PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 10070

, "Front Matter: Volume 10070," Proc. SPIE 10070, Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXIV, 1007001 (24 April 2017); doi: 10.1117/12.2276285

SPIE.

Event: SPIE BiOS, 2017, San Francisco, California, United States

Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXIV

Thomas G. Brown

Carol J. Cogswell

Tony Wilson

Editors

30 January–1 February 2017

San Francisco, California, United States

Sponsored and Published by

SPIE

Volume 10070

Proceedings of SPIE, 1605-7422, V. 10070

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

Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXIV, edited by

Thomas G. Brown, Carol J. Cogswell, Tony Wilson, Proc. of SPIE Vol. 10070, 1007001

© 2017 SPIE · CCC code: 1605-7422/17/\$18 · doi: 10.1117/12.2276285

Proc. of SPIE Vol. 10070 1007001-1

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 *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXIV*, edited by Thomas G. Brown, Carol J. Cogswell, Tony Wilson, Proceedings of SPIE Vol. 10070 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

ISSN: 1605-7422

ISSN: 2410-9045 (electronic)

ISBN: 9781510605817

ISBN: 9781510605824 (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 © 2017, 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 1605-7422/17/\$18.00.

Printed in the United States of America.

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

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

SESSION 1	ILLUMINATION, TOMOGRAPHY AND EXTENDED DEPTH OF FOCUS
10070 04	Implementation of an incoherent 3D patterned illumination design in a structured illumination microscope [10070-3]
10070 05	Toward multi-focal spot remote focusing two-photon microscopy for high speed imaging [10070-4]
SESSION 2	HOLOGRAPHIC MICROSCOPY
10070 08	3D lens-free microscopy for cell culture [10070-7]
10070 09	Focus-tunable lens in limited-angle holographic tomography [10070-8]
10070 0A	Simple and fast spectral domain algorithm for quantitative phase imaging of living cells with digital holographic microscopy [10070-9]
SESSION 3	LIGHT SHEET AND SINGLE PLANE MICROSCOPY
10070 0B	Probing neural tissue with airy light-sheet microscopy: investigation of imaging performance at depth within turbid media [10070-10]
SESSION 4	MULTIDIMENSIONAL IMAGING AND LOCALIZATION
10070 0G	Spatially-controlled illumination with rescan confocal microscopy enhances image quality, resolution and reduces photodamage [10070-16]
10070 0H	Comparison of 3D structured patterns with tunable frequency for use in structured illumination microscopy [10070-17]
10070 0J	A state space based approach to localizing single molecules from multi-emitter images [10070-19]
SESSION 5	TRACKING AND LOCALIZATION
10070 0L	Remote focusing multifocal plane microscopy for the imaging of 3D single molecule dynamics with cellular context [10070-21]

SESSION 6	RESOLUTION ENHANCEMENTS IN MULTIDIMENSIONAL IMAGING
10070 0R	5D imaging approaches reveal the formation of distinct intracellular cAMP spatial gradients [10070-28]
SESSION 7	IMAGE RECONSTRUCTION
10070 0W	Imaging beyond scattering limits utilizing acoustic radiation force as a guidestar [10070-34]
SESSION 8	INCREASING SPEED AND ROBUSTNESS IN MULTIDIMENSIONAL IMAGING
10070 0X	Fast multiplane functional imaging combining acousto-optic switching and remote focusing [10070-35]
10070 0Y	Fast axial scanning for 2-photon microscopy using liquid lens technology [10070-36]
10070 10	Accurate time-domain angular jitter measurements for a high-speed polygon scanner [10070-38]
SESSION 9	IMAGE RECONSTRUCTION AND ANALYSIS
10070 12	White matter segmentation by estimating tissue optical attenuation from volumetric OCT massive histology of whole rodent brains [10070-39]
10070 13	Comparison of two structured illumination techniques based on different 3D illumination patterns [10070-40]
10070 16	Time-resolved wavelet-based acquisitions using a single pixel camera [10070-43]
SESSION 10	COHERENCE AND SPECTRAL IMAGING
10070 17	Multi-beam optical coherence tomography for microvascular imaging of human skin in vivo [10070-44]
SESSION 11	QUANTITATIVE IMAGING
10070 1F	Spatial frequency domain speckle contrast imaging [10070-61]
	POSTER SESSION
10070 1L	Theoretical analysis of lateral resolution given by annular super-resolution phase plate [10070-57]

- 10070 1M **Relationship between reconstruction quality and scan type for compressive sensing based on cone beam CT reconstruction [10070-58]**
- 10070 1N **Coherent light 3D materials microscopy without phase retrieval [10070-60]**

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five 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.

Aggarwal, Sanya, 0B	King, S. V., 04
Allier, Cédric, 08	Kohl, Michael M., 0X
Annamdevula, Naga, 0R	Krauze, W., 09
Barreiros, Inês, 0X	Krishnaswami, Venkataraman, 0G
Berdeu, Anthony, 08	Kujawińska, M., 09
Bokor, Nador, 1L	Kumagai, Hiroshi, 1L
Booth, Martin J., 05, 0X	Kuś, A., 09
Breedijk, Ronald M. P., 0G	Leavesley, Silas J., 0R
Britain, Andrea L., 0R	Lefebvre, Joël, 12
Bub, Gil, 05	Lesage, Frédéric, 12
Castonguay, Alexandre, 12	Li, Bei, 05, 0X
Chao, Jerry, 0J, 0L	Li, Jiao, 1M
Chen, Chaoliang, 17	Manders, Erik M. M., 0G
Chen, Simeng, 1N	Mann, Edward, 05
Cheng, Kyle H. Y., 17	Mayes, Samuel A., 0R
Chong, Ee Zhuan, 05, 0X	McCluskey, Kaley, 0B
Cogswell, Carol, 1N	Min, Junwei, 0A
Corbett, Alexander D., 05	Momey, Fabien, 08
D'Andrea, Cosimo, 16	Mortensen, Luke J., 0Y
Deal, Joshua, 0R	Nagai, Kumei, 1L
De Luca, Giulia M. R., 0G	Necochea, Jaime, 1F
Deorajh, Ryan, 17	Nylk, Jonathan, 0B
Dholakia, Kishan, 0B	Ober, Raimund J., 0J, 0L
DiMarzio, Charles A., 0W, 1F	Patwary, N., 04, 13
Dinten, Jean-Marc, 08	Peyrin, Françoise, 16
Doblas, Ana, 04, 0H, 13	Picollet-D'hahan, Nathalie, 08
Ducros, Nicolas, 16	Preza, Chrysanthé, 04, 0H, 13
Farina, Andrea, 16	Prieto, Jaime, 1F
Gao, Feng, 1M	Ramjist, Joel, 17
Gao, Wanrong, 17	Rich, Thomas C., 0R
Gidrol, Xavier, 08	Rousset, Florian, 16
Griswold, John R., 0R	Saavedra, Genaro, 04, 0H, 13
Hoebe, Ron A., 0G	Shabani, Hasti, 04, 0H, 13
Hoffman, Chase, 0R	So, Byung Hwy, 10
Hoffman, Zachary, 1F	Sun, Min Kyoung, 0Y
Hollmann, Joseph L., 0W	Taylor, C., 04
Holt, R. Glynn, 0W	Tehrani, Kayvan Forouhesh, 0Y
Hwang, Won Sang, 10	Tello, Javier A., 0B
Iketaki, Yoshinori, 1L	Trinh, Kenny, 0R
Jakubovic, Raphael, 17	Vahid, Milad R., 0J
Ji, Youn Young, 10	Vakili, Ali, 0W
Jivraj, Jamil, 17	Valentini, Gianluca, 16
Karumbaiah, Lohitash, 0Y	Van Noorden, Cornelis J. F., 0G
Kemper, Björn, 0A	Velmurugan, Ramraj, 0L
Ketelhut, Steffi, 0A	Ward, E. Sally, 0J, 0L
Kim, Don Geun, 10	West, Savannah, 0R
Kim, Dongyoung, 0L	Wilson, Tony, 05
Kim, Dug Young, 10	Xing, Jian, 1N
Kim, Jun Woo, 10	Yang, Victor X. D., 17

Yao, Baoli, 0A
You, Sungyong, 0L
Yu, Jiun-Yann, 1N
Zhang, Limin, 1M
Zhang, Lin, 1M
Zhao, Huijuan, 1M
Zhou, Zhongxing, 1M

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 Medical School
(United States)

Program Track Chairs

Ammasi Periasamy, University of Virginia (United States)

Daniel L. Farkas, University of Southern California (United States) and
SMI (United States)

Conference Chairs

Thomas G. Brown, University of Rochester (United States)

Carol J. Cogswell, University of Colorado at Boulder (United States)

Tony Wilson, University of Oxford (United Kingdom)

Conference Program Committee

Martin Booth, University of Oxford (United Kingdom)

Charles A. DiMarzio, Northeastern University (United States)

Raimund J. Ober, Texas A&M University (United States)

Chrysanthe Preza, University of Memphis (United States)

Monika Ritsch-Marte, Medizinische Universität Innsbruck (Austria)

Laura Waller, University of California, Berkeley (United States)

Session Chairs

- 1 Illumination, Tomography and Extended Depth of Focus

Thomas G. Brown, University of Rochester (United States)

- 2 Holographic Microscopy

Tony Wilson, University of Oxford (United Kingdom)

- 3 Light Sheet and Single Plane Microscopy

Carol J. Cogswell, University of Colorado Boulder (United States)

- 4 Multidimensional Imaging and Localization

Raimund J. Ober, Texas A&M University (United States)

- 5 Tracking and Localization
Carol J. Cogswell, University of Colorado Boulder (United States)
- 6 Resolution Enhancements in Multidimensional Imaging
Tony Wilson, University of Oxford (United Kingdom)
- 7 Image Reconstruction
Martin J. Booth, University of Oxford (United Kingdom)
- 8 Increasing Speed and Robustness in Multidimensional Imaging
Nicolas Pegard, University of California, Berkeley (United States)
- 9 Image Reconstruction and Analysis
Charles A. DiMarzio, Northeastern University (United States)
- 10 Coherence and Spectral Imaging
Nicolas Pegard, University of California, Berkeley (United States)
Volker Jaedicke, University of California, Berkeley (United States)
- 11 Quantitative Imaging
Ana Doblaz, The University of North Carolina at Chapel Hill
(United States)
- 12 Quantitative Tissue Imaging
Sharon V. King, The University of Memphis (United States)