

PROCEEDINGS OF SPIE

# ***Intelligent Photonics (Meta) Technology Symposium (IPTS2023)***

**Xiang Zhang**  
*Editor*

**16 May 2023**  
**Wuhan, China**

*Organized by*  
Tsinghua University (China)  
Hunan Normal University (China)  
Huazhong University of Science and Technology (China)  
Wuhan University (China)  
Shanghai Ephoton Optoelectronics Technology (China)  
Chinese Laser Press (China)

*Sponsored by*  
Shanghai Huiguang Conference Service Co., Ltd. (China)

*Published by*  
SPIE

**Volume 12785**

Proceedings of SPIE 0277-786X, V. 12785

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

Intelligent Photonics (Meta) Technology Symposium (IPTS2023),  
edited by Xiang Zhang, Proc. of SPIE Vol. 12785, 1278501  
© 2023 SPIE · 0277-786X · doi: 10.1117/12.3006755

Proc. of SPIE Vol. 12785 1278501-1

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 *Intelligent Photonics (Meta) Technology Symposium (IPTS2023)*, edited by Xiang Zhang, Proc. of SPIE 12785, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510668201

ISBN: 9781510668218 (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

iv      *Conference Committee*

---

**INTELLIGENT PHOTONICS (META) TECHNOLOGY SYMPOSIUM (IPITS2023)**

---

12785 02	<b>Machine vision-based portable track inspection system [12785-3]</b>
12785 03	<b>Metamer mismatch volume calculation method based on high-dimensional spherical sampling [12785-7]</b>
12785 04	<b>Camera spectral sensitivity estimation based on spectrally tunable LED illumination [12785-4]</b>
12785 05	<b>Study on spectral adaptive transformation based on chromatic aberration [12785-5]</b>
12785 06	<b>Improved color accuracy of the camera using optimized matching illumination method [12785-6]</b>
12785 07	<b>Optimization of RGB image spectral reconstruction based on radial basis function networks [12785-8]</b>

# Conference Committee

## *Conference Chairs*

**Liangcai Cao**, Tsinghua University (China)  
**Cheng Zhang**, Huazhong University of Science and  
Technology (China)  
**Guoxing Zheng**, Wuhan University (China)  
**Xinxing Zhou**, Hunan Normal University (China)