PROCEEDINGS OF SPIE

[SPIDigitalLibrary.org/conference-proceedings-of-spie](https://spiedigitallibrary.org/conference-proceedings-of-spie)

Front Matter: Volume 8800

, "Front Matter: Volume 8800," Proc. SPIE 8800, Opto-Acoustic Methods and Applications, 880001 (21 June 2013); doi: 10.1117/12.2034108

SPIE.

Event: European Conferences on Biomedical Optics, 2013, Munich, Germany

Opto-Acoustic Methods and Applications

**Vasilis Ntziachristos
Charles P. Lin**
Editors

**12–14 May 2013
Munich, Germany**

Sponsored by
The Optical Society (United States)
SPIE

With Support From
Air Force Office of Scientific Research (United States)
ThorLabs (United Kingdom)

Student Award Sponsors
Toptica Photonics AG (Germany)
Zeiss (United States)

Published by
SPIE

Volume 8800

Proceedings of OSA Biomedical Optics-SPIE, 1605-7422, V. 8800

Opto-Acoustic Methods and Applications, edited by Vasilis Ntziachristos, Charles P. Lin,
Proc. of OSA Biomedical Optics-SPIE Vol. 8800, 880001 · © 2013 OSA-SPIE
CCC code: 1605-7422/13/\$18 · doi: 10.1117/12.2034108

Proc. of OSA-SPIE Vol. 8800 880001-1

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 *Opto-Acoustic Methods and Applications*, edited by Vasilis Ntziachristos, Charles P. Lin, Proceedings of OSA Biomedical Optics-SPIE Vol. 8800 (SPIE, Bellingham, WA, 2013) Article CID Number.

ISSN: 1605-7422

ISBN: 9780819496492

Copublished 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

and

The Optical Society

2010 Massachusetts Ave., N.W., Washington, D.C., 20036 USA

Telephone 1 202/223-8130 (Eastern Time) · Fax 1 202/223-1096

<http://www.osa.org>

Copyright © 2013, Society of Photo-Optical Instrumentation Engineers and The Optical Society

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 1605-7422/13/\$18.00.

Printed in the United States of America.

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

SPIEDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent 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. Numbers in the index correspond to the last two digits of the six-digit CID Number.

Contents

vii *Conference Committee*

SESSION 1 ADVANCEMENTS IN METHODOLOGY I

- 8800 02 **Free beam Fabry-Perot-interferometer as detector for photoacoustic tomography** [8800-14]
S. Gratt, G. Wurzing, R. Nuster, G. Paltauf, Karl-Franzens-Univ. Graz (Austria)
- 8800 03 **Multiple bandwidth volumetric optoacoustic tomography using conventional ultrasound linear arrays** [8800-4]
A. Chekkoury, J. Gateau, V. Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany)

SESSION 2 NOVEL APPLICATIONS I

- 8800 04 **Photoacoustic imaging of breast tumor vascularization: a comparison with MRI and histopathology** [8800-15]
M. Heijblom, Univ. Twente (Netherlands) and Medisch Spectrum Twente (Netherlands); D. Piras, Univ. Twente (Netherlands); F. M. van den Engh, J. M. Klaase, Medisch Spectrum Twente (Netherlands); M. Brinkhuis, Lab. for Pathology East Netherlands (Netherlands); W. Steenbergen, S. Manohar, Univ. Twente (Netherlands)

SESSION 3 ADVANCEMENTS IN METHODOLOGY II

- 8800 05 **Simultaneous three-dimensional laser-ultrasound and photoacoustic imaging** [8800-13]
G. Wurzing, R. Nuster, Karl-Franzens-Univ. Graz (Austria); N. Schmitner, Univ. of Innsbruck (Austria); S. Gratt, G. Paltauf, Karl-Franzens-Univ. Graz (Austria)
- 8800 06 **Image reconstruction in quantitative photoacoustic tomography using the radiative transfer equation and the diffusion approximation** [8800-6]
T. Tarvainen, Univ. of Eastern Finland (Finland) and Univ. College London (United Kingdom); A. Pulkkinen, Univ. of Eastern Finland (Finland); B. T. Cox, Univ. College London (United Kingdom); J. P. Kaipio, Univ. of Eastern Finland (Finland) and Univ. of Auckland (New Zealand); S. R. Arridge, Univ. College London (United Kingdom)
- 8800 07 **Non-contact photoacoustic tomography using holographic full field detection** [8800-22]
J. Horstmann, Medical Laser Ctr. Lübeck (Germany); R. Brinkmann, Medical Laser Ctr. Lübeck (Germany) and Univ. of Lübeck (Germany)

SESSION 4 NOVEL APPLICATIONS II

- 8800 08 **Photoacoustic tomography assessment of vascular targeted therapy to determine vessel regrowth following treatment (Invited Paper)** [8800-21]
S. P. Johnson, O. Ogunlade, E. Zhang, J. Laufer, V. Rajkumar, S. Walker-Samuel, M. F. Lythgoe, R. B. Pedley, P. Beard P., Univ. College London (United Kingdom)
- 8800 09 **Temperature controlled retinal photocoagulation** [8800-20]
K. Schlott, Medical Laser Ctr. Lübeck (Germany) and Institute of Biomedical Optics (Germany); S. Koinzer, Univ. Kiel (Germany); A. Baade, Medical Laser Ctr. Lübeck (Germany); R. Birngruber, Medical Laser Ctr. Lübeck (Germany) and Institute of Biomedical Optics (Germany); J. Roider, Univ. Kiel (Germany); R. Brinkmann, Medical Laser Ctr. Lübeck (Germany) and Institute of Biomedical Optics (Germany)
- 8800 0A **In vivo mouse imaging using frequency domain optoacoustic tomography** [8800-11]
S. Kellnberger, N. C. Deliolanis, D. Queirós, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); G. Sergiadis, Aristotle Univ. of Thessaloniki (Greece); V. Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany)

POSTER SESSION

- 8800 0C **Incorporating geometric detector properties into three-dimensional optoacoustic tomography** [8800-5]
D. Queirós, X. L. Déan-Ben, A. Buehler, D. Razansky, A. Rosenthal, V. Ntziachristos, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany)
- 8800 0D **Transmission line based thermoacoustic imaging of small animals** [8800-9]
M. Omar, S. Kellnberger, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); G. Sergiadis, Aristotle Univ. of Thessaloniki (Greece); D. Razansky, V. Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany)
- 8800 0E **Photoacoustic stability of gold nanorods embedded in biopolymeric scaffolds** [8800-8]
L. Cavigli, M. De Angelis, F. Ratto, P. Matteini, F. Rossi, F. Tatini, Istituto di Fisica Applicata "Nello Carrara" (Italy); S. Centi, Univ. degli Studi di Firenze (Italy); R. Pini, Istituto di Fisica Applicata "Nello Carrara" (Italy)
- 8800 0F **Determination of the Grüneisen parameter from photoacoustic measurements in an integrating sphere** [8800-7]
Y. Villanueva, E. Hondebrink, W. Petersen, W. Steenbergen, Univ. Twente (Netherlands)
- 8800 0G **Photoacoustic and thermoacoustic signal characteristics study** [8800-3]
N. A. Rejesh, M. Pramanik, Indian Institute of Science, Bangalore (India)
- 8800 0H **Optical attenuation correction in multispectral optoacoustic tomography with logarithm unmixing** [8800-16]
X. L. Deán-Ben, A. Buehler, V. Ntziachristos, D. Razansky, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany)

- 8800 0I **Realtime parallel back-projection algorithm for three-dimensional optoacoustic imaging devices** [8800-18]
A. Ozbek, X. L. Deán-Ben, D. Razansky, Technische Univ. München (Germany) and
Helmholtz Zentrum München GmbH (Germany)
- 8800 0J **Weighted reconstruction methodology for optoacoustic tomographic imaging of heterogeneous acoustic samples** [8800-17]
X. L. Deán-Ben, V. Ntziachristos, D. Razansky, Technische Univ. München (Germany) and
Helmholtz Zentrum München GmbH (Germany)
- 8800 0K **Automated calibration of temporal changes in the speed of sound in optoacoustic tomography** [8800-19]
S. Mandal, X. L. Deán-Ben, D. Razansky, Helmholtz Zentrum München GmbH (Germany)
and Technische Univ. München (Germany)

Author Index

Conference Committee

General Chairs

Irene Georgakoudi, Tufts University (United States)
Peter E. Andersen, Technical University of Denmark (Denmark)

Programme Chairs

Jürgen Popp, Friedrich-Schiller-Universität Jena (Germany)
Andreas H. Hielscher, Columbia University (United States)

Conference Chairs

Vasilis Ntziachristos, Technische Universität München (Germany)
Charles P. Lin, Harvard University (United States)

Programme Committee

Fabian Kiessling, Universität Aachen (Germany)
Jan Grimm, Memorial Sloan-Kettering Cancer Center (United States)
Alexander A. Oraevsky, TomoWave Laboratories, Inc. (United States)
Srirang Manohar, Universiteit Twente (Netherlands)
Stanislav Y. Emelianov, The University of Texas at Austin (United States)
Matthew O'Donnell, University of Washington (United States)
Lihong V. Wang, Washington University in St. Louis (United States)
Michael C. Kolios, Ryerson University (Canada)
Vladimir P. Zharov, University of Arkansas for Medical Sciences
(United States)
Amir Rosenthal, Helmholtz Zentrum München GmbH (Germany)

Session Chairs

- 1 Advancements in Methodology I
Wiendelt Steenbergen, Universiteit Twente (Netherlands)
- 2 Novel Applications I
Martin Frenz, Universität Bern (Switzerland)
- 3 Advancements in Methodology II
Srirang Manohar, Universiteit Twente (Netherlands)
- 4 Novel Applications II
Daniel Razansky, Helmholtz Zentrum München GmbH (Germany)

Poster Session

Andreas H. Hielscher, Columbia University (United States)