## PROCEEDINGS OF SPIE

## Advances in Microscopic Imaging IV

Emmanuel Beaurepaire Adela Ben-Yakar YongKeun Park Editors

28 June 2023 Munich, Germany

Sponsored by SPIE

Co-sponsored by Optica (United States)

Published by SPIE

**Volume 12630** 

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 Advances in Microscopic Imaging IV, edited by Emmanuel Beaurepaire, Adela Ben-Yakar, YongKeun Park, Proc. of SPIE 12630, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510664692

ISBN: 9781510664708 (electronic)

Published by

SPIE

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

31 IL.UIG

Copyright © 2023 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**

v Conference Committee

	ADVANCED MULTIPHOTON IMAGING
12630 02	Color TSFG microscopy of red blood cells and oxygenation (Invited Paper) [12630-1]
12630 03	Clear and deep temporal focusing multiphoton microscopy imaging using deep prediction with PhyCell and ConvLSTM [12630-2]
	COHERENT RAMAN TECHNIQUES
12630 04	Broadband CARS microscopy in the entire Raman-active region of biological samples via supercontinuum generation in bulk media (Invited Paper) [12630-4]
12630 06	Steroid penetration through different tissue barriers visualized by phase-modulated stimulated Raman scattering microscopy [12630-6]
	WAVEFRONT CONTROL AND ADAPTIVE OPTICS
12630 07	Random-access two-photon holographic optogenetic stimulation combined with brain-wide functional light-sheet imaging in larval zebrafish (Invited Paper) [12630-7]
12630 08	A novel adaptive optics illumination device for in vivo imaging of fluorescently labeled specimens [12630-8]
12630 0A	3D micropatterned multiphoton stimulation via deep computer-generated holography with digital propagation matrix [12630-10]
	FAST IMAGING METHODS
12630 OB	Kilohertz two-photon SLIDE microscopy using a newly developed 780nm excitation laser (Invited Paper) [12630-11]
12630 OD	Fast hyperspectral confocal microscopy for microlaser-based cell tracking and biosensing [12630-13]
12630 OE	Kilohertz multimodal SLIDE imaging in the visible [12630-14]

## PHASE AND POLARIZATION IMAGING 12630 OI Detection and classification of urine components utilizing quantitative phase imaging and machine learning [12630-19] **COMPUTATIONAL IMAGING** 12630 OL Multiscale resolution in structured illumination microscopy [12630-22] **POSTER SESSION** 12630 OP Highly temporal phase stable common-path quantitative phase microscope [12630-17] Small footprint SLIDE demonstrator for 40Hz volume rate multiphoton microscopy [12630-26] 12630 0Q 12630 OU C-CLASS microscopy allows the detection of nanoscale changes in chromatin structure [12630-30] 12630 OW White light phase-shifting interferometry using deep learning-based phase-shifter [12630-34] 12630 0X Microstructured tissue phantom for fluorescence microscopes and endoscopes [12630-35] 12630 OZ Simulating water as immersion medium for scanning laser optical tomography and correcting image artifacts due to refractive index mismatch [12630-37] 12630 11 **3D** visualization of multicellular tumor spheroids in fluorescence microscopy [12630-39] 12630 12 CNN-assisted quantitative phase microscopy for biological cell imaging [12630-40] 12630 14 Mueller matrix polarimetric imaging of whole-slide tissue samples [12630-42] 12630 16 Low-cost portable lens less digital holographic microscope for studying anemic RBCs [12630-44] 12630 17 Predicting dark-field images of H and E-stained esophageal specimens [12630-45] 12630 18 Al classification for hepatitis B virus detection based on Mueller matrix imaging [12630-46] 12630 1A Fiber-conduit-based laser speckle contrast imaging device for point of care diagnostics [12630-49]