Optical Methods in Developmental Biology III

Andrew M. Rollins Scott E. Fraser Michael A. Choma Editors

7–8 February 2015 San Francisco, California, United States

Sponsored by Nufern Inc. Physik Instrumente ThorLabs, Inc.

Published by SPIE

Volume 9334

Proceedings of SPIE, 1605-7422, V. 9334

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

Optical Methods in Developmental Biology III, edited by Andrew M. Rollins, Scott E. Fraser, Michael A. Choma, Proc. of SPIE Vol. 9334, 933401 · © 2015 SPIE · CCC code: 1605-7422/15/\$18 · doi: 10.1117/12.2192764

The papers included 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. The papers published in these proceedings 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 this book:

Author(s), "Title of Paper," in Optical Methods in Developmental Biology III, edited by Andrew M. Rollins, Scott E. Fraser, Michael A. Choma, Proceedings of SPIE Vol. 9334 (SPIE, Bellingham, WA, 2015) Article CID Number.

ISSN: 1605-7422 ISBN: 9781628414240

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 © 2015, 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 \$18.00 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 1605-7422/15/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.



Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print. Papers are published as they are submitted and meet publication criteria. A unique citation identifier (CID) number is assigned to each article at the time of the first 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, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four 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. The complete citation is used on the first page, and an abbreviated version on subsequent pages.

Contents

- v Authors
- vii Conference Committee

NOVEL PHYSIOLOGY AND DISEASE MECHANISMS

- 9334 08 Using SPIM to track the development of the focal power of the zebrafish lens [9334-7]
- 9334 09 **Dynamic imaging of preimplantation embryos in the murine oviduct** [9334-8]

NOVEL IMAGING I

- 9334 0C An imaging and analysis toolset for the study of Caenorhabditis elegans neurodevelopment (Invited Paper) [9334-11]
- 9334 0D Quantitative analyses for elucidating mechanisms of cell fate commitment in the mouse blastocyst (Invited Paper) [9334-12]

NOVEL IMAGING II

9334 0J Comparison of optical projection tomography and optical coherence tomography for assessment of murine embryonic development [9334-18]

CARDIOVASCULAR II

9334 0S Live dynamic imaging and analysis of developmental cardiac defects in mouse models with optical coherence tomography [9334-27]

POSTER SESSION

- 9334 0V Approach to quantify two-dimensional strain of chick embryonic heart in early stage based on spectral domain optical coherence tomography [9334-30]
- 9334 0W Measurement of wall shear stress in chick embryonic heart using optical coherence tomography [9334-31]
- 9334 0X Improving resolution of optical coherence tomography for imaging of microstructures [9334-32]

Authors

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.

Bao, Zhirong, OC Bokinsky, Alexandra, OC Burton, Jason C., 09 Christensen, Ryan, OC Colón-Ramos, Daniel, OC Dickinson, Mary E., 0J Di Talia, Stefano, OD Dou, Shidan, OV, OW Frazier, Michael V., 0J Garcia, Monica, OS Girkin, John M., 08 Hadjantonakis, Anna-Katerina, OD Janecek, Trevor, OJ Jarrin, Miguel, 08 Kang, Minjung, OD Kovacevic, Ismar, 0C Kumar, Abhishek, 0C Larin, Kirill V., OJ, OS Larina, Irina V., 09, 0S Lopez, Andrew L., III, OS Lou, Xinghua, OD Lu, Hui, OX Ma, Zhenhe, OV, OW Marquina, Javier, OC McCreedy, Evan, 0C Mohler, William, 0C Nair, Achuth, 0J Piazza, Victor, OJ Puliafito, Alberto, 0D Quinlan, Roy, 08 Saiz, Néstor, OD Santella, Anthony, OC Saunter, Christopher D., 08 Schrode, Nadine, 0D Shen, Kai, OX Shroff, Hari, OC Singh, Manmohan, OJ Suo, Yanyan, OW Udan, Ryan, OJ Vedakkan, Tegy, OJ Valladolid, Christian, 0S Wang, Fengwen, OV, OW Wang, James H., OX Wang, Michael R., 0X Wang, Shang, 09, 0S Wang, Yi, OV, OW Winter, Peter, 0C Wu, Yicong, 0C Xenopoulos, Panagiotis, 0D

Xu, Tao, OV Young, Laura K., 08 Zhao, Yuqian, 0V, 0W Zhu, Wenlong, 0V

Conference Committee

Symposium Chairs

James G. Fujimoto, Massachusetts Institute of Technology (United States)

R. Rox Anderson, Wellman Center for Photomedicine, Massachusetts General Hospital (United States) and Harvard School of Medicine (United States)

Program Track Chairs

Ammasi Periasamy, University of Virginia (United States) **Daniel L. Farkas**, The University of Southern California (United States)

Conference Chairs

Andrew M. Rollins, Case Western Reserve University (United States) Scott E. Fraser, The University of Southern California (United States) Michael A. Choma, Yale School of Medicine (United States)

Conference Program Committee

Anjul M. Davis, Thorlabs, Inc. (United States) Mary E. Dickinson, Baylor College of Medicine (United States) Robert G. Gourdie, Virginia Polytechnic Institute and State University (United States) Michael W. Jenkins, Case Western Reserve University (United States) Bradley B. Keller, University of Louisville (United States) Kirill V. Larin, University of Houston (United States) Kersti K. Linask, University of South Florida (United States) Charles D. Little, The University of Kansas Medical Center (United States) Cecilia W. Lo, University of Pittsburgh (United States) David Sedmera, Charles University in Prague (Czech Republic) Lars Thrane, Technical University of Denmark (Denmark) Ruikang K. Wang, University of Washington (United States) Michiko Watanabe, Case Western Reserve University (United States) Talât Mesud Yelbuz, Medizinische Hochschule Hannover (Germany)

Session Chairs

 Cardiovascular I Mary E. Dickinson, Baylor College of Medicine (United States)

- 2 Novel Physiology and Disease Mechanisms Irina V. Larina, Baylor College of Medicine (United States)
- 3 Novel Imaging I Audrey K. Ellerbee, Stanford University (United States)
- 4 Novel Imaging II **Michael W. Jenkins**, Case Western Reserve University (United States)
- 5 Complex Dynamics and Control **Chao Zhou**, Lehigh University (United States)
- 6 Cardiovascular II **Ruikang K. Wang**, University of Washington (United States)