

Multiphoton Microscopy in the Biomedical Sciences XX

Ammasi Periasamy
Peter T. So
Karsten König
Editors

2–4 February 2020
San Francisco, California, United States

Sponsored by
SPIE

Cosponsored by
Thorlabs (United States) · Leica Microsystems (United States) · Becker & Hickl GmbH (Germany)
Spectra-Physics (United States) · Carl Zeiss (United States) · Applied Scientific Instrumentation
(United States) · Chroma Technology Corporation (United States) · PicoQuant Photonics
(United States) · Coherent Inc. (United States) · Semrock Inc. (United States) · Excelitas Technologies
ISS, Inc. (United States) · LaVision BioTec GmbH (Germany) · JenLab GmbH (Germany)

Published by
SPIE

Volume 11244

Proceedings of SPIE, 1605-7422, V. 11244

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 *Multiphoton Microscopy in the Biomedical Sciences XX*, edited by Ammasi Periasamy, Peter T. So, Karsten König, Proceedings of SPIE Vol. 11244 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

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

ISBN: 9781510632516
ISBN: 9781510632523 (electronic)

Published 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
Copyright © 2020, Society of Photo-Optical Instrumentation Engineers.

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 copying fees. The Transactional Reporting Service base fee for this volume is \$21.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online 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. The CCC fee code is 1605-7422/20/\$21.00.

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: Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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

vii	Authors
ix	Conference Committee
xiii	Introduction

METABOLISM/NADH/FAD/TRYPHTOPHAN

11244 0L	Metabolic imaging by simultaneous 2-photon FLIM of NAD(P)H and FAD (Invited Paper) [11244-20]
----------	---

TECHNOLOGY AND IN VIVO IMAGING I

11244 0S	Multiphoton and FLIM imaging in quantifying ex vivo and in vivo body organ kinetics of solutes (Invited Paper) [11244-27]
----------	---

SHG/THG MICROSCOPY

11244 10	Evaluation of newly synthesized potential NLO-phores for 2-photon and SHG imaging (Invited Paper) [11244-37]
11244 14	Second harmonic generation imaging collagen structure modulation in embryonic chicken cornea [11244-39]

FLIM/FRET/FCS

11244 1B	Live cell metabolic imaging of cancer cell lines using multiphoton fluorescence polarization (Invited Paper) [11244-46]
----------	---

TECHNOLOGY AND IN VIVO IMAGING III

11244 1C	Time-resolved mesoscopic imaging of a whole animal by FastFLIM (Invited Paper) [11244-47]
11244 1D	Real time imaging of the detection volume of a confocal microscope (Invited Paper) [11244-48]

11244 1F Multiplexed 3-photon microscopy for functional connectomics of mammalian brains
[11244-50]

TECHNOLOGY AND RAMAN MICROSCOPY

11244 1K High-speed imaging of gas-bubble formation during femtosecond-laser cell optoporation
[11244-55]

11244 1M Frequency-tunable two-color ultrafast fiber laser for nonlinear excitation of NADH and FAD
[11244-57]

TECHNOLOGY AND IN VIVO IMAGING IV

11244 1S Flexible multiphoton tomography with femtosecond pulse hollow-core fiber delivery [11244-62]

11244 1V Multiphoton autofluorescence imaging of advanced glycation end products in glycated
tissues [11244-65]

POSTER SESSION

11244 20 Bleed-through elimination method in a dual-channel fluorescence microscopy system
(Best Poster Award) [11244-70]

11244 26 Nonlinear imaging using a 35 fs 3.5 nJ all-PM fiber laser frequency doubled at 800 nm
[11244-76]

11244 28 Multiphoton imaging of dye penetration dynamics in tissue sections [11244-78]

11244 2A Automated Gleason grading of prostate cancers via deep learning in label-free multiphoton
microscopic images [11244-80]

11244 2B Multi-photon excited Fourier-transform fluorescence recovery after photobleaching (FT-FRAP)
with patterned illumination [11244-81]

11244 2C Electric field imaging with vibrationally-resonant electric field-induced sum-frequency
generation [11244-82]

11244 2E Study of the sarcomeric addition process in a tissue-like cell construct under mechanical
overload via TPEF-SHG imaging system [11244-85]

11244 2H Monitoring drug induced changes in cardiomyocyte contractility with second harmonic
generation (SHG) microscopy (Best Poster Award) [11244-89]

11244 2L High-speed, large field-of-view and deep imaging with an adaptive excitation source
[11244-93]

- 11244 2M Imaging plasma membrane microviscosity in cancer cells during chemotherapy (JenLab Young Investigator Award) [11244-94]
- 11244 2N Monitoring uptake of palmitic acid by glioma cells using stimulated Raman scattering microscopy (Best Poster Award) [11244-84]