

PROCEEDINGS OF SPIE

Optical Sensing and Imaging Technologies and Applications

**Mircea Guina
HaiMei Gong
Jin Lu
Dong Liu**
Editors

**22–24 May 2018
Beijing, China**

Organized by

Chinese Society for Optical Engineering (CSOE) (China)
Photoelectronic Technology Committee, Chinese Society of Astronautics (China)
Photoelectronic Industrialization Committee, CHIA (China)
Department of Cooperation and Coordination for Industry, Academe and Research, CHIA (China)
Science and Technology on Low-light-level Night Vision Laboratory (China)

Sponsored by

Division of Information and Electronic Engineering of Chinese Academy of Engineering (China)
Chinese Society for Optical Engineering (CSOE) (China)

Published by
SPIE

Volume 10846
Part One of Two Parts

Proceedings of SPIE 0277-786X, V. 10846

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

Optical Sensing and Imaging Technologies and Applications, edited by Mircea Guina,
HaiMei Gong, Jin Lu, Dong Liu, Proc. of SPIE Vol. 10846, 1084601 · © 2018 SPIE
CCC code: 0277-786X/18/\$18 · doi: 10.1117/12.2521332

Proc. of SPIE Vol. 10846 1084601-1

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," in *Optical Sensing and Imaging Technologies and Applications*, edited by Mircea Guina, HaiMei Gong, Jin Lu, Dong Liu, Proceedings of SPIE Vol. 10846 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

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

ISBN: 9781510623347
ISBN: 9781510623354 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445

SPIE.org

Copyright © 2018, Society of Photo-Optical Instrumentation Engineers.

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 copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online 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. The CCC fee code is 0277-786X/18/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE. DIGITAL
LIBRARY**

SPIEDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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

xi	<i>Authors</i>
xv	<i>Conference Committee</i>
xvii	<i>Introduction</i>

Part One

OPTICAL SENSING AND IMAGING TECHNOLOGIES AND APPLICATIONS

10846 02	Design of flexible small pixel readout integrated circuit (ROIC) with high input charge handling ability [10846-2]
10846 03	Accuracy analysis for target location with no control point for the camera loaded on space-based platform [10846-4]
10846 04	A non-reference image quality objective evaluation algorithm based on neural network [10846-5]
10846 05	Sum frequency generation of communication band pumped by sub-nanosecond micro-cavity laser [10846-6]
10846 06	Beam radius transformation of orbital angular momentum in free space optical communication system [10846-7]
10846 07	Research on laser proximity detection method based on optical circumferential scanning technology [10846-8]
10846 08	Hyperspectral anomaly detection based on laplace of Gaussian operator [10846-9]
10846 09	A research on HDR and low illumination imaging based on the dual channel monochrome sCMOS [10846-10]
10846 0A	Error comparison and analysis of six-light-screen vertical target under different light-screen-array model [10846-14]
10846 0B	Research on micro-motion target feature extraction based on inverse synthetic aperture laser radar [10846-15]
10846 0C	Recovery of ammonia absorption spectroscopy using asynchronous differential detection [10846-16]
10846 0D	Design of a balanced amplified photodetector based gas sensor [10846-17]

10846 OE	Design of fiber bundle imaging system [10846-18]
10846 OF	Analysis of UV-visible spectra of phthalocyanine compounds by quantum chemistry calculation [10846-19]
10846 OG	Underwater image enhancement algorithm based on RGB channels histogram equalization [10846-20]
10846 OI	An improved unscented Kalman filter for satellite tracking [10846-23]
10846 OJ	A high-precision institutional design and mechanical performance analysis of the medium-wave infrared continuous zoom [10846-24]
10846 OK	Image motion compensation method on reflector multi degree of freedom of aerial cameras [10846-25]
10846 OL	An approach on motion blurred star map simulation for star sensor [10846-26]
10846 OM	Monte-Carlo investigation of cell packed geometries on detection properties in Wolter type square-pore micro-channel optics [10846-27]
10846 ON	Design of in-situ monitor system for lithium-ion battery based on multifunctional fiber [10846-28]
10846 OO	Real-time detection and recognition algorithm for hyperspectral small targets on ocean [10846-29]
10846 OP	A green-band Scheimpflug lidar system: feasibility studies for atmospheric remote sensing [10846-30]
10846 OQ	Sub-blocks segmentation based on multi-feature fusion [10846-31]
10846 OR	Tilt error analysis for laser triangulation sensor based on ZEMAX [10846-32]
10846 OS	Shunting mode railway obstacles detection using feature fusion neural network [10846-33]
10846 OT	Full-waveform echo tomography radar target reconstruction modeling and simulation [10846-34]
10846 OU	A fast method for searching the best matching point of the automatic reconstruction of focal spot measurement using the steepest descent method [10846-35]
10846 OV	Image quality assessment method based on human visual system [10846-36]
10846 OW	The infrared polarization characteristics of ship-target in marine environment [10846-37]
10846 OX	Modeling and date analysis of the error propagation of double-theodolite wind data [10846-38]

10846 0Y	Research on wide-angle telescope array space target surveillance and orbit determination method [10846-39]
10846 0Z	Design of APD double temperature compensation circuit with high gain stability [10846-41]
10846 10	Calculation and analysis of working performance about spaceborne HgCdTe infrared detector affected by temperature [10846-42]
10846 11	Analysis of optical properties of different types of aerosol [10846-43]
10846 12	Highlight removal method in polarimetric images based on Stokes parameters [10846-45]
10846 13	Applications of InGaAs near-infrared linear scanning camera in solar cell inspection [10846-46]
10846 14	Hydrodynamic measurements in water tunnel using enhanced-sensitivity all-fiber Fabry-Perot strain gauges [10846-47]
10846 15	Integrated navigation method based on inertial and geomagnetic information fusion [10846-48]
10846 16	A fiber bragg grating sensing system for monitoring IGBT temperature distribution and thermal conduction state of upper surface silicone [10846-49]
10846 17	Research of algorithm for single gray-scale image haze removal [10846-50]
10846 18	Athermal design of a compact MWIR dual field-of-view optical system [10846-51]
10846 19	A real-time compensation method for blind pixels in infrared focal plane detectors based on spatio-temporal combined filtering [10846-52]
10846 1A	Fiber-solid hybrid amplification laser system with high peak power and high beam quality [10846-53]
10846 1B	GeSn on Si avalanche photodiodes for short wave infrared detection [10846-54]
10846 1C	Simulation and experiment of diffractive optic imaging spectrometer [10846-55]
10846 1D	Scheme for second-generation forest lidar based on few-photon mode [10846-56]
10846 1E	A novel wind lidar system based on 1.55μm all-fiber coherent Doppler laser [10846-57]
10846 1F	Condition detection of overhaul platform based on image processing [10846-58]
10846 1G	Multi-scale kernel correlation filter for visual tracking [10846-59]
10846 1H	Design and implementation of continuous weak grating demodulation system [10846-60]

- 10846 1I **High sensitivity detection integrated cryogenic optical system** [10846-61]
- 10846 1J **High resolution distance measurement using reverse frequency sample method** [10846-64]
- 10846 1K **Research on target loss early warning of KCF algorithm based on hypothesis test** [10846-65]
- 10846 1L **The influence about meteorological parameters on infrared detection distance of point targets**
[10846-66]
- 10846 1M **ESD design of radiation-hardened for UV AlGaIn focal plane arrays readout circuit** [10846-67]
- 10846 1O **Research on nonlinear focal plane stitching method for TDICCD space camera** [10846-69]
- 10846 1P **A model of point target temperature estimation based on multispectral infrared** [10846-70]

Part Two

- 10846 1Q **High accuracy alignment facility for the receiver and transmitter of laser altimeter** [10846-72]
- 10846 1R **Boresight test of the space camera** [10846-73]
- 10846 1S **Remote sensing image segmentation based on a modified pulse coupled neural network**
[10846-74]
- 10846 1T **Hardware-in-the-loop simulation system for dual-star-sensor** [10846-75]
- 10846 1U **The design of laser detection circuit with high reliability and large dynamic range based on APD** [10846-76]
- 10846 1V **Design and research of a spectral data acquisition system for underwater in-situ detection**
[10846-77]
- 10846 1W **Real-time super-block-based star detection and centroid calculation** [10846-79]
- 10846 1X **Generation of three-dimensional fluorescent spot with radially polarized Laguerre-Gaussian beams for STED microscopy imaging** [10846-81]
- 10846 1Y **Study on inner orientation element measurement method for plane array camera using self-calibration technique** [10846-84]
- 10846 1Z **Thermal design and verification for a small space remote sensing camera** [10846-85]
- 10846 20 **Simulation of AlGaIn avalanche photodiodes** [10846-86]
- 10846 21 **Research and realization of geophysical system for HJ-2 satellite camera controller** [10846-87]
- 10846 22 **Effect of electron scrubbing on gain and dynamic range of microchannel plate** [10846-88]

- 10846 23 **Design of atmospheric polarization transmission analysis system based on multi information fusion** [10846-89]
- 10846 24 **Denoising and dimensionality reduction based on PARAFAC decomposition for hyperspectral images** [10846-90]
- 10846 25 **A real-time location method for sea surface target by aerial camera** [10846-91]
- 10846 26 **A novel ellipse detection method for real-time applications** [10846-92]
- 10846 27 **Negative differential capacitance in InGaAs/InAlAs photodetector** [10846-93]
- 10846 28 **Research on temperature measurement by spontaneous Rayleigh-Brillouin scattering profile** [10846-94]
- 10846 29 **A novel laser stripe center extraction method for pavement rut detection** [10846-95]
- 10846 2A **Improved Lidar system based on optical bandpass filter** [10846-96]
- 10846 2B **Edge detection in planet image using an improved partial area effect algorithms** [10846-97]
- 10846 2C **Image mosaic of bionic compound eye imaging system based on image overlap rate prior** [10846-100]
- 10846 2D **Influence of aerodynamic optics on the imaging quality degradation of an high-speed aircraft** [10846-101]
- 10846 2E **Study on aerodynamic heat response of multi-free curvilinear surface dome of hypersonic vehicle** [10846-102]
- 10846 2F **Research on multi-channel gain response nonuniformity correction technique for x-ray single-photon detection** [10846-103]
- 10846 2G **Graphene infrared electromagnetic interference shielding filter on ZnS and As₄₀Se₆₀ substrates** [10846-104]
- 10846 2H **Annealing effect on the photodiode properties of Be implanted InSb** [10846-105]
- 10846 2I **Study of technology on spectral polarization imaging** [10846-106]
- 10846 2J **Hyperspectral unmixing using graph-regularized and sparsity-constrained deep NMF** [10846-107]
- 10846 2K **Study on preparation and sensitive properties of Ag-doped ZnO thin films** [10846-108]
- 10846 2L **Study on a new type of green infrared stealth film material** [10846-109]

10846 2M	Research on structural design and preparation technology of InGaAsInP photocathodes [10846-110]
10846 2N	Specular reflectance calibration based on integral cavity output spectroscopy [10846-111]
10846 2O	Application of pixel-level digital integration in spacial infrared remote sensing [10846-113]
10846 2P	The real-time data processing and lightning extraction technology of lightning imager on FY-4 meteorological satellite [10846-114]
10846 2Q	Deep metric learning on point sets for 3D industry elements recognition [10846-116]
10846 2R	Hyperspectral subpixel target detection based on joint spectral and spatial preprocessing prior to endmember extraction [10846-117]
10846 2S	Research on the application of infrared weak and small target detection algorithm based on SVM posterior probability in weekly vision search system [10846-119]
10846 2T	Adaptive dual-feature image stitching based on moving-DLT [10846-120]
10846 2U	Toward a domain-specific heuristic knowledge based spectrum reconstruction method for multispectral camera with CMOS Fabry-Perot interferometer [10846-121]
10846 2V	Mesa InSb infrared focal plane detector by Be implantation [10846-122]
10846 2W	Retinal scanning display with microlens-array-based exit pupil expanders [10846-123]
10846 2X	Infrared imaging guidance missile's target recognition simulation based on air-to-air combat [10846-124]
10846 2Y	Optical fiber laser phased array technology for space laser communication [10846-125]
10846 2Z	Operating range analysis of infrared detection system to a ground target [10846-126]
10846 30	Fast playback technique of key sequence diagram based on mixed Gauss background modeling and super compression [10846-127]
10846 31	Image registration for defects detection of high-speed train bogies [10846-128]
10846 32	Hyper-spectral remote sensing water depth retrieval based on spectral difference factors [10846-129]
10846 33	Exhaust plume warning method based on modeling of infrared characteristics and motion features [10846-131]
10846 34	Analysis and design of the dual color warning optical system for ultraviolet and infrared in the near-space [10846-132]

- 10846 35 **An outdoor accuracy evaluation method of aircraft flight attitude dynamic vision measure system [10846-133]**
- 10846 36 **Bibliometric trend analysis on global image processing research [10846-134]**
- 10846 37 **Lateral collection structure for planar type InGaAs infrared detector [10846-136]**

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Bao, Shulong, 2P	Fang, Hao, 2J
Bian, He, 0J	Fang, Jiaxiong, 13
Bo, Tiezhu, 0M, 22	Fang, Weikai, 0Z
Cai, Hua, 0M, 22	Fei, Cheng, 13
Cai, Yi, 0Z	Fei, Jiaqi, 0K, 1Z
Cao, Baofeng, 2D, 2E	Feng, Gaoping, 2N
Cao, Haiyi, 1D	Feng, Lei, 1C
Chai, Binhu, 35	Feng, Qibo, 0R
Chang, Hongwei, 2J	Feng, Ying-wang, 17
Chang, Jun, 0E	Feng, Yuechong, 22
Chang, Sansan, 0J, 25	Feng, Yuhang, 2O
Chang, Zheng, 0Q, 1G	Feng, Yun-song, 2Z
Chen, Daming, 13	Fu, Anmin, 1D
Chen, Ding, 0A	Fu, Kaihu, 2G
Chen, Faling, 1G	Fu, Qiang, 2I
Chen, Gang, 2H, 2V	Gan, Lin, 07
Chen, Haiyan, 0Z	Gan, Yu-quan, 21
Chen, Hao, 0N	Gao, Bo, 03, 0J, 0K, 1Z, 25
Chen, Hongyu, 0Q	Gao, Chun-yu, 06
Chen, Jiaxin, 0O	Gao, Kun, 0I, 19
Chen, Jiayu, 2Y	Gao, Yang, 0L, 11, 1T
Chen, Jun, 20, 27	Gao, Zhiyong, 15
Chen, Rui, 0A	Gong, Chen, 19
Chen, Shaodong, 09	Gong, Haimei, 37
Chen, Shouqian, 2D, 2E	Gong, Jian, 0W
Chen, Songcong, 36	Gu, Hailun, 19
Chen, Wei, 2G	Guo, Chuan, 05
Chen, Weining, 0J, 0K, 1Z	Guo, Gao, 0X
Chen, Xu, 2S	Guo, Rongli, 0V
Cheng, Buwen, 1B	Guo, Ruijie, 29
Cheng, Dewen, 2W	Guo, Yue, 1O
Chu, Yannan, 0Z	Guo, Yunzeng, 25
Ci, Mingru, 2Y	Han, Bin, 2G
Cong, Menglong, 0C	Han, Jian, 2W
Cui, Jian-yong, 1U	Han, Li, 0N
Dai, Congming, 0B, 1P	Han, Long, 2Y
Deng, Honghai, 37	Hao, Peiyu, 09
Ding, Qinghai, 1G	Hao, Yingming, 26
Ding, Ziyu, 1B	He, Jing, 16
Dong, Long, 2F	He, Tao, 1D
Dong, Xin, 1Q	He, Xingdao, 28
Du, Baolin, 04	He, Youjin, 0W
Du, Guojun, 1Q	He, Zhenxin, 08
Du, Huijie, 1T	He, Zhuo, 2S
Fan, Erlei, 0J	Hou, Ye, 31
Fan, Kaiyuan, 0E, 0E	Hu, Bing Liang, 0G, 0O, 1V
Fan, Shuzhen, 13	Hu, Haitao, 2L
Fan, Yao, 0G	Hu, Hui-jun, 34
Fan, Zhigang, 2D, 2E	Hu, Qiuping, 33

Hu, Rongjing, 28
 Hu, Xiaoyan, 1B
 Hu, Yihua, 0T
 Hua, Nian, 1S
 Hua, Weihong, 05
 Huang, Hesong, 2X
 Huang, Hua, 0X
 Huang, Jin, 1D
 Huang, Jing, 37
 Huang, Kangsheng, 0M
 Huang, Zhoudi, 35
 Hui, Bin, 0Q, 1G
 Ji, Yicai, 29
 Ji, Yufeng, 0Z
 Jia, Jinsheng, 0M
 Jia, Xiaodong, 2U
 Jia, Xin, 1O, 1R
 Jiang, Hongzhi, 2Q, 2T, 31
 Jiang, Huilin, 2I
 Jiang, Jie, 1W, 2B
 Jiang, Shan, 1H
 Jiao, Anbo, 0Q
 Jin, Wei-qi, 2C
 Jin, Yangli, 2G
 Jin, Yihan, 0E
 Ju, Lin, 2D, 2E
 Ju, Yu, 0N
 Kang, Kai, 2E
 Kuang, Yongbian, 02
 Lei, Wuhu, 10
 Li, Aihua, 2J
 Li, Bin, 23, 30, 33
 Li, Chongyang, 1Y
 Li, Chunbo, 2K
 Li, Fangqi, 1C
 Li, Gang, 0U
 Li, Hong-bo, 1V
 Li, Hongcai, 08
 Li, Hui, 2K
 Li, Jiakun, 0R
 Li, Juan, 0S, 1I
 Li, Junwei, 2R
 Li, Kai, 1H
 Li, Lekang, 2K
 Li, Shanchuang, 2E
 Li, Shenbo, 2X
 Li, Sun, 1S
 Li, Ting, 18
 Li, Xia, 1L
 Li, Xiangyang, 1M
 Li, Xudong, 2Q, 2T, 31
 Li, Xue, 37
 Li, Xueshen, 2E
 Li, Yanlei, 0Z
 Li, Yongfu, 13
 Li, Zhi, 0Y
 Li, Zishou, 0N
 Lian, Jiao, 0M, 22
 Liang, Hua, 2P
 Liang, Mei, 0P

Lin, Xiao, 1B
 Liu, Biao, 23
 Liu, Bin, 1A
 Liu, Chang, 2R
 Liu, Chaoshan, 0L
 Liu, Chong, 1A
 Liu, Chuntong, 08
 Liu, Dachuan, 1B
 Liu, Dong, 1A
 Liu, Fulin, 3S
 Liu, Gang, 33
 Liu, Hao, 1L
 Liu, Heng, 0F
 Liu, Hong, 1V, 21
 Liu, Hui, 0M, 22
 Liu, Jiaguo, 18
 Liu, Jianguo, 1L
 Liu, Jiaqi, 15
 Liu, Jingjiao, 2Y
 Liu, Jin-sheng, 34
 Liu, Lei, 05
 Liu, Liang, 0W
 Liu, Pengzu, 23, 30
 Liu, Qi, 02
 Liu, Ruihuang, 2L
 Liu, Shujing, 1X
 Liu, Shuyang, 2U
 Liu, Wen-long, 21
 Liu, Xianzhu, 2I
 Liu, Xin, 29
 Liu, Xingrun, 1L
 Liu, Xue-bin, 21
 Liu, Yachao, 1F
 Liu, Yang, 2I
 Liu, Yanli, 1C
 Liu, Yunpeng, 1G
 Liu, Zheng, 0B, 1P
 Liu, Zhiqiang, 14
 Long, Liang, 2O
 Luo, Haibo, 0Q, 1G
 Luo, Mingyan, 1X
 Lv, Yanqiu, 02, 2H
 Ma, Ding, 1M
 Ma, Dong-mei, 24
 Ma, Kai, 09
 Ma, Lina, 1Y
 Ma, Shixin, 08
 Ma, Yi, 32
 Ma, Zengguang, 1X
 Mao, Hongxia, 0B, 1P
 Mei, Chao, 0J, 0K
 Meng, Gang, 15
 Min, Fu, 14
 Ming, Yue, 2D, 2E
 Mu, Lei, 15
 Mu, Shengbo, 1Q
 Nan, Tianzhang, 2S
 Ni, Jin-ping, 0A, 0V
 Nie, Yunsong, 1R
 Niu, Lihong, 1E

Ou, Wen, 1I
 Ou, Zongyao, 1Q
 Pan, Wang, 26
 Peng, Guan, 0P
 Peng, Jianwei, 03, 0K, 1Z
 Peng, Jin-ye, 24
 Qin, Zidong, 2P
 Qiu, Huacheng, 14
 Qiu, Longjia, 04
 Qiu, Shi, 36
 Qiu, Su, 2C
 Qu, Huiyang, 1T
 Qu, Xinghua, 1J
 Ran, Zengling, 14
 Rao, Wei, 2N
 Ren, Xiaodong, 10
 Rong, Xiaolong, 23
 Sha, Weiwei, 2M
 Shang, Jingcheng, 28
 Shao, Si-pei, 34
 Shen, Nan, 2Z
 Shen, Xiaofang, 0L
 Shen, Yu-jiao, 17
 Shi, Feng, 2M
 Shi, Guangwei, 0E
 Shi, Jiaming, 2L
 Shi, Kui, 03, 0K, 1Z, 25
 Shi, Xiaotian, 2D, 2E
 Shi, Xiaoxuan, 22
 Shi, Xing-chun, 21
 Shi, Yu-feng, 34
 Shi, Zhan, 09
 Song, Juan, 34
 Song, Junling, 2N
 Song, Junru, 1R
 Song, Li-quan, 1K
 Song, Yajun, 1F
 Su, Binghua, 1E
 Sun, Chen, 12
 Sun, Dandan, 0C, 0D
 Sun, Dongqing, 1X
 Sun, Lu, 1E
 Sun, Qiyun, 11
 Sun, Weifeng, 02
 Sun, Yong, 0M, 22
 Tan, Ke, 35
 Tan, Meng, 0U
 Tang, Jinying, 0T, 10
 Tian, Feng, 16
 Tian, Si, 17
 Tian, Zhen, 32
 Wang, Chaozhe, 2X
 Wang, Chen, 0M
 Wang, Chunhun, 1Q
 Wang, Cong, 1Q
 Wang, Dan, 1A
 Wang, Dongjie, 1Y
 Wang, Fan, 0V
 Wang, Gaoping, 2N
 Wang, Guangping, 0I, 19, 2R

Wang, Guangyu, 2N
 Wang, Guohong, 1T
 Wang, Hao, 08
 Wang, Hongqiang, 1I
 Wang, Hongyan, 05
 Wang, Hui, 2D, 2E
 Wang, Jinchun, 02
 Wang, Jing, 0I, 19, 1O
 Wang, Jiqiang, 1M
 Wang, Jiuwang, 0M
 Wang, Kun, 2P
 Wang, Le, 0R
 Wang, Ling, 1M
 Wang, Lingjie, 0E
 Wang, Mingliang, 15
 Wang, Ran, 0B
 Wang, Shuang, 0G
 Wang, Songceng, 0N
 Wang, Tao, 2J
 Wang, Ting, 11
 Wang, Wei, 0U
 Wang, Weidong, 15
 Wang, Weiping, 1B
 Wang, Wen-cong, 34
 Wang, Xin, 30, 33
 Wang, Yajun, 36
 Wang, Yanchao, 0U
 Wang, YaXu, 2A
 Wang, Yingrui, 1I
 Wang, Yong, 1A, 2M
 Wang, Yongtian, 2W
 Wang, Yu, 30, 33
 Wang, Yubo, 2H
 Wang, Zhaohui, 1H
 Wang, Zhen, 1W
 Wang, Zhengzhou, 0U
 Wang, Zhiliang, 37
 Wang, Zhiqiang, 1B
 Wei, Bin, 0N
 Wei, Heli, 0B, 1P
 Wei, Peng, 2H, 2V
 Wei, Wen-peng, 21
 Wei, Zhenzhong, 35
 Wen, De-sheng, 24
 Weng, Xuhui, 10
 Wu, Haiying, 23
 Wu, Hongbo, 0E
 Wu, Lan, 1A
 Wu, Limin, 2O
 Wu, Qiong, 0I
 Wu, Tao, 28
 Wu, Xue-ying, 1U
 Xiang, Zhen, 1A
 Xiao, Ting, 34
 Xie, Jing, 1M
 Xie, Yu, 1E
 Xie, Zhendong, 14
 Xin, Xiang-jun, 16
 Xing, Hui, 1R
 Xiong, Jian, 1I

Xu, Bo, 2G
 Xu, Can, 0Y
 Xu, Chidong, 0Z
 Xu, Chong, 0N
 Xu, Chuan-gang, 1K
 Xu, Chun-xiao, 1U
 Xu, Hao, 0F
 Xu, Huoxi, 2J
 Xu, Jiating, 0L
 Xu, Jun, 1I
 Xu, Kuan, 2Q
 Xu, Tao, 22
 Xu, Taohu, 23
 Xu, Yanglei, 0M
 Xu, Ying, 1L
 Xu, Yingshun, 1X
 Xue, Chunlai, 1B
 Xue, Jia-an, 2C
 Xue, Mowen, 2T
 Xue, Wei, 14
 Yan, Qiang-qiang, 2I
 Yan, Rong-hua, 24
 Yan, Wei, 04
 Yan, Yongming, 1E
 Yang, Benya, 13
 Yang, Biao, 0T, 10
 Yang, Chao, 2C
 Yang, Chen, 1F
 Yang, Chuanyin, 28
 Yang, Fan-chao, 12
 Yang, Hongtao, 1Z
 Yang, Jinbao, 1F
 Yang, Shuguang, 1X
 Yang, Xiaojun, 0X
 Yang, Yanguang, 14
 Yang, Yanju, 1X
 Yang, Zhe, 0Z
 Yao, Guansheng, 2H
 Yao, Hong, 0Y
 Ye, Shengbo, 29
 Ye, Tao, 0S
 Ye, Zhibin, 1A
 Yin, Peng, 06
 Yin, Xiao-li, 06
 You, He, 16
 You, Jiang, 23
 Yu, Dongsheng, 0Z
 Yu, Tao, 0G, 1V
 Zhan, Juntong, 2I
 Zhang, Chen, 2U
 Zhang, Dongliang, 1B
 Zhang, Feiran, 2F
 Zhang, Feng, 1K
 Zhang, Fumin, 1J
 Zhang, Gaopeng, 0J, 1Z
 Zhang, Geng, 0O
 Zhang, Guangdong, 03, 0J, 0K, 25
 Zhang, Guangjun, 1W, 2B
 Zhang, He, 07
 Zhang, Hongwei, 0K
 Zhang, Hua, 33
 Zhang, Jingwei, 29
 Zhang, Jin-long, 16
 Zhang, Jinsuo, 2S
 Zhang, Jiyou, 1Y
 Zhang, Jun-ju, 17, 2M
 Zhang, Junxi, 27
 Zhang, Limin, 26
 Zhang, Lisha, 2O
 Zhang, Mingqi, 1C
 Zhang, Rongda, 2D, 2E
 Zhang, RongZhu, 2A
 Zhang, Shengjun, 15
 Zhang, Shoucai, 2P
 Zhang, Tingfa, 13
 Zhang, Tong, 1J
 Zhang, Wei, 03
 Zhang, Xian, 22
 Zhang, Xin, 21
 Zhang, Xinwei, 1D
 Zhang, Xuwen, 0Y
 Zhang, Yan, 1M, 2A
 Zhang, Yezhi, 1O
 Zhang, Ying, 1K, 1T
 Zhang, Yong, 2B
 Zhang, Yue, 1Z
 Zhang, Zhanying, 0Z
 Zhang, Zhengyu, 20
 Zhang, Zhi, 1Z
 Zhang, Zhou-feng, 1V
 Zhang, Zhuang-zhuang, 2C
 Zhao, Anna, 2U
 Zhao, Haibo, 1C
 Zhao, Hao, 2O
 Zhao, Huijie, 2Q, 2T, 31
 Zhao, Lingwei, 05
 Zhao, Tao, 2U
 Zhao, Wei, 05
 Zhao, Yinglong, 1Y
 Zhao, Yue, 0J
 Zhen, Zheng, 1I
 Zheng, Kelin, 2V
 Zheng, Kong, 0P
 Zheng, Wei, 1U
 Zheng, Yong-chao, 1U
 Zhong, Hui, 1O
 Zhou, Dezhaoh, 04
 Zhou, Dongzhan, 0M
 Zhou, Jun, 1I
 Zhou, Tao, 2U
 Zhou, Zhanrong, 0L
 Zhou, Zhiqiang, 30
 Zhu, Feng, 26
 Zhu, Huiqun, 2K
 Zhu, Jianhua, 32
 Zhu, Kai, 17
 Zhu, Miao, 0V
 Zhu, Xiaohui, 2N
 Zhu, Zhenyu, 0I
 Zhuang, Youwen, 0I

Conference Committee

Conference Chair

Guangjun Zhang, Southeast University (China)

Conference Co-chairs

Junhao Chu, Shanghai Institute of Technical Physics (China)

Qionghai Dai, Tsinghua University (China)

Dianyuan Fan, Shenzhen University (China)

Jiancheng Fang, Beihang University (China)

Gu Min, Royal Melbourne Institute of Technology University (Australia)

Desheng Jiang, Wuhan University of Technology (China)

Huilin Jiang, Changchun University of Science and Technology (China)

Lin Li, The University of Manchester (United Kingdom)

Yueguang Lv, Chinese Academy of Engineering (China)

Zhejin Liu, National University of Defense Technology (China)

Wang Xiaomo, China Academy of Electronics and Information Technology (China)

Huaming Wang, Beihang University (China)

Lijun Wang, Changchun Institute of Optics, Fine Mechanics and Physics (China)

Wei Wang, China Aerospace Science and Technology Corporation (China)

Jianyu Wang, Shanghai Branch of Chinese Academy of Sciences (China)

Zuyan Xu, The Technical Institute of Physics and Chemistry (China)

Jiubin Tan, Harbin Institute of Technology (China)

Jianquan Yao, Tianjin University (China)

Hao Yin, China Electronic Systems Engineering Corporation (China)

Shaohua Yu, Wuhan Research Institute of Posts and Telecommunications (China)

Renhe Zhang, Institute of Acoustics (China)

Zisen Zhao, Wuhan Research Institute of Posts and Telecommunications (China)

Liwei Zhou, Beijing Institute of Technology (China)

Shouhuan Zhou, North China Research Institute of Electro-optics (China)

Zhongliang Zhu, Southwest Electronic Telecom Technology Research Institute (China)

Program Committee

Byoungcho Lee, Seoul National University (Korea, Republic of)
Liangcai Cao, Tsinghua University (China)
Weibiao Chen, Shanghai Institute of Optics and Fine Mechanics (China)
Haimei Gong, Shanghai Institute of Technical Physics (China)
Sen Han, University of Shanghai for Science and Technology (China)
Huikai Xie, University of Florida (United States)
John McBride, University of Southampton (United Kingdom)
Yanbiao Liao, Tsinghua University (China)
Dong Liu, Zhejiang University (China)
Jian Liu, Harbin Institute of Technology (China)
Jin Lu, Tianjin Jinhang Institute of Technical Physics (China)
Mircea Guina, Tampere University of Technology (Finland)
Shibin Jiang, AdValue Photonics, Inc. (United States)
Guohai Situ, Shanghai Institute of Optics and Fine Mechanics (China)
Hongbo Sun, Tsinghua University (China)
Yongtian Wang, Beijing Institute of Technology (China)
Yuelin Wang, Shanghai Institute of Microsystem and Information Technology (China)
Renhe Zhang, Institute of Acoustics (China)
Xuejun Zhang, Changchun Institute of Optics, Fine Mechanics and Physics (China)
Pu Zhou, National University of Defense Technology (China)
Zhongliang Zhu, Southwest Electronic Telecom Technology Research Institute (China)

Session Chairs

- 1 Infrared Sensing and Imaging Technology I
Mircea Guina, Tampere University of Technology (Finland)
- 2 Image Processing and Analysis I
Haimei Gong, Shanghai Institute of Technical Physics (China)
- 3 Infrared Sensing and Imaging Technology II
Yi Gu, Shanghai Institute of Microsystem and Information Technology (China)
- 4 Image Processing and Analysis II
Jin Lu, Tianjin Jinhang Institute of Technical Physics (China)
- 5 Novel Laser Radar and Related Technology
Dong Liu, Zhejiang University (China)
- 6 Ultra-violet and Visible Sensing and Imaging Technology
Jin Lu, Tianjin Jinhang Institute of Technical Physics (China)

Introduction

The International Symposium on Optoelectronic Technology and Application 2018 (OTA 2018) is the annual conference of the Chinese Society for Optical Engineering. It continues to be one of the largest academic and industrial conferences in the field of optical and optoelectronic technology in China. This year's program included academic exchanges, industry exhibitions, and cooperation negotiations together in one event. There were five technical conferences, seven exhibition themes, and 600 technical negotiations. We sincerely hope that this event continues to promote research and development of optoelectronic technology and to enhance international cooperation in the optical and optoelectronic fields.

OTA 2018 was sponsored by The Division of Information and Electronic Engineering of the Chinese Academy of Engineering (China), and The Chinese Society for Optical Engineering (CSOE) (China). The conference was organized by the Chinese Society for Optical Engineering (CSOE) (China), the Photoelectronic Technology Committee, the Chinese Society of Astronautics (China), the Photoelectronic Industrialization Committee, CHIA (China), the Department of Cooperation and Coordination for Industry, Academic, and Research, CHIA (China), and the Science and Technology on Low-light-level Night Vision Laboratory (China). We received more than 759 contributions from more than 15 countries, including the United States, United Kingdom, Germany, France, Spain, Australia, Canada, Mexico, Brazil, Japan, Republic of Korea, Thailand, Singapore, Russian Federation and China. There were more than 400 contributions published in SPIE Proceedings, including 70 contributions from invited speakers. After careful discussion, six keynote speeches were selected and presented by famous scientists from the United States, United Kingdom, Republic of Korea, and China. There were 138 excellent invited talks, 45 from overseas, that reflected first-class level in the field of optics and photonics technology. On behalf of the OTA 2018 Organizing Committee, I would like to express thanks to all the invited speakers and authors for their contributions and support.

Finally, on behalf of the other Co-chairmen and the Organizing Committee, I would like to heartily thank our sponsors and cooperating organizers for all they have done for the conference, and to all of the participants and friends for their interests and efforts in helping us to make the conference a success. Thanks also to the Program Committee for their effective work and valuable advice, especially the Secretariat, and to the staff of SPIE for their tireless efforts and outstanding service preparing and publishing the proceedings.

We hope to see you next year!

Guangjun Zhang

