High-Throughput Biophotonics: Imaging, Spectroscopy, and Beyond X

Kevin K. Tsia Keisuke Goda Editors

25–27 January 2025 San Francisco, California, United States

Sponsored by SPIE

Cosponsored by BaySpec, Inc. (United States) Nippon Electric Glass Company, Ltd. (Japan) OZ Optics Ltd. (Canada) Prospective Instruments LK OG (Austria) Tokyo Instruments Corporation (Japan) Yokogawa Corporation of America (United States)

Published by SPIE

Volume 13330

Proceedings of SPIE, 1605-7422, V. 13330

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 *High-Throughput Biophotonics: Imaging, Spectroscopy, and Beyond X,* edited by Kevin K. Tsia, Keisuke Goda, Proc. of SPIE 13330, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 1605-7422 ISSN: 2410-9045 (electronic)

ISBN: 9781510684089 ISBN: 9781510684096 (electronic)

Published by **SPIE** P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) SPIE.org Copyright © 2025 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

NEXT-GENERATION FLOW CYTOMETRY

- 13330 02 High-throughput, high-resolution volumetric imaging with light-field flow cytometry for multiparametric 3D single-cell analysis [13330-12]
- 13330 03 Ultra-high-throughput instant two-color light-field flow cytometer with extended field and depth [13330-13]

LARGE-SCALE NEUROSCIENCE

13330 04 Large-scale, single-shot quantitative polarization imaging with deep learning for label-free brain-wide analysis (Best Paper Award) [13330-18]

HIGH-THROUGHPUT IMAGING STRATEGIES II

13330 05 Stop stopping! A review of modern imaging and motion technologies to maximize throughput for gigapixel+ fields of view [13330-22]

HIGH-SPEED MULTIPHOTON IMAGING

- 13330.06 New ultrafast optics and scan engine technology to enable breakthrough multiphoton applications (Keynote Paper) [13330-27]
- 13330 07 Rapid Raman mapping of 96 μ-well SERS with an automated single-array Raman probe system [13330-32]

EMERGING IMAGING APPLICATIONS

- 13330 08 Multimodal imaging of subcellular metabolic dynamics reveals the anti-aging effect of metformin [13330-34]
- 13330 09 Volumetric phenotype quantification of in-vivo aquatic model using high-throughput optical coherence tomography [13330-36]

- 13330 0A Deep-learning-based 3D virtual histopathological image generation using DAPI and eosin fluorescence double staining and SACSI-CUT (self-attention with cellular structure and intensity consistency-based contrastive unpaired image translation) [13330-38]
- 13330 OB Advancing digital PCR data management: an open-source benchmark database [13330-40]