singapore Optical Society (Singapore) • European Optical Society

Supporting Organizations

China Association for Science and Technology (CAST) (China)
Department of Information of National Nature Science Foundation, China (NSFC) (China)

Published by
SPIE

Volume 11551

Proceedings of SPIE 0277-786X, V. 11551

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 SPIDigitalLibrary.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 *Holography, Diffractive Optics, and Applications X*, edited by Yunlong Sheng, Changhe Zhou, Liangcai Cao, Proceedings of SPIE Vol. 11551 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510639171

ISBN: 9781510639188 (electronic)

Published by

SPIE

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

Telephone +1 360 676 3290 (Pacific Time) Fax +1 360 647 1445

SPIE.org

Copyright © 2020, Society of Photo-Optical Instrumentation Engineers.

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 copying fees. The Transactional Reporting Service base fee for this volume is \$21.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online 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. The CCC fee code is 0277-786X/20/\$21.00.

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

SPIDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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

HOLOGRAPHY IN ARTIFICIAL INTELLIGENCE I

- 11551 03 **Holographic optical elements for augmented reality systems (Invited Paper)** [11551-2]
- 11551 06 **On the use of deep learning for single-pixel imaging** [11551-68]

HOLOGRAPHY IN ARTIFICIAL INTELLIGENCE II

- 11551 08 **Restore multiple particles by using short-path U-net model with average pooling based on digital holography** [11551-6]
- 11551 0A **Digital holography with deep learning and generative adversarial networks for automatic microplastics classification** [11551-8]
- 11551 0B **Model-based network architecture for image reconstruction in lensless imaging** [11551-9]

HOLOGRAPHY WITH PLASMONIC STRUCTURES

- 11551 0F **Based on variation of refractive index active-tuned far-field plasmonic lens with double-diffraction for potential application of achromatic three-dimensional (3D) display** [11551-13]

PICOMETER SCALE AND HIGH-SENSITIVE METROLOGY

- 11551 0I **Picocompography (Invited Paper)** [11551-16]
- 11551 0J **Simulation analysis of digital acousto-optic holography for internal structural inspection (Invited Paper)** [11551-17]
- 11551 0L **Measuring fabrication errors of computer-generated holograms using embedded microgratings** [11551-19]

DIGITAL HOLOGRAPHY

- 11551 0M **Multidimensional digital holographic microscopy based on computational coherent superposition for coherent and incoherent light sensing (Invited Paper)** [11551-20]
- 11551 0P **Riesz transform for fringes pattern analysis: advantages and limitations** [11551-23]

3D IMAGING AND DISPLAY

- 11551 0Z **EPISM-based full-parallax holographic stereogram: principle, modeling, and optimization (Invited Paper)** [11551-36]
- 11551 11 **Holographic three-dimensional display based on shifted Fraunhofer diffraction** [11551-38]
- 11551 13 **Investigation on characteristics of multi-beam interference pattern for 3D structured-illumination incoherent holographic imaging** [11551-40]

COMPUTER-GENERATED HOLOGRAMS AND SPATIAL LIGHT MODULATORS

- 11551 16 **Volumetric graphics of microbubbles (Invited Paper)** [11551-44]
- 11551 1A **A holographic method for generating axial cosinoidal structured light using spatial light modulator** [11551-48]

POSTER SESSION

- 11551 1B **Three-dimensional anti-counterfeiting method based on reflective volume holography** [11551-41]
- 11551 1C **Approach for finding amplitudes of the transmitted diffraction orders in the framework of a rigorous coupled-wave analysis and its application in the study of three-layer sawtooth microstructures** [11551-49]
- 11551 1D **Design of 2-layer transmission grating with high efficiency, large bandwidth and great dispersion** [11551-50]
- 11551 1E **Research on grating signal processing based on DSP** [11551-51]
- 11551 1F **Polarization imaging of a sinusoidal amplitude grating with partially polarized and partially coherent light** [11551-52]
- 11551 1H **Large-field holographic projection system based on deep-learning acceleration calculation** [11551-54]
- 11551 1I **Polarization effects in interferometric testing with f/1 diffractive transmission sphere** [11551-55]
- 11551 1K **Improvement and denoising for dual-wavelength digital holographic microscopy** [11551-57]
- 11551 1L **Optimization of high-resolution reconstruction algorithm for off-axis digital holographic imaging** [11551-58]

- 11551 1N **Determination of linewidth for metal/oxide gratings by measured diffraction efficiency in several orders** [11551-60]
- 11551 1O **Dry method for the formation of reflective phase DOEs using direct laser writing on thin Zr films** [11551-61]
- 11551 1Q **Comparison of polarization-controllable multifocal arrays generated by radially and azimuthally polarized beams** [11551-63]
- 11551 1R **Simulation calculation of diffraction intensity of non-equal period grating** [11551-64]
- 11551 1T **Singular skeleton in speckle field** [11551-66]
- 11551 1U **Phase unwrapping with the convolutional neural network** [11551-67]