

PROCEEDINGS OF SPIE

International Conference on Images, Signals, and Computing (ICISC 2023)

Qian He
Ioannis Kypraios
Lipo Wang
Editors

27–29 May 2023
Chengdu, China

Organized by

The University of Glasgow (United Kingdom)
University of Electronic Science and Technology of China (China)
De Montfort University (United Kingdom)
Nanyang Technological University (Singapore)
Southwest Jiaotong University (China)

Sponsored by

The University of Glasgow (United Kingdom)
University of Electronic Science and Technology of China (China)
De Montfort University (United Kingdom)
Nanyang Technological University (Singapore)
Southwest Jiaotong University (China)

Published by
SPIE

Volume 12783

Proceedings of SPIE 0277-786X, V. 12783

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

International Conference on Images, Signals, and Computing (ICISC 2023), edited by Qian He,
Ioannis Kypraios, Lipo Wang, Proc. of SPIE Vol. 12783, 1278301
© 2023 SPIE · 0277-786X · doi: 10.1117/12.3004480

Proc. of SPIE Vol. 12783 1278301-1

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.

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 Images, Signals, and Computing (ICISC 2023)*, edited by Qian He, Ioannis Kypraios, Lipo Wang, Proc. of SPIE 12783, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510668164
ISBN: 9781510668171 (electronic)

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

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*
ix *Introduction*

IMAGES

- 12783 01 **Computer vision based crystallization monitoring in automated laboratories** [12783-26]
- 12783 02 **Learning rate range test for the vision transformer** [12783-16]
- 12783 03 **Application specific convolutional neural networks for brain tumor detection** [12783-3]
- 12783 04 **A high-resolution image dehazing GAN model in icing meteorological environment** [12783-8]
- 12783 05 **A trajectory simplification algorithm based on motion trend and variable speed characteristics** [12783-9]
- 12783 06 **3D point cloud target detection based on pseudo segmentation for autonomous driving** [12783-10]
- 12783 07 **Reducing ringing artefact in fresnel digital holography using compressed sensing** [12783-11]
- 12783 08 **Adolescent dysmorphic disorder model research based on machine learning** [12783-12]
- 12783 09 **Global temporal pyramid for human abnormal action recognition** [12783-21]
- 12783 0A **Low-complexity moving object detection algorithm in dynamic background** [12783-25]
- 12783 0B **License plate recognition using machine learning** [12783-28]
- 12783 0C **Face mask recognition during KYC generation from a live photo detection methodology** [12783-27]

SIGNALS

- 12783 0D **Multi-sensor fusion for the security surveillance of public areas** [12783-22]
- 12783 0E **Research on a personalized classifier of health status based on pulse signal** [12783-4]

- 12783 OF **DOA estimation in a distributed optimization framework: a sparse approach based on consensus ADMM implementation** [12783-5]
- 12783 OG **Development of thickness measurement software for aircraft absorbing coatings based on magnetic force measurement** [12783-29]

COMPUTING

- 12783 OH **Wireless and sensors network security threats and countermeasures** [12783-23]
- 12783 OI **Merging public opinion information and stock numerical data for stock trend prediction based on deep learning** [12783-2]
- 12783 OJ **Highly reliable on-board computer software design and verification for space radiation** [12783-13]
- 12783 OK **Improved k-means-based FAKM clustering method for scientific and technical literature** [12783-17]
- 12783 OL **Methods of entity resolution in dataspace** [12783-18]
- 12783 OM **Gold and bitcoin trading strategies: a comprehensive model for optimal investment returns** [12783-19]
- 12783 ON **Kweichow moutai stock price forecasting using transformers** [12783-1]

Conference Committee

General Chairs

Kelum Gamage, The University of Glasgow (United Kingdom)
Qian He, University of Electronic Science and Technology of China
(China)
Ioannis Kypraios, De Montfort University (United Kingdom)
Lipo Wang, Nanyang Technological University (Singapore)
Haiquan Zhao, Southwest Jiaotong University (China)

Publicity Chairs

Yong Fang, Chang'an University (China)
Tian Lan, University of Electronic Science and Technology of China
(China)
Jin Li, Shaanxi Normal University (China)
Yun Liu, Southwest University (China)
Xin Lu, De Montfort University (United Kingdom)

Publication Chairs

Mohamed Khaled Almekkawy, Pennsylvania State University
(United States)
Qiang Li, Shenzhen University (China)
Edward Wong, New York University (United States)

Program Chairs

Xiaohua (Edward) Li, Binghamton University (United States)
Jin Liu, Central South University (China)

Committee Members

Sathyanarayanan Aakur, Oklahoma State University–Stillwater
(United States)
Mohamed Khaled Almekkawy, Pennsylvania State University
(United States)
Bo Cai, Southwest University of Science and Technology (China)
Fei Cai, Hunan Normal University (China)
Aibin Chen, Central South University of Forestry and Technology
(China)
Changsheng Chen, Shenzhen University (China)
Guangzhu Chen, Chengdu University of Technology (China)
Honghong Chen, Xihua University (China)

Jing Chen, Chongqing University (China)
Peng Chen, Xihua University (China)
Yanping Chen, Guizhou University (China)
Ji-Xin Cheng, Boston University (United States)
Shi Cheng, Shaanxi Normal University (China)
Chun-hua Chu, Hainan University (China)
Raffaele de Amicis, Oregon State University (United States)
Yong Fang, Chang'an University (China)
Kelum Gamage, The University of Glasgow (United Kingdom)
Yan Gan, Chongqing University (China)
Lianli Gao, University of Electronic Science and Technology of China
(China)
Shengwen Guo, South China University of Technology (China)
Zhiwei Guo, Chongqing Technology and Business University (China)
Abolfazl Hashemi, Purdue University (United States)
Hongsen He, Southwest University of Science and Technology
(China)
Qian He, University of Electronic Science and Technology of China
(China)
Xing He, Shantou University (China)
Feifei Hou, Central South University (China)
Nan Hu, Soochow University (China)
Xiao Hu, Emory University (United States)
Xin Hu, Chang'an University (China)
He Huang, Soochow University (China)
Luwen Huang, Northwest A&F University (China)
Renjie Huang, Southwest University (China)
Ke Jia, Chengdu University of Information Technology (China)
Junzheng Jiang, Guilin University of Electronic Technology (China)
Wenbo Jiang, Xihua University (China)
Tao Ju, Lanzhou Jiaotong University (China)
Ioannis Kypraios, De Montfort University (United Kingdom)
Tian Lan, University of Electronic Science and Technology of China
(China)
Fan Li, Xi'an Jiaotong University (China)
Jin Li, Shaanxi Normal University (China)
Qiang Li, Shenzhen University (China)
Wanchun Li, University of Electronic Science and Technology of
China (China)
Xiaohua (Edward) Li, Binghamton University (United States)
Xiaolong Li, University of Electronic Science and Technology of
China (China)
Xiuhua Li, Chongqing University (China)
Zhongyu Li, University of Electronic Science and Technology of
China (China)
Xiao Liang, Southwest Petroleum University (China)
Dongmei Lin, Lanzhou University of Technology (China)

Chuanlin Liu, Southwest Petroleum University (China)
Hanqiang Liu, Shaanxi Normal University (China)
Jin Liu, Central South University (China)
Jinping Liu, Hunan Normal University (China)
Ruihua Liu, Chongqing University of Technology (China)
Shuai Liu, Hunan Normal University (China)
Yun Liu, Southwest University (China)
Zhanwen Liu, Chang'an University (China)
Shenglian Lu, Guangxi Normal University (China)
Xin Lu, De Montfort University (United Kingdom)
Zhijia Lu, Ningbo University (China)
Renze Luo, Southwest Petroleum University (China)
Miao Ma, Shaanxi Normal University (China)
Fan Min, Southwest Petroleum University (China)
Chad Mourning, Ohio University (United States)
Dong Pan, Central South University (China)
Bo Peng, Southwest Petroleum University (China)
Hong Peng, Xihua University (China)
Jun Peng, Chongqing University of Science and Technology (China)
Qihang Peng, University of Electronic Science and Technology of
China (China)
Xiaoming Peng, University of Electronic Science and Technology of
China (China)
Michael Pusateri, Pennsylvania State University (United States)
Bin Qin, Hunan University of Technology (China)
Chao Ren, Sichuan University (China)
Hisham Sager, Colorado School of Mines (United States)
Aarti Sathyanarayana, Northeastern University (United States)
Yanhua Shao, Southwest University of Science and Technology
(China)
Wenjing Shen, Shenzhen Technology University (China)
Yongpan Sheng, Chongqing University (China)
Chuang Shi, University of Electronic Science and Technology of
China (China)
Lingyun Song, Northwestern Polytechnical University (China)
Yimao Sun, Sichuan University (China)
Zhi Sun, University of Electronic Science and Technology of China
(China)
Yujuan Tan, Chongqing University (China)
Xiaochuan Tang, Chengdu University of Technology (China)
Guoqing Wang, University of Electronic Science and Technology of
China (China)
Hongxing Wang, Chongqing University (China)
Tao Wang, Northwestern Polytechnical University (China)
Wenyong Wang, University of Electronic Science and Technology of
China (China)
Yongtian Wang, Northwestern Polytechnical University (China)

Zhengning Wang, University of Electronic Science and Technology of China (China)
Zhuoran Wang, University of Electronic Science and Technology of China (China)
Edward Wong, New York University (United States)
Jie Wu, Shaanxi Normal University (China)
Junyun Wu, Nanchang University (China)
Lianwei Wu, Northwestern Polytechnical University (China)
Yifeng Wu, Sun Yat-sen University (China)
Juanying Xie, Shaanxi Normal University (China)
Weicheng Xie, Xihua University (China)
Feng Xu, Southwest University of Science and Technology (China)
Jian Xu, Louisiana State University (United States)
Liming Xu, China West Normal University (China)
Zhigang Xu, Lanzhou University of Technology (China)
Guiqin Yang, Lanzhou Jiaotong University (China)
Xiaojun Yang, Chang'an University (China)
Xin Yang, Southwestern University of Finance and Economics (China)
Mang Ye, Wuhan University (China)
Yi Yu, Southwest University of Science and Technology (China)
Jianjun Yuan, Southwest University (China)
Yongna Yuan, Lanzhou University (China)
Liaoyuan Zeng, University of Electronic Science and Technology of China (China)
Erlei Zhang, Northwest A&F University (China)
Haixi Zhang, Northwest A&F University (China)
Le Zhang, University of Electronic Science and Technology of China (China)
Lizong Zhang, University of Electronic Science and Technology of China (China)
Ting Zhang, Zhejiang University (China)
Xiaoqiang Zhang, Southwest University of Science and Technology (China)
Xiaozhi Zhang, University of South China (China)
Xingpeng Zhang, Southwest Petroleum University (China)
Haiquan Zhao, Southwest Jiaotong University (China)
Yu Zhao, Southwestern University of Finance and Economics (China)
Xiaojun Zhou, Central South University (China)
Donglan Zou, Xinyu University (China)

Introduction

On behalf of the organizing committee, it is my honor and pleasure to welcome all of you to the 2023 International Conference on Images, Signals, and Computing (ICISC 2023).

ICISC 2023 aims to bring together researchers and scientists from academia, industry, and government laboratories to present new results and identify future research directions in images, signals, and computing. Recent research in these fast has witnessed significant progress. Innovations in image recognition have propelled computer vision applications, enabling accurate object detection and analysis. Signal processing advancements have enhanced data transmission, leading to improved telecommunications and faster information exchange. Moreover, computing capabilities have surged, enabling more powerful and efficient algorithms for artificial intelligence and machine learning. These advancements have revolutionized various domains, including healthcare, robotics, and autonomous systems, paving the way for transformative technologies and applications with widespread impact on society. We are delighted to receive a number of submissions from around the globe. After a rigorous review process, the accepted papers are included in the conference program and proceedings.

During this conference, we will have the opportunity to engage in stimulating discussions, attend insightful keynote speeches, and witness the presentation of exciting research papers. ICISC 2023 will provide a platform to explore emerging trends, share best practices, and envision the future of images, signals, and computing.

As we delve into the conference sessions, let us embrace the spirit of collaboration and foster an environment of open dialogue. Let us engage in fruitful debates, challenge conventional wisdom, and inspire each other to push the boundaries of what is possible.

We would like to sincerely thank all organizing committee members, program committee members, and reviewers for their hard work and valuable contribution. Without your help, this conference would not have been possible. Special thanks go to SPIE for publishing the proceedings. We are very grateful to the keynote speakers for their authoritative speeches. We thank all authors and conference participants for using this platform to communicate your excellent work. I warmly invite all of you to participate in the next year's ICISC 2024.

Once again, I extend a warm welcome to all of you. May this conference be a catalyst for groundbreaking discoveries, foster collaboration, and ignite a passion for further advancements in images, signals, and computing.

Thank you, and let us embark on this remarkable journey together!

Qian He

