

PROCEEDINGS OF SPIE

# ***International Academic Conference on Optics and Photonics (IACOP 2023)***

**Yang Yue  
Gefeson Mendes Pacheco**  
*Editors*

**29–30 October 2023  
ONLINE, China**

*Organized by*  
Pashanhu Association of Scholars and Engineers (PASE)

*Published by*  
SPIE

**Volume 12972**

Proceedings of SPIE 0277-786X, V. 12972

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

International Academic Conference on Optics and Photonics (IACOP 2023), edited by  
Yang Yue, Gefeson Mendes Pacheco, Proc. of SPIE Vol. 12972, 1297201  
© 2023 SPIE · 0277-786X · doi: 10.1117/12.3023790

Proc. of SPIE Vol. 12972 1297201-1

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 [SPIDigitalLibrary.org](http://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 *International Academic Conference on Optics and Photonics (IACOP 2023)*, edited by Yang Yue, Gefeson Mendes Pacheco, Proc. of SPIE 12972, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510672543  
ISBN: 9781510672550 (electronic)

Published by

**SPIE**

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

[SPIE.org](http://SPIE.org)

Copyright © 2023 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](http://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.

**SPIE. DIGITAL LIBRARY**

[SPIDigitalLibrary.org](http://SPIDigitalLibrary.org)

---

**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*

---

## OPTICAL SENSOR

---

- 12972 02 **Photonic integrated wireless communication and sensing with OFDM modulation** [12972-2]
- 12972 03 **Seven-core fiber spatial multiplexing refractometer based on convolutional neural networks** [12972-3]
- 12972 04 **3-DOF angle measurement method based on two interference images** [12972-6]
- 12972 05 **Simultaneously reconstructing gas and carbon soot properties using multispectral light field images** [12972-8]
- 12972 06 **Temperature sensing system based on OFDR demodulation principle for identical weakly reflecting FBGs** [12972-13]
- 12972 07 **Miniaturized interferometric fiber optic gyroscope based on a novel Y-waveguide and photonic crystal fiber** [12972-21]

---

## OPTICAL IMAGING

---

- 12972 08 **Denosing for optical-resolution photoacoustic microscopy via a score-based diffusion generative model** [12972-17]
- 12972 09 **Enhancing photoacoustic imaging with BFP-GAN** [12972-25]
- 12972 0A **Generative model for limited-view photoacoustic tomography reconstruction** [12972-29]
- 12972 0B **BaTiO<sub>3</sub> microsphere assisted imaging of erythrocytes by light structuring photonic hook** [12972-33]

---

## OPTICAL COMMUNICATION

---

- 12972 0C **BER performance of QPSK, 16-APSK and 16-QAM E-band photon-assisted millimeter wave wireless system in Rician channel** [12972-11]
- 12972 0D **Scalable low-modal-crosstalk mode-group demultiplexer for MDM transmission over MMF** [12972-24]

- 12972 OE **Analysis of nonlinear phase noise suppression for CO-OFDM systems based Gaussian basis expansion method** [12972-37]
- 12972 OF **Gaussian basis expansion-based phase noise suppression for CO-OFDM system** [12972-41]

---

**OPTICAL TECHNOLOGY**

---

- 12972 OG **The design of compact air-cooling LD-pumped Nd:YVO<sub>4</sub> laser** [12972-5]
- 12972 OH **Techniques for speeding up algorithms for implementing rigorous coupled-wave analysis** [12972-7]
- 12972 OI **All polarization maintaining Brillouin erbium-doped fiber laser with narrow linewidth and stable single longitudinal mode** [12972-10]
- 12972 OJ **Quantitative analysis method for the Fourier transform Infrared spectroscopy of gases** [12972-20]
- 12972 OK **GaN-based back-illuminated ultraviolet photodetector with an absorption layer compensation doping** [12972-30]
- 12972 OL **Improvement of target recognition ability based on micro-scanning** [12972-34]
- 12972 OM **Thermal ablation behavior of infrared optical element under high energy CW laser** [12972-35]

# Conference Committee

## *Conference Chairs*

**Yang Yue**, Xi'an Jiaotong University (China)  
**Gefeson Mendes Pacheco**, Aeronautics Institute of Technology  
(Brazil)

## *Program Committee*

**Xiaochen Dong**, Nanjing Tech University (China)  
**Hadji Djebbar**, Saida University (Algeria)  
**Xueli Chen**, Xidian University (China)  
**David Perez de Lara**, Guangdong Technion-Israel Institute of  
Technology (China)  
**Yiping Wang**, Shenzhen University (China)  
**Mário F. S. Ferreira**, University of Aveiro (Portugal)  
**Vladimir G. Chigrinov**, Hong Kong University of Science and  
Technology (China)  
**Heping Zeng**, East China Normal University (China)  
**Khashayar Ghandi**, University of Guelph (Canada)  
**Huawei Liang**, Shenzhen University (China)  
**Bing Gu**, Southeast University (China)  
**Strek Wieslaw**, Polish Academy of Sciences (Poland)  
**Qizhen Sun**, Huazhong University of Science and Technology (China)  
**Dmitry Sergeevich Shtarev**, Far Eastern Federal University  
(Russian Federation)

## *Session Chairs*

- 1 Breaking Developments of Optical Technology  
**You Wang**, Southwest Institute of Technical Physics (China)  
**Weiqing Gao**, Hefei University of Technology (China)
- 2 Molecular Vibration Spectroscopy  
**Yong Du**, China Jiliang University (China)
- 3 Quantum Cryptography and Information Security  
**Banghong Guo**, South China Normal University (China)
- 4 Imaging and Computational Optics  
**Yonghui Liang**, National University of Defense Technology (China)  
**Xianlin Song**, Nanchang University (China)

- 5 Optical Sensor and Measurement  
**Muguang Wang**, Beijing Jiaotong University (China)
- 6 Microwave Photonics  
**Zhiyao Zhang**, University of Electronic Science and Technology of  
China (China)