

PROGRESS IN BIOMEDICAL OPTICS AND IMAGING

Vol. 21 No. 8

Ophthalmic Technologies XXX

Fabrice Manns
Arthur Ho
Per G. Söderberg
Editors

1–2 February 2020
San Francisco, California, United States

Sponsored and Published by
SPIE

Volume 11218

Proceedings of SPIE, 1605-7422, V. 11218

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 *Ophthalmic Technologies XXX*, edited by Fabrice Manns, Arthur Ho, Per G. Söderberg, Proceedings of SPIE Vol. 11218 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

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

ISBN: 9781510631991
ISBN: 9781510632004 (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	<i>Authors</i>
ix	<i>Conference Committee</i>
xi	<i>Introduction</i>

IMAGING, SURGERY, AND THERAPY: NEW TECHNOLOGIES I

11218 04	Motion-free optical coherence tomography imaging of retinal disease using Lissajous scanning pattern [11218-3]
11218 06	Holographic display for optical retinal prosthesis: design and validation [11218-5]

PASCAL ROL LECTURE

11218 0D	Achievements and need for technologies to advance image-guided retinal surgery and the care of retinal diseases in children (Invited Paper) [11218-12]
----------	---

OPHTHALMIC IMAGING AND DIAGNOSIS: CLINICAL

11218 0I	Fully automatic estimation of the angular distribution of the waist of the nerve fiber layer in the optic nerve head [11218-17]
----------	--

OPHTHALMIC IMAGING: CELLULAR

11218 0Q	Fully automatic quantification of individual ganglion cells from AO-OCT volumes via weakly supervised learning [11218-25]
----------	--

OCULAR BIOMECHANICS: JOINT SESSION WITH CONFERENCES 11242 AND 11218

11218 0U	All-optical correlative micro-spectroscopies in the investigation of stromal collagen morpho-mechanics [11218-29]
----------	--

IMAGING, SURGERY, AND THERAPY: NEW TECHNOLOGIES II

11218 0X **Wavefront sensorless multimodal handheld adaptive optics scanning laser ophthalmoscope for in vivo imaging of human retinal cones** [11218-32]

OPHTHALMIC IMAGING: FUNCTIONAL

11218 13 **Investigating the functional response of human cones and rods with a combined adaptive optics SLO-OCT system** [11218-38]

11218 15 **Measuring dysfunction of cone photoreceptors in retinitis pigmentosa with phase-sensitive AO-OCT** [11218-40]

OPHTHALMIC DIAGNOSIS: CONTRAST AND BIOMARKERS

11218 1G **Analyzing birefringence in the retinal nerve fiber layer of diabetic patients using polarization sensitive OCT** [11218-8]

11218 1H **Retinal pigment epithelium-melanin specific contrast imaging by multi-contrast OCT** [11218-52]

POSTER SESSION

11218 1K **Application of an enhanced deep super-resolution network in retinal image analysis** [11218-55]

11218 1L **Analysis of tear film break-up time based on the tear film surface quality obtained using Placido rings images** [11218-56]

11218 1N **Prototype for blue light blocking tests in sunglasses** [11218-58]

11218 1O **Comparison of foveal avascular zone in diabetic retinopathy, high myopia, and normal fundus images** [11218-59]

11218 1P **Deep learning for objective OCTA detection of diabetic retinopathy** [11218-60]

11218 1Q **UV and blue light protection on sunglasses after aging process** [11218-61]

11218 1R **A new technique for estimating the foveal avascular zone dimensions** [11218-62]

11218 1W **New high-resolution wave ophthalmic instrument for the characterizing ocular optics** [11218-67]

11218 22 **Estimating visual acuity from a single wavefront measurement** [11218-73]

- 11218 23 **Estimating retinal vascular permeability from fluorescein videoangiography data despite signal saturation in large vessels in low-dynamic range systems** [11218-74]
- 11218 24 **Quantitative analysis of vascular complexity in OCTA of diabetic retinopathy** [11218-75]
- 11218 25 **Multimodal photoacoustic microscopy and optical coherence tomography imaging of damaged choroidal vessels in the rabbit retina** [11218-76]
- 11218 28 **Diagnosis of corneal pathologies using deep learning** [11218-80]