# PROCEEDINGS OF SPIE

# International Conference on Frontiers of Applied Optics and Computer Engineering (AOCE 2024)

Mário F. Ferreira Bikash Nakarmi Editors

27–28 January 2024 Kunming, China

Organized by Wuhan Textile University (China)

Sponsored by
Xinjiang University (China)
Shandong University (China)
National Institute of Applied Sciences Centre Val de Loire (France)

Published by SPIE

**Volume 13080** 

Proceedings of SPIE 0277-786X, V. 13080

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

International Conference on Frontiers of Applied Optics and Computer Engineering (AOCE 2024), edited by Mário Fernando S. Ferreira, Bikash Nakarmi, Proc. of SPIE Vol. 13080, 1308001 © 2024 SPIE · 0277-786X · doi: 10.1117/12.3028475

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 *International Conference on Frontiers of Applied Optics and Computer Engineering (AOCE 2024)*, edited by Mário F. Ferreira, Bikash Nakarmi, Proc. of SPIE 13080, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510674783

ISBN: 9781510674790 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2024 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 vii Introduction

### APPLIED OPTICS AND INTERDISCIPLINARY APPLICATION

	APPLIED OFFICS AND INTERDISCIPLINARY APPLICATION
13080 02	A building curtain wall security inspection system based on terahertz wave imaging [13080-10]
13080 03	Research and design of near infrared spectroscopy wastewater COD analysis system based on 1D-CNN [13080-26]
13080 04	Research on calibration method of infrared camera based on thermal radiation enhancement [13080-43]
13080 05	Enhanced induced circular dichroism by asymmetric surface plasmon resonance mode [13080-21]
13080 06	Calculation of water spray on heat transfer of composite flat plate and analysis of the effect on infrared radiation [13080-27]
13080 07	Design and implementation of multi-node simulated phased array beam data transmission based on MLVDS [13080-7]
13080 08	Optimization design of cooling system stability of double crystal monochromator [13080-30]
13080 09	Hyperspectral anomaly detection by isolation using nearest neighbor ensembles [13080-37]
13080 0A	Design of wave control system based on Ka phased array AIP antenna [13080-8]
13080 OB	Inverse tridiagonal array eigenvalue inverse problem with double constraints [13080-16]
	COMPUTER SCIENCE AND ENGINEERING
13080 0C	Image semantic segmentation model based on CBAMUNet [13080-20]
13080 0D	Multi-exposure fusion light field image quality assessment with motion region detection [13080-34]
13080 OE	Rapid calibration method for head-mounted eye-tracker [13080-35]
13080 OF	Review of deep learning fusion methods for visible and Infrared thermal images [13080-42]

13080 0G	Method for extracting power emergency plan information based on LLM prompt learning [13080-5]
13080 OH	Monet style oil painting generation based on cyclic generation confrontation network [13080-15]
13080 01	Distributed topology control based on reinforcement learning in unmanned aerial vehicles networks [13080-29]
13080 OJ	Design and development of home health monitoring system based on intelligent robot platform [13080-36]
	AUTOMATION AND CONTROL
13080 0K	AUTOMATION AND CONTROL  Research on the automatic navigation control system of Lycium barbarum spray machine based on Beidou navigation system [13080-38]
13080 0K 13080 0L	Research on the automatic navigation control system of Lycium barbarum spray machine
	Research on the automatic navigation control system of Lycium barbarum spray machine based on Beidou navigation system [13080-38]  Research on target detection and automatic navigation algorithm for intelligent vehicles

# **Conference Committee**

### Conference Chairs

Jupeng Ding, Xinjiang University (China)

Haihan Lu, Institute of Electro-Optical Engineering, National Taipei
University of Technology (Taiwan, China)

Conference Co-chair

Xiao Wang, China Academy of Engineering Physics (China)

**Publicity Chair** 

Lei Chen, Shandong University (China)

### Program Committee

Chi-Wai Chow, National Chiao Tung University (China)
Jing Gao, Suzhou Institute of Biomedical Engineering and
Technology, Chinese Academy of Sciences (China)
Julio C. Rodríguez-Quiñonez, Autonomous University of Baja

Julio C. Rodriguez-Quiñonez, Autonomous University of Bajo California (Mexico)

 Haizhi Song, University of Electronic Science and Technology (China)
 Doudou Sofiane, Laboratory of Power Quality in Electrical Networks, University of Setif 1 (Algeria)

Yuchen Jiang, Harbin Institute of Technology (China)

Jinping Liu, Hunan Normal University (China)

**Xiangwei Bu**, Air Force Engineering University (China)

**Shiva Kumar**, McMaster University (Canada)

Yuliang Mao, Xiangtan University (China)

Huachao Yang, Zhejiang University (China)

**Pacheco Gefeson Mendes**, Technological Institute of Aeronautics (Brazil)

Paulo Fernando da Costa Antunes, Aveiro University (Portugal)

Mahmoud Afshari, Persian Gulf University (Iran, Islamic Republic of)

Boris Andrievskiy, Russian Academy of Sciences (Russian Federation)

Xiaoyong He, Shanghai Normal University (China)

Huchang Liao, Sichuan University (China)

Weitao Huang, Hunan Normal University (China)

**Vasily Golubev**, Moscow Institute of Physics and Technology (Russian Federation)

**Yakovin Mikhail Dmitrievitch**, Novosibirsk State University (Russian Federation)

Kaixin Lu, National University of Singapore (Singapore)

**Ilya Galaktionov**, Institute of Applied Physics, Russian Academy of Sciences (Russian Federation)

**Kaiyu Hu**, China Aerospace Science and Industry Corporation (CASIC) (China)

Li Yang, Karlsruhe Institute of Technology (KIT) (Germany)

Yang Liu, Beijing Institute of Technology (China)

**Syed Agha Hassnain Mohsan**, Zhejiang University (China)

## Introduction

The 2024 International Conference on Frontiers of Applied Optics and Computer Engineering is organized by the Wuhan Textile University in Kunming, on 27 and 28 January 2024. Taking place in the historic city of Kunming, AOCE2024 will showcase the latest cutting-edge developments in optical science and computer engineering, as well as an exciting international program that will allow delegates to network and share ideas whilst experiencing the best of China culture and academic community. The AOCE2024 focuses on original research in engineering applications and technology, it provides a medium that enables researchers, young scientists, students from different fields such as application and technology in optics, image processing, automation and control, advanced technology, and interdisciplinary application, et al.

This volume comprises select 22 papers from 78 AOCE submissions. These contributions, which were selected by means of a rigorous international peer-review process, presented exciting ideas and methods that will open your novel research directions among different communities.

We sincerely appreciate all the participants who contributed their latest research in this volume. Thank our keynote speakers: Prof. Xiao Wang, China Academy of Engineering Physics, China; Prof. Yuchen Jiang, Harbin Institute of Technology (HIT), China; Prof. Shixiang Xu, Shenzhen University, China; and all the reviewers who involved, for their kindly support and work on this edition of AOCE2024 proceedings. We also sincerely appreciate SPIE for their help and with proofreading of the contributed submissions and preparing this proceeding volume.

We hope to see you again next year!

Conference Chair Jupeng Ding Xinjiang University, China 27 Jan. 2024