PROCEEDINGS OF SPIE

Three-Dimensional Imaging, Visualization, and Display 2024

Bahram Javidi Xin Shen Arun Anand Editors

22–24 April 2024 National Harbor, Maryland, United States

Sponsored by SPIE

Cosponsored by NHK Foundation (Japan)

Published by SPIE

Volume 13041

Proceedings of SPIE 0277-786X, V. 13041

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 Three-Dimensional Imaging, Visualization, and Display 2024, edited by Bahram Javidi, Xin Shen, Arun Anand, Proc. of SPIE 13041, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X ISSN: 1996-756X (electronic)

ISBN: 9781510674004 ISBN: 9781510674011 (electronic)

Published by **SPIE** P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) SPIE.org Copyright © 2024 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.



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

SESSION 1 DEVICES FOR 3D IMAGING, TV, VIDEO, AND VISUALIZATION SYSTEMS

13041 02 Increasing depth of field for slanted lenticular 3D displays (Invited Paper, Okano Best Paper Award) [13041-3]

SESSION 2 DIGITAL HOLOGRAPHY AND RELATED TECHNOLOGIES I

- 13041 03 Deep learning in digital holography for biomedical applications (Invited Paper) [13041-5]
- 13041 04 Enhanced wide-field off-axis holography based on intensity correlation [13041-7]
- 13041 05 Overview of 3D object detection through fog and occlusion: passive integral imaging vs active LiDAR sensing [13041-35]

SESSION 3 3D IMAGING AND RELATED TECHNOLOGIES I

- 13041 06 Hollow point cloud generation by procedural inlier removal [13041-11]
- 13041 07 Active sensing of a hidden object using Gaussian and perfect optical vortices speckles: a comparative study [13041-57]

SESSION 4 DIGITAL HOLOGRAPHY AND RELATED TECHNOLOGIES II

13041 08 Exit-pupil expansion in Maxwellian-type holographic-based waveguide near-eye displays (Invited Paper) [13041-14]

SESSION 5 BIOMEDICAL APPLICATIONS OF 3D SENSING AND IMAGING

13041 09 Polarization digital holographic microscope for live cell imaging (Invited Paper, Okano Best Paper Award) [13041-16]

SESSION 6 3D IMAGING AND RELATED TECHNOLOGIES II

13041 0A Overcoming the division by zero problem in the assessment of the degree of polarization in poorly illuminated scenes (Invited Paper) [13041-21]

SESSION 7 DIGITAL HOLOGRAPHY AND RELATED TECHNOLOGIES III

- 13041 0BOverview of computational advances in quantitative phase imaging using digital holographic
microscopy (Invited Paper, Okano Best Paper Award) [13041-22]
- 13041 OC Lensless imaging systems: a technological and clinical review for automated disease identification [13041-38]
- 13041 0D Overview of 3D profilometry using integral imaging [13041-39]

POSTER SESSION

13041 OE	Three-dimensional optical sensing and computational reconstruction combining integral imaging and axially distributed sensing [13041-28]
13041 OF	Camera array calibration for 3D integral imaging reconstruction and depth detection [13041-32]
13041 0G	An overview of polarimetric integral imaging in turbid water: sensing and imaging [13041-34]
13041 OH	An overview of 1D integral imaging convolutional neural networks applied in underwater optical signal detection under degraded environments [13041-36]
13041 01	An overview of 3D integral imaging-based human gesture recognition under degraded environments: comparison between 3D integral imaging and RGB-D sensors [13041-37]
13041 OJ	Robustness of single random phase encoding lensless imaging systems to reducing number of sensor pixels by orders of magnitude and increasing sensor pixel size [13041-41]
13041 OK	Overview of digital holographic deep learning of red blood cells for field-portable, rapid disease screening [13041-42]
13041 OL	Detecting driving hazards using point cloud data from LiDAR and AI for industrial navigation robot [13041-44]
13041 OM	Complementation by binocular vision about aerial image missing by monocular vision in AIRR with a gap between retro-reflectors [13041-45]
13041 ON	3D multi-perspective depth detection using point clouds and machine learning [13041-47]
13041 00	A study of integral imaging-based depth detection using single planner computational volumetric reconstruction [13041-48]

13041 OP	Design and development of a second-generation eye-hand coordination assisting device [13041-49]
13041 0Q	End-to-end simulation process in lens design software for integral imaging-based 3D light field displays evaluation [13041-50]
13041 OR	Towards the development of standards and performance metrics for 3D imaging systems [13041-51]
	DIGITAL POSTER SESSION
13041.05	APi microscopy in biomedicine: a comprehensive bibliometric assessment of its evolution and

13041 0S **4Pi microscopy in biomedicine: a comprehensive bibliometric assessment of its evolution and impact** [13041-43]