

# ***Optical Elastography and Tissue Biomechanics VII***

**Kirill V. Larin**  
**Giuliano Scarcelli**  
*Editors*

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

*Sponsored by*  
SPIE

*Cosponsored by*  
Thorlabs (United States)

*Published by*  
SPIE

**Volume 11242**

Proceedings of SPIE, 1605-7422, V. 11242

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Optical Elastography and Tissue Biomechanics VII, edited by Kirill V. Larin, Giuliano Scarcelli, Proc. of SPIE  
Vol. 11242, 1124201 · © 2020 SPIE · CCC code: 1605-7422/20/\$21 · doi: 10.1117/12.2566013

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 *Optical Elastography and Tissue Biomechanics VII*, edited by Kirill V. Larin, Giuliano Scarcelli, Proceedings of SPIE Vol. 11242 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

ISSN: 1605-7422

ISSN: 2410-9045 (electronic)

ISBN: 9781510632479

ISBN: 9781510632486 (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](http://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**  
SPIEDigitalLibrary.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

v	<i>Authors</i>
vii	<i>Conference Committee</i>

---

## OPTICAL COHERENCE ELASTOGRAPHY I

---

11242 02	<b>OCT-based strain mapping and compression optical coherence elastography to study and control laser-assisted modification of avascular collagenous tissues (Invited Paper) [11242-1]</b>
11242 05	<b>Heartbeat OCE: Corneal biomechanical response to simulated heartbeat pulsation [11242-4]</b>

---

## BRILLOUIN ELASTOGRAPHY

---

11242 0F	<b>Mapping the phonon dispersion in biological matter using angle-resolved Brillouin light scattering microspectroscopy (Invited Paper) [11242-14]</b>
----------	--

---

## OPTICAL COHERENCE ELASTOGRAPHY II

---

11242 0W	<b>Mechanical changes of the crystalline lens in oxidative cataractogenesis assessed with optical coherence elastography [11242-31]</b>
----------	---

---

## POSTER SESSION

---

11242 14	<b>Tissue analysis using optical and mechanical tissue properties obtained by polarization-sensitive optical coherence elastography [11242-39]</b>
11242 18	<b>Spatial coordinate corrected motion tracking for optical coherence elastography [11242-43]</b>



# Author Index

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

Aglyamov, Salavat R., 05, 0W  
Baum, Olga I., 02  
Elsayad, Kareem, 0F  
Hubbi, Basil, 18  
Kobayashi, Masaki, 14  
Larin, Kirill V., 05, 0W  
Li, En, 14  
Liu, Xuan, 18  
Liu, Yuwei, 18  
Makita, Shuichi, 14  
Matveev, Lev A., 02  
Matveyev, Alexander L., 02  
Miyazawa, Arata, 14  
Nair, Achuth, 05, 0W  
Omelchenko, A. I., 02  
Peters, Stephen, 18  
Sakai, Shingo, 14  
Singh, Manmohan, 05  
Sobol, Emil N., 02  
Sovetsky, Alexander A., 02  
Yamazaki, Kohei, 14  
Yasuno, Yoshiaki, 14  
Yuzhakov, Alexey V., 02  
Zaitsev, Vladimir Y., 02  
Zhang, Hongqiu, 0W  
Zhou, Xianlian, 18



# Conference Committee

## *Symposium Chairs*

**Jennifer K. Barton**, The University of Arizona (United States)  
**Wolfgang Drexler**, Medizinische Universität Wien (Austria)

## *Program Track Chairs*

**E. Duco Jansen**, Vanderbilt University (United States)  
**Jessica C. Ramella-Roman**, Florida International University  
(United States)

## *Conference Chairs*

**Kirill V. Larin**, University of Houston (United States)  
**Giuliano Scarcelli**, University of Maryland, College Park  
(United States)

## *Conference Program Committee*

**Steven G. Adie**, Cornell University (United States)  
**Albert Claude Boccara**, Institut Langevin Ondes et Images (France)  
**Brett E. Bouma**, Wellman Center for Photomedicine (United States)  
**Stefan Catheline**, Institut National de la Santé et de la Recherche  
Médicale (France)  
**Zhongping Chen**, Beckman Laser Institute and Medical Clinic  
(United States)  
**Jürgen W. Czarske**, TU Dresden (Germany)  
**Kishan Dholakia**, University of St. Andrews (United Kingdom)  
**Christine P. Hendon**, Columbia University (United States)  
**Daive Iannuzzi**, Vrije Universiteit Amsterdam (Netherlands)  
**Brendan F. Kennedy**, The University of Western Australia (Australia)  
**Sean J. Kirkpatrick**, Michigan Technological University (United States)  
**Matthew O'Donnell**, University of Washington (United States)  
**Amy L. Oldenburg**, The University of North Carolina at Chapel Hill  
(United States)  
**Gabriel Popescu**, University of Illinois (United States)  
**Jannick P. Rolland**, The Institute of Optics (United States)  
**David D. Sampson**, University of Surrey (United Kingdom)  
**Ian A. Sigal**, University of Pittsburgh (United States)  
**Kandice Tanner**, National Cancer Institute (United States)  
**Peter Török**, Imperial College London (United Kingdom)  
**Ruikang K. Wang**, University of Washington (United States)  
**Tianshi Wang**, Erasmus MC (Netherlands)

**Vladislav V. Yakovlev**, Texas A&M University (United States)  
**Seok Hyun A. Yun**, Wellman Center for Photomedicine (United States)  
**Vladimir Y. Zaitsev**, Institute of Applied Physics of the RAS  
(Russian Federation)  
**Qifa Zhou**, The University of Southern California (United States)

*Session Chairs*

- 1 Optical Coherence Elastography I  
**Qifa Zhou**, The University of Southern California (United States)  
**Albert Claude Boccara**, Institut Langevin Ondes et Images (France)
- 2 Novel Methods I  
**Ian A. Sigal**, Laboratory of Ocular Biomechanics (United States)  
**Jürgen W. Czarske**, TU Dresden (Germany)
- 3 Keynote  
**Kirill V. Larin**, University of Houston (United States)
- 4 Tissue Mechanics  
**Brendan F. Kennedy**, Harry Perkins Institute of Medical Research  
(Australia)  
**Christine P. Hendon**, Columbia University (United States)
- 5 Brillouin Elastography  
**Seok-Hyun Yun**, Wellman Center for Photomedicine (United States)  
**Peter Török**, Nanyang Technological University (Singapore)
- 6 Ocular Biomechanics: Joint Session with Conferences 11242 and  
11218  
**Kirill V. Larin**, University of Houston (United States)  
**Giuliano Scarcelli**, University of Maryland, College Park  
(United States)
- 7 Novel Methods II  
**Steven G. Adie**, Cornell University (United States)  
**Tianshi Wang**, Erasmus MC (Netherlands)
- 8 Computational Methods for Biomechanics  
**Matthew O'Donnell**, University of Washington (United States)  
**Stefan Catheline**, Laboratoire de Thérapeutiques Applications of  
Ultrasound (France)
- 9 Optical Coherence Elastography II  
**Amy L. Oldenburg**, The University of North Carolina at Chapel Hill  
(United States)  
**Zhongping Chen**, Beckman Laser Institute and Medical Clinic  
(United States)