PROCEEDINGS OF SPIE

First Conference on Biomedical Photonics and Cross-Fusion (BPC 2022)

Zhenxi Zhang Junle Qu Buhong Li Editors

21–23 August 2022 Shanghai, China

Organized by Chinese Laser Press (China) Shanghai Society of Laser (China)

Technical Co-Sponsor and Published by SPIE

Volume 12461

Proceedings of SPIE 0277-786X, V. 12461

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

First Conference on Biomedical Photonics and Cross-Fusion (BPC 2022), edited by Zhenxi Zhang, Junle Qu, Buhong Li, Proc. of SPIE Vol. BPCF100, BPCF10000 © 2022 SPIE · 0277-786X · doi: 10.1117/12.2664405

Proc. of SPIE Vol. BPCF100 1246101-1

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," *First Conference on Biomedical Photonics and Cross-Fusion (BPC 2022)*, edited by Zhenxi Zhang, Junle Qu, Buhong Li, Proc. of SPIE 12461, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510660274 ISBN: 9781510660281 (electronic)

Published by **SPIE** P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) SPIE.org Copyright © 2022 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

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.



Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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 Conference Committee

FIRST CONFERENCE ON BIOMEDICAL PHOTONICS AND CROSS-FUSION (BPC 2022)

- 12461 02 Photoacoustic blood glucose multiple factors measurement based on BP neural network algorithm [12461-3]
- 12461 03 Automatic image registration of optoacoustic tomography and magnetic resonance imaging based on deep learning [12461-5]
- 12461 04 Analysis of prostate cancer using serum surface-enhanced Raman spectroscopy and multivariate statistical algorithm [12461-7]
- 12461 05 Rhodamine 6G and adenine were detected based on HAP/Ag SERS matrix [12461-10]
- 12461 06 Design of LED light therapy device based on free-form lens [12461-11]
- 12461 07 A graphical digital processing platform for photoacoustic signal based on GUI [12461-12]

Conference Committee

Conference Chair

Qingming Luo, Hainan University (China)

Conference Co-chairs

Zhenxi Zhang, Xi'an Jiaotong University (China) Junle Qu, Shenzhen University (China) Buhong Li, Hainan University (China)

Session Chairs

- Interaction Between Light and Biological Tissue
 Ling Fu, Huazhong University of Science and Technology (China)
- 2. Super-Resolution Optical Imaging Liangyi Chen, Peking University (China)
- Neurophotonics and Optogenetics
 Pengcheng Li, Huazhong University of Science and Technology (China)
- Optical Diagnosis and Treatment
 Changfeng Wu, Southern University of Science and Technology of China (China)
- 5. Bio-Optical Sensing and Regulation **Tongsheng Chen**, South China Normal University (China)
- 6. Tissue Optical Spectroscopy and Imaging Liwei Liu, Shenzhen University (China)
- Micro-Nano Bio-Photoelectric Functional Materials
 Qiang Zhao, Nanjing University of Posts and Telecommunications (China)
- 8. Laser Medicine and its Clinical Application Haixia Qiu, Chinese PLA General Hospital (China)