Advances in Microscopic Imaging III

Emmanuel Beaurepaire Adela Ben-Yakar YongKeun Park Editors

20–24 June 2021 Online Only, Germany

Sponsored by The Optical Society (United States) SPIE

Published by SPIF

Volume 11922

Proceedings of SPIE-OSA Biomedical Optics, 1605-7422, V. 11922

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 Advances in Microscopic Imaging III, edited by Emmanuel Beaurepaire, Adela Ben-Yakar, YongKeun Park, Proc. of SPIE-OSA 11922, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 1605-7422

ISSN: 2410-9045 (electronic)

ISBN: 9781510647107

ISBN: 9781510647114 (electronic)

Copublished by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445 SPIE.org

The Optical Society

2010 Massachusetts Ave., N.W., Washington, D.C., 20036 USA Telephone +1 202 223 8130 (Eastern Time) · Fax +1 202 223 1096 osa ora

Copyright © 2021 Society of Photo-Optical Instrumentation Engineers (SPIE) and The Optical Society

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

ADAPTIVE OPTICS AND IN-DEPTH IMAGING

	ADAI IVE OF IIOS AND IVE DEL III IMAGINO
11922 02	Multiphoton image enhancement with variable squared cubic phase masks [11922-1]
11922 03	Closed loop multi conjugated adaptive optics in microscopy using deformable lenses [11922-2]
11922 04	Sensorless adaptive optics for multimode optical fibre endo-microscopy [11922-3]
	ENDOSCOPY, SOURCES, FIBERS, TECHNOLOGY
11922 05	Robust optical autofocus system utilizing neural networks applied to automated multiwell plate STORM microscopy [11922-4]
11922 06	Unmatched back projector deconvolution for a miniature light field microscope [11922-5]
11922 07	Minimally invasive fiber endoscope with 3D printed diffractive optical element (DOE) for biomedicine [11922-6]
11922 08	Speckle-based super-resolution imaging via a multimode fiber [11922-7]
11922 09	Resolution limits of compressive imaging via a multimode fiber [11922-8]
11922 0A	Fiber-coupled, 20 MHz repetition rate, sub-ps Ti:sapphire laser for in-vivo nonlinear microscopy of the skin [11922-9]
11922 OB	Wide-field microscopic structural imaging of biological tissues using random laser [11922-10]
	FLIM AND ADVANCED FLUORESCENCE TECHNIQUES
11922 OC	SPAD array technology enables fluctuation-contrast super-resolution in a confocal microscope [11922-11]
11922 OD	Multispectral FLIM microscope based on compressive sensing acquisition [11922-12]
11922 OE	QuanTI-FRET calibration for quantitative FRET imaging in living samples [11922-13]
11922 OF	Photobleaching and correlation spectroscopy for in-situ quantification of multi-labelled molecules on surfaces [11922-14]

11922 0G	Ultra-broadband few-cycle laser pulses for simultaneous multi-color fluorescence microscopy applications via the SyncRGB-FLIM method [11922-15]
	LIGHT-SHEET AND VOLUMETRIC IMAGING TECHNIQUES
11922 OH	Adaptive optics light-sheet microscopy for functional neuroimaging [11922-16]
11922 01	Fast cardiac imaging in live embryos using multiphoton light-sheet microscopy at low laser repetition rate [11922-17]
11922 OJ	Single-shot volumetric imaging using optical projection tomography [11922-18]
11922 OK	Adaptive light sheet microscopy for in-vivo imaging of fluorescently labeled specimens [11922-19]
	MULTIPHOTON: SHG, THG, FWM, POLARIZATION
11922 OL	Polarization-resolved SHG imaging of lamellar organization in keratoconic human corneas [11922-20]
11922 OM	Wide-field polarization-resolved SHG microscopy in biomedical imaging [11922-21]
11922 ON	Nonlinear response of complex chiral biological structures in the focal volume of the microscope [11922-22]
11922 00	Novel time domain ptychography, i ² PIE, for improved contrast in nonlinear microscopy [11922-23]
11922 OP	In-vivo tracking of potassium niobate nanocrystals by means of a tunable nonlinear high energy widefield microscope [11922-24]
11922 0Q	Background-free 3D four-wave mixing microscopy of single gold nanoparticles inside biological systems [11922-25]
	POLARIZATION, ABSORPTION, SCATTERING, AND RAMAN TECHNIQUES
11922 OR	Hyperspectral absorption microscopy of live chicken embryo using photoacoustic remote sensing [11922-26]
11922 OS	Depth-resolved hematoxylin and eosin virtual histopathology with photoacoustic remote sensing and scattering microscopy [11922-27]
11922 OT	Improving objective measurements of the tumour-stroma ratio in breast cancer using polarized light microscopy [11922-28]

11922 OU	Signal-to-noise sensitivity of distance measures in hierarchical cluster analysis for Raman spectral imaging [11922-29]
11922 OV	Multimodal polarization-resolved/fluorescence optical scanning microscopy for chromatin organization imaging [11922-30]
11922 OW	Refractive index tomography for drug-induced liver injury analysis [11922-31]
	QPI AND PHASE TECHNIQUES
11922 OX	Lattice light-sheet microscopy with incoherent detection and extended field of view [11922-32]
11922 OY	Single-shot quantitative phase contrast using polarisation-resolved differential phase microscopy [11922-33]
11922 OZ	Self-referencing digital holographic microscopes for bio-physical and bio-mechanical characterization of blood cells [11922-34]
11922 10	Engineering of AOTF transfer function for phase imaging microscopy and optical trapping [11922-35]
11922 11	Pulsed optical phase contrast microscopy to measure the absolute pressure amplitudes of ultrasonic fields [11922-36]
	SRS/APPLICATIONS OF MULTIPHOTON MICROSCOPY
11922 12	Broadband stimulated Raman scattering microscopy for biomedical applications: a multi-channel lock-in approach [11922-37]
11922 13	3D-Imaging and quantification of collagen networks in mammary tumors on different size scales [11922-38]
11922 14	Comparison of SLOT and TPEF for cell spheroid imaging [11922-39]
11922 15	In-vivo multiphoton imaging of the human ocular anterior segment [11922-40]
	POSTER SESSION I
11922 16	Numerical classification of RBC images retrieved using diffraction phase microscopy [11922-41]
11922 17	Reducing labeling time of fluorescent molecules in thick tissue sections [11922-42]
11922 18	Rapid, contact-free, multimodal, non-linear optical imaging for collagen in formalin-fixed paraffin-embedded tendon tissue [11922-43]

11922 19	Fast analysis of resected breast tissue margins using ultraviolet photoacoustic remote sensing microscopy [11922-44]
11922 1A	Single objective tilted lightsheet for three-dimensional localization microscopy [11922-45]
11922 1B	Contrast and axial confinement enhancement in deep imaging via HiLo-based line-scanning temporal focusing microscopy [11922-46]
11922 1C	Spectral selection using acousto-optic tunable filters for the skin lesions diagnostics [11922-47]
	POSTER SESSION II
11922 1D	Chromatic dispersion-based wide-band, fiber-coupled, tunable light source for hyperspectral imaging [11922-48]
11922 1E	Low concentration <i>Phloxine B</i> staining for high chemical contrast, nonlinear microscope mosaic imaging of skin alterations in pseudoxanthoma elasticum [11922-49]
11922 1F	Differentiable microscopy ($\delta\mu$) for high-throughput imaging cytometry [11922-50]
11922 1G	Changes in human milk lipid composition and conformational state during a single breastfeed [11922-51]
11922 1H	Characterizing solid immersion focusing system using numerical modeling [11922-52]
11922 11	Assessing culture vitality with Raman spectral imaging [11922-53]
11922 1J	Design studies of aperiodic multicore fibres for lensless endoscopy [11922-54]
11922 1K	Fluorescence lifetime phantoms based on quenched coumarin derivatives [11922-55]
11922 1L	Multimodal label-free nonlinear optical microscopy on murine cortical bone to study skeletal diseases [11922-56]
	POSTER SESSION III
11922 1M	Investigation of Radachlorin accumulation in 3T3 cells by fluorescence microscopy and holographic tomography [11922-57]
11922 1N	Lensless microscopy through multiple determined masks [11922-58]
11922 10	Ptychography by using pinhole illumination in lens-less microscopy [11922-59]
11922 1P	A 3D-printed Archimedean actuator for focus adjustment in endoscopes [11922-60]