PROGRESS IN BIOMEDICAL OPTICS AND IMAGING
Vol. 20 No. 25

Microfluidics, BioMEMS, and Medical Microsystems XVII

Bonnie L. Gray
Holger Becker
Editors

2–4 February 2019
San Francisco, California, United States

Sponsored by
SPIE

Cosponsored by
Microfluidic ChipShop GmbH (Germany)
The Ohio Center for Microfluidic Innovation (OCMI) at The University of Cincinnati (United States)

Published by
SPIE

Volume 10875

Proceedings of SPIE, 1605-7422, V. 10875

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 *Microfluidics, BioMEMS, and Medical Microsystems XVII*, edited by Bonnie L. Gray, Holger Becker, Proceedings of SPIE Vol. 10875 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

ISSN: 1605-7422
ISSN: 2410-9045 (electronic)

ISBN: 9781510623927
ISBN: 9781510623934 (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

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.

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