# Multiscale Imaging and Spectroscopy VI

Paul J. Campagnola Darren M. Roblyer Alex J. Walsh Editors

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

Sponsored and Published by SPIE

Volume 13327

Proceedings of SPIE 0277-786X, V. 13327

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 *Multiscale Imaging and Spectroscopy VI*, edited by Paul J. Campagnola, Darren M. Roblyer, Alex J. Walsh, Proc. of SPIE 13327, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510684027 ISBN: 9781510684034 (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

## LIGHT AND OPTICS I

13327 02 Fiber-based bimodal fluorescence detection under visible and two-photon excitation for tissue cancer discrimination [13327-7]

#### LIGHT AND DATA

13327 03 Oxygen-sensitive fluorophore-enhanced diffuse optical NIR spectroscopic imaging [13327-19]

#### MULTISCALE IMAGING OF VASCULATURE

- 13327 04 Quantitative imaging and measurement of tissue perfusion with laser speckle (Invited Paper) [13327-27]
- 13327 05 Combined structural and molecular zebrafish embryonic imaging on ethanol exposure effects during vasculature development [13327-30]

## POSTER SESSION

- 13327 06 Ultra-widefield multimodal microscope using a 250 megapixel sensor [13327-34]
- 13327 07 Computational ghost imaging using microwave kinetic inductance detectors for highresolution, wavelength-resolved bio and medical imaging [13327-36]