

PROGRESS IN BIOMEDICAL OPTICS AND IMAGING

Vol. 10, No. 33

Microfluidics, BioMEMS, and Medical Microsystems VII

Wanjun Wang

Editor

26–28 January 2009

San Jose, California, United States

Sponsored and Published by

SPIE

Symposium Cosponsors

Texas Instruments Inc. (United States)

Nanolnk, Inc. (United States)

The Photonics Center at Boston University (United States)

Ozen Engineering, Inc. (United States)

Volume 7207

Proceedings of SPIE, 1605-7422, v. 7207

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

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 *Microfluidics, BioMEMS, and Medical Microsystems VII*, edited by Wanjun Wang, Proceedings of SPIE Vol. 7207 (SPIE, Bellingham, WA, 2009) Article CID Number.

ISSN 1605-7422

ISBN 9780819474537

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 © 2009, 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 1605-7422/09/\$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

SPIDigitalLibrary.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 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

- v *Conference Committee*
- vii *The high versatility of silicon based micro-optical modulators (Plenary Paper) [7208-101]*
H. Schenk, Fraunhofer Institute for Photonic Microsystems (Germany)

SESSION 1 SPECIAL SESSION: DIP PEN NANOLITHOGRAPHY

- 7207 03 **DPN writing on non-flat gold surfaces and detection by SERS** [7207-02]
R. J. Stokes, J. A. Dougan, E. Irvine, Univ. of Strathclyde (United Kingdom); J. Ohayon, S. Rozhok, T. Levesque, B. Dudzik, M. Nelson, NanoInk, Inc. (United States); D. Graham, Univ. of Strathclyde (United Kingdom)
- 7207 06 **MEMS-enabled Dip Pen Nanolithography for directed nanoscale deposition and high-throughput nanofabrication** [7207-33]
J. R. Haaheim, O. A. Nafday, T. Levesque, J. Fragala, R. Shile, NanoInk, Inc. (United States)

SESSION 2 MICROFLUIDICS AND APPLICATIONS

- 7207 07 **SU-8 microfluidic channels with porous sidewalls for biological applications** [7207-05]
M. R. Padgen, A. Gracias, N. Tokranova, N. Cady, J. Castracane, Univ. at Albany (United States)
- 7207 09 **Active integrated components for fluid control in automatic analytical chip-based systems** [7207-07]
F. von Gernar, J. Claußen, R. Gransee, E. Schaeffer, L. B. Mohammadi, T. Klotzbücher, Institut für Mikrotechnik Mainz GmbH (Germany)
- 7207 0A **Microfabrication of a two-stage BioMEMS microfluidic cell sorter** [7207-08]
M. M. Grafton, B. Geheb, J. H. Jang, H.-S. Chuang, P. Rajdev, L. M. Reece, P. P. Irazoqui, S. T. Wereley, B. Jung, J. F. Leary, Purdue Univ. (United States)

SESSION 3 MICRO-BIOMEDICAL DEVICES AND SYSTEMS

- 7207 0D **Integration of a bioMEMS device into a disposable microfluidic cartridge for medical diagnostics** [7207-11]
P. Ortiz, N. Keegan, J. Spoor, J. Hedley, A. Harris, J. Burdess, R. Burnett, Newcastle Univ. (United Kingdom); T. Velten, M. Biehl, T. Knoll, W. Haberer, Fraunhofer Institute for Biomedical Engineering (Germany); M. Solomon, A. Campitelli, MiniFAB (Australia) Pty Ltd. (Australia); C. McNeil, Newcastle Univ. (United Kingdom)
- 7207 0E **A new diagnostic for cancer dynamics: status and initial tests of the NANIVID** [7207-12]
W. K. Raja, Univ. at Albany (United States); B. Gligorijevic, J. S. Condeelis, Albert Einstein College of Medicine (United States); J. Castracane, Univ. at Albany (United States)

- 7207 0F **Obstacles to the production of protein microarray cassettes** [7207-13]
J. Montagu, H. DeWeerd, N. Tyburczy, N. Rodionova, P. Maimonis, Decision BioMarkers Inc. (United States)
- 7207 0G **Fast and precise detection of ricin with microcapillary sensor system** [7207-14]
J.-T. Lee, D. Dosev, M. Nichkova, Z. Ma, S. Gee, B. D. Hammock, I. M. Kennedy, Univ. of California, Davis (United States)

SESSION 4 BIOSENSORS AND LAB-ON-A-CHIP TECHNOLOGIES

- 7207 0H **Coupling confocal fluorescence microscopy and microfluidic device for single molecule detection** [7207-16]
G. Shen, B. Chang, B. D. Dickerson, Luna Innovations Inc. (United States); X. Li, L. M. Davis, The Univ. of Tennessee Space Institute (United States)
- 7207 0J **Continuous-flow PCR using segmented flow and integrating sample preparation** [7207-18]
H. Becker, N. Hlawatsch, C. Carstens, R. Klemm, C. Gärtner, microfluidic ChipShop GmbH (Germany)

SESSION 5 POINT-OF-CARE BIOMEMS SYSTEMS

- 7207 0M **LabOnFoil: laboratory skin patches and SmartCards based on OLED-on-CMOS and MEMS components** [7207-21]
M. Scholles, Fraunhofer Institute for Photonic Microsystems (Germany); H. Doyle, Biosensia Ltd. (Ireland); C. Merveille, J. Ruano-Lopez, IKERLAN (Spain); U. Vogel, Fraunhofer Institute for Photonic Microsystems (Germany)
- 7207 0P **A MEMS flow cytometer with integrated out-of-plane microlens and 3-D hydro-focus unit** [7207-24]
G. Shao, W. Wang, Louisiana State Univ. (United States)

POSTER SESSION

- 7207 0R **Sensitivity evaluation of a Love wave sensor with multilayer structure for biochemical application** [7207-27]
H. Oh, W. Wang, K. Lee, S. Yang, Ajou Univ. (Korea, Republic of)
- 7207 0S **Microfluidic chip based hematoanalyzer using polyelectrolytic gel electrodes** [7207-28]
K. B. Kim, Seoul National Univ. (Korea, Republic of); H. Chun, The Univ. of North Carolina at Chapel Hill (United States); H. C. Kim, T. D. Chung, Seoul National Univ. (Korea, Republic of)
- 7207 0W **Simultaneous and wireless measurement of CO₂ and humidity using a SAW reflective delay line** [7207-32]
C. Lim, W. Wang, K. Lee, H.-K. Oh, S. Yang, Ajou Univ. (Korea, Republic of)

Author Index

Conference Committee

Symposium Chair

Albert K. Henning, Nanolnk, Inc. (United States)

Symposium Cochair

Thomas J. Suleski, The University of North Carolina at Charlotte
(United States)

Conference Chair

Wanjun Wang, Louisiana State University (United States)

Conference Cochair

Holger Becker, microfluidic ChipShop GmbH (Germany)

Program Committee

Eva M. Campo, Centro Nacional de Microelectrónica (Spain)
Bruce K. Gale, The University of Utah (United States)
Claude M. Vauchier, Commissariat à l'Energie Atomique (France)
Yu-Cheng Lin, National Cheng Kung University (Taiwan)
Yuehe Lin, Pacific Northwest National Laboratory (United States)
Ian Papautsky, University of Cincinnati (United States)
Albert van den Berg, University of Twente (Netherlands)
Bernhard H. Weigl, PATH (United States)

Session Chairs

- 1 Special Session: Dip Pen Nanolithography
Albert K. Henning, Nanolnk, Inc. (United States)
- 2 Microfluidics and Applications
Wanjun Wang, Louisiana State University (United States)
- 3 Micro-Biomedical Devices and Systems
Bernhard H. Weigl, PATH (United States)
- 4 Biosensors and Lab-on-a-Chip Technologies
Eva M. Campo, Centro Nacional de Microelectrónica (Spain)
- 5 Point-of-Care BioMEMS Systems
Holger Becker, microfluidic ChipShop GmbH (Germany)

