

PROCEEDINGS OF SPIE

Fifth International Conference on Wireless and Optical Communications

Maode Ma
Alexander Balinsky
Editors

7–9 July 2017
Singapore

Organized by
Chongqing University (China)

Sponsored by
University of Electronic Science and Technology of China (China)

Published by
SPIE

Volume 10465

Proceedings of SPIE 0277-786X, V. 10465

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

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 SPIDigitalLibrary.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 *Fifth International Conference on Wireless and Optical Communications*, edited by Maode Ma, Alexander Balinsky. Proceedings of SPIE Vol. 10465 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

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

ISBN: 9781510614116
ISBN: 9781510614123 (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 0277-786X/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

SPIDigitalLibrary.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

- v *Authors*
- vii *Conference Committee*
- ix *Introduction*

WIRELESS NETWORKING AND TECHNOLOGY

- 10465 02 **Resource selection matching algorithm in underlay cognitive radio networks** [10465-9]
- 10465 03 **Filtering methods for broadcast authentication against PKC-based denial of service in WSN: a survey** [10465-11]
- 10465 04 **On the performance of cognitive radio networks** [10465-8]
- 10465 05 **Multiband phase-modulated radio over IsOWC link with balanced coherent homodyne detection** [10465-7]
- 10465 06 **A range-based predictive localization algorithm for WSID networks** [10465-10]

ELECTRONIC AND COMMUNICATIONS ENGINEERING

- 10465 07 **Wireless-powered distributed amplify-and-forward relaying with a large number of relays** [10465-2]
- 10465 08 **Design and analysis of coplanar waveguide triple-band antenna based on defected ground structure** [10465-3]
- 10465 09 **Locally optimal resource allocation algorithm for dense femtocells** [10465-5]
- 10465 0A **Saving energy for the data collection point in WBAN network** [10465-1]
- 10465 0B **Design and implementation of Remote Digital Energy Meter (RDEM) based on GSM technology** [10465-12]
- 10465 0C **Experimental research on crack detection in pipes based on Fiber Bragg grating** [10465-4]
- 10465 0D **Reliable actuators for twin rotor MIMO system** [10465-6]

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.

Afianti, Farah, 03
C, Kavitha, 09
C, Shreesh, 0D
Cai, Lin, 0C
Chen, Jiangjingxian, 02
Chen, Junjie, 06
Chen, Wanli, 08
Fang, Zhaoxi, 07
Irfan, Muhammad, 0B
Jin, Liping, 07
Kamath, Surekha, 0D
Kamioka, Eiji, 0A
Khan, Ali Hassan, 0B
Khan, Muhammad Waseem, 0B
Li, Gang, 06
Li, Xiaowei, 0C
Liu, Yuan, 06
Lu, Ming, 0C
Lv, Hong, 08
Murthy, Chethana R., 09
Nguyen-Duc, Toan, 0A
Pang, Zeping, 07
Qi, Peng, 08
Rao, Vidya S., 0D
Shi, Jiong, 07
Shiraz, M., 0B
Sun, Quanling, 08
Suryani, Titiek, 03
V.I, George, 0D
Wang, Jie, 0B
Wang, Li, 04
Wei, Qin, 0C
Wirawan, Iwan, 03
Xia, Xinsheng, 08
Yu, Zhaoxiang, 0C
Zhang, Li, 04
Zhang, Shibing, 02, 04
Zhu, Jiang, 05
Zhu, Zhipei, 02
Zong, Kang, 05

Conference Committee

Conference Chairs

Maode Ma, Nanyang Technological University (Singapore)

Alexander Balinsky, Cardiff University (United Kingdom)

Steering Committee Chairs

Feng Gang, University of Electronic Science and Technology of China
(China)

Peng Li, Chongqing University (China)

Program Chairs

Qi Shi, Liverpool John Moores University (United Kingdom)

Mohamed El-Tarhuni, American University of Sharja
(United Arab Emirates)

Aristidis Likas, University of Ioannina (Greece)

Session Chairs

- 1 Wireless Communication Technology and Network
Shibing Zhang, Nantong University (China)
- 2 Wireless Communication Technology
Maode Ma, Nanyang Technological University (Singapore)

Introduction

This volume contains some of the work presented at the Fifth International Conference on Wireless and Optical Communications (ICWOC 2017), which was held 7-9 July, 2017, in Singapore.

ICWOC provides a scientific platform for both local and international scientists, engineers, and technologists who work in all aspects of wireless and optical communications. In addition to the contributed papers, internationally known experts from several countries were invited to deliver plenary and keynote speeches.

The volume includes 12 manuscripts which were selected from more than 20 papers submitted to the conference from universities, research institutes, and industries. Each contributed paper has been peer-reviewed by reviewers including organizing and advisory committee members as well as other experts in the field from different countries. The proceedings present the newest research results and findings in the field of wireless and optical communications.

The chairpersons of the two sessions played an important role in conducting the proceedings of the session in a timely and efficient manner and on behalf of the conference committee; we express sincere appreciation for their involvement.

The reviewers of the manuscripts, those who by tradition remains anonymous have also been very helpful in efficiently reviewing the manuscripts and providing valuable comments well, within the time allotted to them. We express our sincere and grateful thanks to all reviewers.

Maode Ma

