

PROCEEDINGS OF SPIE

3D Printed Optics and Additive Photonic Manufacturing IV

**Alois M. Herkommer
Georg von Freymann
Manuel Flury**
Editors

**8–9 April 2024
Strasbourg, France**

Sponsored by
SPIE

Cooperating Organisations
Photonics 21 (Germany)
EOS—European Optical Society

Published by
SPIE

Volume 12995

Proceedings of SPIE 0277-786X, V. 12995

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 *3D Printed Optics and Additive Photonic Manufacturing IV*, edited by Alois M. Herkommer, Georg von Freymann, Manuel Flury, Proc. of SPIE 12995, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510673083

ISBN: 9781510673090 (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.

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.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

v *Conference Committee*

TECHNOLOGIES I

12995 02 **YAG:Ln for laser 3D lithography: precursor synthesis and study** [12995-2]

TECHNOLOGIES II

12995 03 **STED-inspired optical lithography beyond acrylates (Invited Paper)** [12995-4]

12995 04 **Development of polymer-dye hybrids for the optical limitation: photopolymerization versus thermal polymerization** [12995-5]

12995 05 **Comprehensive evaluation of grayscale laser lithography build accuracy via benchmark artefacts** [12995-7]

APPLICATION OF 3D PRINTING OPTICS I

12995 06 **3D nanoprinting of high-numerical aperture multilevel metalenses** [12995-11]

12995 07 **Manufacturing of solid core optical waveguide based pressure sensor for 3D-printed below-knee orthosis** [12995-12]

12995 08 **Monolithic mounting structures for robust optical systems through passive compensation of mechanical and thermal loads** [12995-13]

MODELLING AND DESIGN

12995 09 **Modelling and compensating proximity effects in massively parallelized multiphoton photoplotter (Invited Paper)** [12995-14]

12995 0A **Design and simulation of a nozzle-mask for optical fiber 3D-printing** [12995-17]

12995 0B **Image formation through a 3D printed conic lens considering a linear array of point sources** [12995-18]

JOINT SESSION: 3D LASER ADDITIVE MANUFACTURING

- 12995 0C **Comparative study about the properties of in situ synthesized TiN/Ti6Al4V sandwich structure materials by selective laser melting and laser directed energy deposition [12995-25]**
- 12995 0D **Formation and extreme thickness controlling mechanism of ultra-thin-wall tungsten grids fabricated via selective laser melting [12995-26]**

POSTER SESSION

- 12995 0E **Challenges in the simulation of a multimode arrayed waveguide grating [12995-29]**