PROCEEDINGS OF SPIE

2017 International Conference on Optical Instruments and Technology

Optoelectronic Measurement Technology and Systems

Jigui Zhu
Kexin Xu
Hwa-Yaw Tam
Hai Xiao
Editors

28–30 October 2017
Beijing, China

Sponsored by
CIS — China Instrument and Control Society (China)
SPIE

Published by
SPIE

Volume 10621

Proceedings of SPIE 0277-786X, V. 10621

2017 International Conference on Optical Instruments and Technology: Optoelectronic Measurement Technology and Systems, edited by Jigui Zhu, Kexin Xu, Hwa-Yaw Tam, Hai Xiao, Proc. of SPIE Vol. 10621, 1062101 · © 2018 SPIE · CCC code: 0277-786X/18/$18 · doi: 10.1117/12.2316579

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 *2017 International Conference on Optical Instruments and Technology: Optoelectronic Measurement Technology and Systems*, edited by Jigui Zhu, Kexin Xu, Hwa-Yaw Tam, Hai Xiao, Proceedings of SPIE Vol. 10621 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 0277-786X
ISSN: 1996-756X (electronic)

ISBN: 9781510617537
ISBN: 9781510617544 (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.

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

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.

Symposium Committee

General Chairs

Tianchu Li, National Institute of Metrology (China)
H. Phillip Stahl, NASA Marshall Space Flight Center (United States)

Conference Co-Chairs

Songlin Zhuang, Shanghai University of Science and Technology (China)
Liwei Zhou, Beijing Institute of Technology (China)
Shenghua Ye, Tianjin University (China)
Yimo Zhang, Tianjin University (China)
Zheng You, Tsinghua University (China)
Guangjun Zhang, Southeast University (China)

Technical Program Chair

Guofan Jin, Tsinghua University (China)

Technical Program Co-Chairs

Jinxue Wang, SPIE
Tiegen Liu, Tianjin University (China)

Local Organizing Committee Chair

Youhua Wu, China Instrument and Control Society (China)

Local Organizing Committee Co-Chairs

Guoqiang Ni, Beijing Institute of Technology (China)
Daoyin Yu, Tianjin University (China)

General Secretary

Tong Zhang, China Instrument and Control Society (China)

Administrative Vice General Secretary

Yu-nan Sun, Beijing Institute of Technology (China)

Vice General Secretaries

Qun Hao, Beijing Institute of Technology (China)
Yuejin Zhao, Beijing Institute of Technology (China)
Cunlin Zhang, Capital Normal University (China)
Liquan Dong, Beijing Institute of Technology (China)

Local Organizing Committee

Hongda Chen, Institute of Semiconductors, CAS (China)
Xuping Zhang, Nanjing University (China)
Shangzhong Jin, China Jiliang University (China)
Libo Yuan, Harbin Engineering University (China)
Yumei Wen, Chongqing University (China)
Tian Lan, Beijing Institute of Technology (China)
Cuiling Li, Beijing Institute of Technology (China)

Conference Committee

Conference Chairs

Jigui Zhu, Tianjin University (China)
Hwa-Yaw Tam, Hong Kong Polytechnic University (Hong Kong, China)
Kexin Xu, Tianjin University (China)
Hai Xiao, Clemson University (United States)

Program Committee

Weihong Bi, Yanshan University (China)
Bukem Bilen, Bogaziçi University (Turkey)
Julian Chi Chiu Chan, Nanyang Technological University (Singapore)
Fengzhong Dong, Hefei Institute of Physical Science (China)
Bo Dong, Institute for Infocomm Research (Singapore)
Fajie Duan, Tianjin University (China)
Qibo Feng, Beijing Jiaotong University (China)
Baiou Guan, Jinan University (China)
Young-Geun Han, Hanyang University (Korea, Republic of)
Emily Jianzhong Hao, A*STAR Institute for Infocomm Research (Singapore)
Aaron H. P. Ho, Chinese University of Hong Kong (Hong Kong, China)
Xuguang Huang, South China Normal University (China)
Shangzhong Jin, China Jiliang University (China)
Yange Liu, Nankai University (China)
Yunqi Liu, Shanghai University (China)
Bo Liu, Nankai University (China)
Xuefeng Liu, Nanjing University of Science and Technology (China)
Li Pei, Beijing Jiaotong University (China)
Xiang Peng, Shenzhen University (China)
Osami Sasaki, Niigata University (Japan)
Liyang Shao, Carleton University (Canada)
Changku Sun, Tianjin University (China)
Tong Sun, City University London (United Kingdom)
Takamasa Suzuki, Niigata University (Japan)
Jian Wang, Focused Photonics (Hangzhou), Inc. (China)
Yiping Wang, Shenzhen University (China)
Yuanhong Yang, Beihang University (China)
Changyuan Yu, National University of Singapore (Singapore)
Liandong Yu, Hefei University of Technology (China)
Aping Zhang, Zhejiang University (China)
Weiqian Zhao, Beijing Institute of Technology (China)
Chunliu Zhao, China Jiliang University (China)

Weihu Zhou, Academy of Optoelectronics, CAS (China)
Lianqing Zhu, Beijing Information Science and Technology University (China)
Zonghua Zhang, Hebei University of Technology (China)
Jiarui Lin *(Secretary)*, Tianjin University (China)

Session Chairs

1 Optoelectronic Technology in Metrology
Qibo Feng, Beijing Jiaotong University (China)

2 Optoelectronic Measurement and Detection
Liandong Yu, Hefei University of Technology (China)

3 Optoelectronic Instruments and System
Jiarui Lin, Tianjin University (China)

4 Optoelectronic Instruments and System and Other Related Technologies and Applications
Zhenzhong Wei, Beihang University (China)

5 Optoelectronic Instruments and System and Other Related Technologies and Applications
Changku Sun, Tianjin University (China)

Introduction

With the deepening and intensification of social informatization, a wider range of information sources and acquisition methods have become the basis for social development. Because of its large capacity, high efficiency and high precision, optoelectronic measurement technology has become the main means of information sensing and acquisition. It has played – and will continue to play– an significant role in important fields such as: consumer electronics, industrial manufacturing, environmental protection, and scientific research.

Optoelectronic measurement research covers a rich content, including many of areas from scientific research to manufacturing industry for our daily life. The scope will expand continuously and the content to become more and more deep as research goes further. On one hand, the traditional optoelectronic measurement research and applications (represented by the background of industrial measurement and optoelectronic detection) have been constantly improved, and the relevant performances have continously improved as well. On the other hand, the needs of optoelectronic measurement (represented by the spectral measurement and optical dynamic measurement) have continued to emerge, as well as the measuring methods and applications that have been developed.

More than 80 papers (4 invited and 22 oral) have been accepted into the OIT 2017: Optoelectronic Measurement Technology and Systems conference proceedings. They span many research fields including: optoelectronic measurement, optical instruments, industrial measurement, spectral measurement, optical dynamic measurement, etc. These papers appropriately reflect the current focusing problems and research level of the optoelectronic measurement field.

Jigui Zhu
Kexin Xu
Hwa-Yaw Ta
Hai Xiao

Conference Organizers

Organized by
Opto-Electronic-Mechanic Technology and System Integration Chapter, CIS (China)
Committee on Optoelectronic Technology, COS (China)
Committee on Optics, China Ordnance Society (China)
Optical Instrument Chapter, CIS (China)
Beijing Institute of Technology (China)
Tianjin University (China)
Tsinghua University (China)
Peking University (China)
Nanjing University (China)
Shanghai Jiao Tong University (China)
Zhejiang University (China)
Nankai University (China)
Capital Normal University (China)
Beijing University of Posts and Telecommunications (China)
Chongqing University (China)
University of Shanghai for Science and Technology (China)
Instrument Society of America (United States)
Institute of Measurement and Control (United Kingdom)
Hong Kong Institution of Engineers (Hong Kong, China)
The Society of Measurement and Control (Japan)