

# The 9<sup>th</sup> International Symposium on Advanced Optical Manufacturing and Testing Technologies

26-29 June 2018

Century City International Convention Centre

ChengDu, China

### Sponsored by:

COS - The Chinese Optical Society

IOE - Institute of Optics and Electronics,  
- Chinese Academy of Sciences

SPIE - The International Society for Optics and Photonics  
- (Technical Co-Sponsor)

### Supported by:

Ministry of Science and Technology of China

Chinese Academy of Sciences (CAS)

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### Conferences:

- 1 Large Mirror and Telescopes
- 2 Advanced Optical Manufacturing Technologies
- 3 Optical Test and Measurement Technology and Equipments
- 4 Micro/Nano Optics and Subwavelength Electromagnetics
- 5 Meta Surface-wave and Surface Plasmon Lithography
- 6 Extreme Manufacturing Technology
- 7 Innovative Manufacturing Technology
- 8 Flexible Materials and Devices
- 9 Optoelectronic Materials and Devices for Sensing and Imaging

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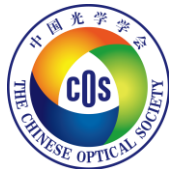
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## Organizations & Committees

### Sponsored by:

COS - The Chinese Optical Society



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IOE - Institute of Optics and Electronics, Chinese Academy of Sciences



中国科学院光电技术研究所  
THE INSTITUTE OF OPTICS AND ELECTRONICS THE CHINESE ACADEMY OF SCIENCES

SPIE - The International Society for Optics and Photonics (*Technical Co-Sponsor*)

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for optics and photonics

### Supported by:

- Ministry of Science and Technology of China
- Chinese Academy of Sciences (CAS)
- National Natural Science Foundation of China

### Symposium General Chair:

**Bingkun ZHOU**, Academician, Chinese Academy of Sciences; Former President of COS

**Guangcan GUO**, Academician, Chinese Academy of Sciences; Former President of COS

**Liwei ZHOU**, Academician, Chinese Academy of Engineering; Beijing Institute of Technology

**Qihuang GONG**, Academician, Chinese Academy of Sciences; President of COS; Peking University

**Henri LEZEC**, National Institute of Standards and Technology

**Minghui HONG**, National University of Singapore

**Yuwen QIN**, National Natural Science Foundation of China

**Yudong ZHANG**, President of Chengdu Branch, Chinese Academy of Sciences, Director of Academic Committee of Institute of Optics and Electronics

**Enhui LIU**, Vice President of Institute of Optics and Electronics Chinese Academy of Sciences

**Organizer:**

- Committee of Optical Manufacturing Technology, Chinese Optical Society
- Opto-Electronic Journal
- State Key Laboratory of Optical Technologies on Nano-Fabrication and Micro-Engineering, Institute of Optics and Electronics, Chinese Academy of Sciences
- Key Laboratory of Optical Engineering, Chinese Academy of Sciences
- Key Laboratory of Adaptive Optics, Chinese Academy of Sciences
- Key Laboratory of Optoelectronics Technology on Space Precision Measurement, Institute of Optics and Electronics, Chinese Academy of Sciences
- Key Laboratory of Optoelectronic Technology & Systems (Chongqing University), Ministry of Education, China

**Supporting Organization:**

TRIOPTICS CHINA



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**Liwei ZHOU**, Academician, Chinese Academy of Engineering; Beijing Institute of Technology

**Yuen-Ron SHEN**, University of California, Berkeley

**Myung K. CHO**, National Optical Astronomy Observatory

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**Jinghua CAO**, Deputy Director-general of CAS Bureau of International Cooperation

**Yadong JIANG**, Director of School of Optoelectronic Information, University of Electronic Science and Technology of China

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**Xue FENG**, Tsinghua University

**Junsheng YU**, University of Electronic Science and Technology of China

**Xinbing CHENG**, Tongji University

**Zheyu FANG**, Peking University

## Conference Program



**Rui ZHOU**, Xiamen University

**Changtao WANG**, Institute of Optics and Electronics, Chinese Academy of Sciences

### ***Symposium General Secretary:***

**Duocai TAN**, Institute of Optics and Electronics, Chinese Academy of Sciences

**Penghao ZHOU**, Institute of Optics and Electronics, Chinese Academy of Sciences

**Xiaoping TANG**, Institute of Optics and Electronics, Chinese Academy of Sciences

**Xiaodong GAO**, Institute of Optics and Electronics, Chinese Academy of Sciences

**Qian WANG**, Institute of Optics and Electronics, Chinese Academy of Sciences

**Bin FAN**, Institute of Optics and Electronics, Chinese Academy of Sciences

**Yongjian WAN**, Institute of Optics and Electronics, Chinese Academy of Sciences

**Leilei YANG**, Institute of Optics and Electronics, Chinese Academy of Sciences

### ***Coordinators:***

**Jinxue WANG**, The International Society for Optics and Photonics

**Xiangang LUO**, Institute of Optics and Electronics, Chinese Academy of Sciences

***Symposium General Chair:***

**Bingkun ZHOU**, Academician, Chinese Academy of Sciences, Former President of COS

**Biography: Bingkun Zhou**, a specialist of Laser and Optoelectronics, was born in March, 1936 in Sichuan, China. He graduated from Tsinghua University, Beijing, China in 1956. Since then he has been with the Electronic Engineering Department at the same university. From 1960 to 1962 he was a visiting scholar at Leningrad Electro technical Institute, Leningrad, former USSR. From 1983 to 1984 he was a visiting scholar of Applied Physics Department, Stanford University, U.S.A. From 1985, he has been a professor of Electronic Engineering Department at Tsinghua University. He was elected Academician of Chinese Academy of Sciences in 1991 and was elected Academician of Third World Academy of Sciences in 2001. At present, he is also the vice-president of the Chinese Optical Society, fellow of the Optical Society of America and Chinese Institute of Electronics.



He has been engaged in laser and optoelectronics research and teaching for more than 40 years. In 1984, he made key contributions to development of diode-pumped, narrow line width and frequency stable Solid State Lasers. He with his research group has made scientific research achievements in the area of “external cavity semiconductor lasers”, “semiconductor laser pumped solid state lasers”, “crystal fibers and devices”, “fiber ring cavity and their applications”, “fiber amplifiers and lasers”, “high temperature optical fiber thermometer and its applications” and “DWDM optical fiber transmission and all optical network technology” . He has won 13 national and ministry-level prizes in China. He is the author or co-authors of about 100 papers, presentations, patents and one book Laser Principle.

### *Symposium General Chair:*

**Guangcan GUO**, Academician, Chinese Academy of Sciences, Former President of COS

**Biography:**Guo Guangcan, Member of CAS, Chief Scientist of 973 Project, currently teaching at University of Science and Technology of China, signed with NUPT on October 31st to become an honorary professor with the university. President Yang Zhen attended the ceremony to present the letter of appointment, after which Professor Guo gave a lecture titled “Quantum High Precision Measurement based on Weak Measurement Theory”, and had a follow-up discussion with the audience.



Guo Guangcan, professor with University of Science and Technology of China, and Director of the Key Lab of CAS Quantum Information, is Chief Scientist in his field in Chinese Academy of Sciences, and Chief Scientist of Quantum Communication and Quantum Communication Technologies.

Professor Guo has long devoted himself to the research on theory and experiment of quantum optics, quantum cryptography, quantum communication, and quantum computation, as well as the teaching of Optics and Physics, and has achieved a series of internationally recognized accomplishments. He has published over 820 journal researches, with SCI 10781 citations, including 9788 non-self citations, and 11 book-length researches (translations). He has supervised a total of 40 PHD candidates and 30 Master candidates, 4 of whom have made the Top Hundred PHD Dissertations and 2 recipients of National Outstanding Youth Fund. Professor Guo has been awarded the honor of Progressive Staff of CAS, Moe Outstanding Teachers of China, and was elected Member of CAS in 2003.

***Symposium General Chair:***

**Liwei ZHOU**, Academician, Chinese Academy of Engineering

**Biography:** Liwei ZHOU, Professor, PhD, Member of Chinese Academy of Engineering, was born in Shanghai in 1932. He was graduated from Beijing Institute of Technology (BIT) in 1958 and received the USSR Candidate Degree (PhD) of physics-mathematical science in 1966. In 1984 he was titled “Outstanding Expert at the State Level” for developing a school of his own in the electron optics study, and in the same year he was promoted to the rank of full professor. He used to be the Chairman of Academic Committee, BIT, the vice president of Chinese Optical Society and Chairman of Association of Science and Technology, BIT. Now he is the Chair-Expert of BIT, Honorary Director of School of Basic Education of BIT and president of Beijing Optical Society.



Prof. Zhou Liwei is engaged in electron optics and photoelectronic imaging. Since 1978, Prof. Zhou Liwei has published 6 monographs and 6 printed teaching materials and more 270 academic and technical papers at home and abroad. His monograph “Electron Optics with Wide Beam Focusing” has been awarded the Chinese Books Prize in 1994, the National Books Prize (nominative prize) in 1995 and the Nation-wide Scientific Excellent Books First Prize in 1995.

Achievements of Prof. Zhou Liwei in scientific research were awarded the National Science Congress Prize in 1978, the Ministry’s First and Second Prizes for Science and Technology Progress in 1980, 1990, 1995 and 1996, the Guang Hua Fund First Prize for Science and Technology in 1991. He was also twice of the winner of State Prize for Science and Technology Progress in 1991 and 1996. In 1996, he was given a title of “Advanced Worker” by State Personnel Ministry for his outstanding service in educational and scientific field. In 1997, he got an Honorary Degree of Doctor of Science by Samara State Aerospace University, Russia. In 1999, he was elected member of Chinese Academy of Sciences, and in 2000, he was elected Foreign member of Academy of Engineering Sciences of the Russian Federation.



### ***Symposium General Chair:***

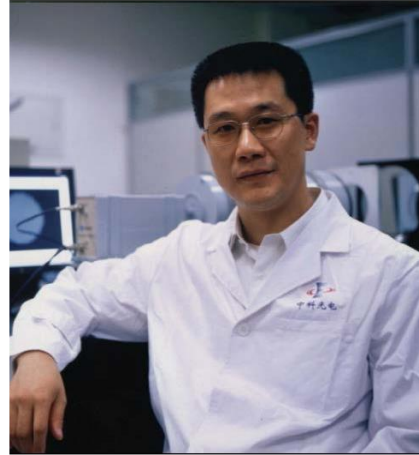
**Qihuang GONG**, Academician, Chinese Academy of Sciences, President of COS

**Biography:** **Qihuang Gong** received the B.S. and Ph.D. degrees in physics from Peking University, China in 1983 and 1989, respectively. In 1988 and 1989, he studied atomic optics at Manchester University, UK. He is currently a Full Professor and a Cheung Kong Scholar at the Physics Department, Peking University. Moreover, he has been appointed as the Director of both the State Key Laboratory for Artificial Microstructure and Mesoscopic Physics and the Institute of Modern Optics, Peking University. His current research interests are in ultrafast optics and spectroscopy, nonlinear optics, and mesoscopic optical devices for applications in optical information processing and communication. Professor Gong has authored more than 200 articles. He also serves as a Topic Editor of Optics Letters, an Advisor Editor of Chemical Physics Letters, an Editorial Board Member of the Journal of Optics, and an Associate Editor-in-Chief at Chinese Physics B, Chinese Optics Letters, Acta Physics Sinica (in Chinese), and Quantum Electronics (in Chinese). He was also elected as an Executive Council Member of Chinese Optics Society and Chinese Physical Society. Moreover, he served as a Member of the International Council of Optical Society of America (OSA), a Fellow of IOP, and a Co-chair of Asian Intense Laser Network.



***Symposium General Chair:***

**Yudong ZHANG**, President of Chengdu Branch,  
Chinese Academy of Sciences (China)



**Biography:** Yudong ZHANG, PhD and Research Professor, President of Chengdu Branch, CAS (Chinese Academy of Sciences) is a member of the Appraisal Expert Team of Information Directorate of NSFC (National Natural Science Foundation of China), a vice-chair of Bio-optics and Laser Medicine Subcommittee of COS (Chinese Optical Society), a vice-Chair of Electro-Optical Specialty Committee of Chinese Society of Astronautics, and a committeeman of Quantum Electronics and Electro-Optical Subcommittee of CIE (Chinese Institute of Electronics), an adjunct professor of UESTC (University of Electronic Science and Technology of China) and Zhejiang University respectively. Mr. Zhang received his BS from Zhejiang University in 1984, his MS from IOE in 1987, and his PhD from Shanghai Institute of Optics and Fine Mechanics, CAS, in 1991. From 1991 to 1997 he held the technical posts of Research Assistant, Research Associate Professor and Research Professor in Fujian Institute of Research on the Structure of Matter, CAS. He has been working in IOE since 1998 and serving as President since 2003.

For more than 10 years, he has carried out many frontier researches in the fields of adaptive optics, microlithography and new materials of non-linear optics and has obtained many innovative achievements that are leading in China or advanced in the world. He has won one first-grade award of CAS Prize for S&T Progress and CAS Prize for Invention respectively. Altogether, he has applied for and obtained 38 pieces of patents, and published more than 50 papers among which 30 are included in EI Database and 10 in SCI Database.

From 1998 to present, he has been taking charge of the development of the adaptive optical (AO) system for imaging live human eye retina with high resolution. The system is the first practical compact AO system for this application in the world.

He is also in charge of the development of Dynamic Wavefront Correction AO System for the new generation of ICF prototype system in China. It is the first AO system that can reduce the wavefront distortion of laser beam in ICF system from  $9\lambda$  to about  $1.5\lambda$  in China. This extends the application of adaptive optics in the ICF field and is at the advanced world level.

### **Organization Committee:**

**Enhai LIU**, Vice President of Institute of Optics and Electronics, CAS (China)

**Biography: Professor Enhai LIU**, Vice President of Institute of Optics and Electronics (IOE) Chinese Academy of Sciences, graduated from Dalian University of Technology in 1987, and received his master degree in University of Electronic Science and Technology of China in 2004. He is a committee member of Chinese Optical Society, Chinese Optical Engineering, and Space Optical Engineering.

Professor LIU engaged in space optical precision measurement technology, especially in light-weight and compact design of the space system, high-sensitivity, low-noise signal processing, real-time image extraction and recognition, smart visual servo method, high dynamic performance control systems, high-precision imaging testing and calibration technology.

As a project leader, chief designer and engineer, professor LIU completed many important projects from national 863, 973, manned space flight and lunar exploration project. He has published over 20 papers and trained more than 20 doctors and masters.



## Daily Event Schedule

| Date                               | Time        | Contents                                                                                                     | Place                                                                                                           |
|------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Monday<br/>June 25, 2018</b>    | 08:00-21:00 | Registration For Domestic Authors                                                                            | Holiday Inn Chengdu Century City-West Tower                                                                     |
|                                    | After 21:00 | Late Attendee Contact Hotel Reception Counter For Help                                                       | Holiday Inn Chengdu Century City-West Tower                                                                     |
| <b>Tuesday<br/>June 26, 2018</b>   | 08:30-08:45 | Opening Ceremony                                                                                             | Crystal hall, floor 5, Century City International Convention Centre                                             |
|                                    | 08:45-12:00 | Plenary Presentation 1 to 3                                                                                  |                                                                                                                 |
|                                    | 13:00-16:50 | Plenary Presentation 4 to 7                                                                                  |                                                                                                                 |
|                                    | 19:30       | Welcome Dinner                                                                                               | Crystal hall, floor 5, Century City International Convention Centre                                             |
| <b>Wednesday<br/>June 27, 2018</b> | 08:00-18:30 | Conference 1<br>Conference 2<br>Conference 3<br>Conference 4<br>Conference 5<br>Conference 7<br>Conference 8 | WuHou hall<br>GaoXin hall<br>QingYang hall<br>JinJiang hall<br>ChengHua hall<br>QingBaiJiang hall<br>XinDu hall |
| <b>Thursday<br/>June 28, 2018</b>  | 08:00-12:00 | Conference 2<br>Conference 4<br>Conference 5<br>Conference 6<br>Conference 8<br>Conference 9                 | GaoXin hall<br>JinJiang and WuHou hall<br>ChengHua hall<br>JingJiang hall<br>XinDu hall<br>QingYang hall        |
|                                    | 13:00-18:30 | Conference 3<br>Conference 4<br>Conference 5<br>Conference 9                                                 | JinFuRong hall<br>JinJiang and WuHou hall<br>ChengHua hall<br>QingYang hall                                     |
|                                    |             | Poster Presentations                                                                                         | GaoXin hall, floor 5, Century City International Convention Centre                                              |

## Opening Ceremony

08:30-08:45 June 26, 2018

Opening Ceremony

Location: Crystal hall, floor 5, Century City International Convention Centre

## Plenary Presentation

08:45-12:00 June 26

Plenaries 1 to 3

Crystal hall, floor 5

Location: Crystal hall, floor 5, Century City International Convention Centre

### Plenary Session 1 (Time: 08:45 to 09:35)

1. **Nanoscale Additive Manufacturing: Coming of Age**  
**Prof. MIN GU (Australia)**  
Royal Melbourne Institute of Technology University

Tea time and Group Photo (09:35-10:20)

### Plenary Session 2 (Time: 10:20 to 11:10)

2. **Industry 4.0 – Next generation Ultrafast Laser Systems and Ablation Applications**  
**Prof. Reinhart POPRAWE (Germany)**  
Fraunhofer Institute for Laser Technology

### Plenary Session 3 (Time: 11:10 to 12:00)

3. **Development of Microsphere Assisted Laser Nano-lithography and Optical Nano-imaging Technologies**  
**Prof. Minghui HONG (Singapore)**  
National University of Singapore.

Lunch time (12:00-13:00)

13:00-14:40 June 26

Plenaries 4 to 5

Crystal hall, floor 5

Location: Crystal hall, floor 5, Century City International Convention Centre

### Plenary Session 4 (Time: 13:00 to 13:50)

4. **Some milestones in the design, development and manufacture of freeform optics**  
**Prof. William T. PLUMMER (USA)**  
Massachusetts Institute of Technology

**Plenary Session 5 (Time: 13:50 to 14:40)**

- 5. Three Dimensional Photonic Manufacturing: From Architected Metamaterials to Freeform Optics Design**

**Prof. Nicholas Xuanlai FANG (USA)**

*Massachusetts Institute of Technology*

Tea time (14:40-15:10)

**15:10-16:50 June 26**

**Plenaries 6 to 7**

**Crystal hall, floor 5**

**Location: Crystal hall, floor 5, Century City International Convention Centre**

**Plenary Session 6 (Time: 15:10 to 16:00)**

- 6. Solar Adaptive Optics in IOE**

**Prof. Changhui RAO (China)**

*Institute of Optics and Electronics, Chinese Academy of Sciences*

**Plenary Session 7 (Time: 16:00 to 16:50)**

- 7. The European Southern Observatory Giant Optical telescopes of the present and future**

**Dr. Adrian RUSSELL (Germany)**

*European Organisation for Astronomical Research in the Southern Hemisphere*

### ***Welcome Dinner***

**19:30 June 26, 2018**

**Welcome Dinner**

**Location: Crystal hall, floor 5, Century City International Convention Centre**

## Plenary Presentation

08:45-09:35 June 26 Plenary Presentation 1  
Crystal hall, floor 5

### ■ Plenary Presentation 1

**Title: Nanoscale Additive Manufacturing: Coming of Age**

**Speaker: Min GU**



**Abstract:** Additive manufacturing is a process of joining materials to make objects from 3D model data, which is usually achieved by layer upon layer approaches. The utilisation of a laser beam is one of the effective ways to achieve this process. In the case of laser additive manufacturing, the fundamental restriction is the limit of the feature size, which is determined by the so called Abbe's law discovered by a German physicist, Ernst Abbe, in 1873. Abbe's barrier means that the size of the features generated by a laser beam is approximately 300 nm, for example, in a visible beam. In this presentation, I will show how

Abbe's limit can be broken in the recent development of optical beam nanolithography. Therefore, the feature size by a laser beam focused by a high numerical lens can be remarkably reduced to 9 nm in a polymerisable material. This breakthrough in laser additive manufacturing will not only provide means that the capacity of an optical disk can be as high as Petabytes, which will allow for the accelerating development of green optical data centres, but also facilitate a new horizon of ultrahigh energy density super-capacitors, nanoscale organic optoelectronic devices, nanoscale chemical reaction chips, artificial neural networks, and biomimetic systems.

**Biography:** Professor Gu is Distinguished Professor and Associate Deputy Vice-Chancellor at RMIT University and was a Laureate Fellow of the Australian Research Council. He is an author of four standard reference books and has over 450 publications in nano/biophotonics. He is an elected Fellow of the Australian Academy of Science as well as the Australian Academy of Technological Sciences and Engineering. He is also an elected fellow of the AIP, the OSA, the SPIE, the InstP, and the IEEE. He was President of the International Society of Optics within Life Sciences, Vice President of the Board of the International Commission for Optics (ICO) (Chair of the ICO Prize Committee) and a Director of the Board of the Optical Society of America (Chair of the International Council). He was awarded the Einstein Professorship (Chinese Academy of Science, 2010), the W. H. (Beattie) Steel Medal of the Australian Optical Society (2011), the Ian Wark Medal and Lecture of the Australian Academy of Science (2014), the Boas Medal of the AIP (2015) and the Victoria Prize for Science and Innovation (2016). Professor Gu was elected as a Foreign Fellow of the Chinese Academy of Engineering in 2017.



10:20-11:10 June 26 Plenary Presentation 2

Crystal hall, floor 5

■ **Plenary Presentation 2**

**Title: Industry 4.0 – Next generation ultrafast laser systems and ablation applications**

**Speaker: Reinhart POPRAWE**



**Abstract:** The context of future Laser Applications in modern manufacturing can be summarized by “Digital Photonic Production”. The vision of designing a structure or product in the computer and creating it additively or by ablation with high power ultrafast lasers drives many research topics in this area. But also the integration into production chains with the challenge of meeting the demands of production along the lines of Industry 4.0 is starting to be addressed seriously. From the point of Laser technology, main fields of activity are measurement processes of quality relevant data on-line, process control mechanisms and the combination with automation as a whole. A huge challenge is the data

handling and control system technology, which up to now is fragmented and component specific. The need of more integrated data control systems becomes obvious.

Of course, the processes themselves are under intense investigation, such as Laser Ultrafast Ablation and Laser Drilling. Removal rates are the prime goal under economical aspects. New concept and performance results under this aspect will be presented. Also correspondingly increased quality of the resulting products in terms of surface roughness and precision is a key issue of consideration. At ILT the strategy is the continuous improvement of average power of ps- and fs-Laser sources. The present world record in sub ps-pulse durations is 1.5 kW demonstrated in Aachen.

**Biography:** Reinhart Poprawe has worked in the laser industry and its related organizations for over 30 years. He received an M.A. in physics from California State University in Fresno in 1977. After completion of his Ph.D. in physics (Darmstadt, 1984) he joined the Fraunhofer Institute for Laser Technology (ILT) in Aachen, Germany where he worked as head of a department for laser-oriented process development. Prof. Poprawe started Thyssen Laser Technik GMBH in 1988 and was the company’s CEO. Since 1996, he has been managing director of Fraunhofer ILT and holds the University Chair for Laser Technology at the RWTH Aachen. In 2004 he served as vice rector of Aachen University and currently is a member of several boards in the scientific and industrial organizations, e.g. the AKL Arbeitskreis Lasertechnik e. V. Aachen. He also chairs the RWTH International Board and is the Rectors delegate for China.



11:10-12:00 June 26 Plenary Presentation 3  
Crystal hall, floor 5

■ Plenary Presentation 3

**Title: Development of Microsphere Assisted Laser Nano-lithography and Optical Nano-imaging Technologies**

**Speaker: Minghui HONG**



**Abstract:** Pushing the optical resolution beyond 100 nm is a key task for laser advanced manufacturing and light-based surface imaging. Microsphere possesses its versatile capability to enable our current laser precision engineering and optical microscopy down to nanometers scale. In this talk, I will report our research progresses on laser surface nano-patterning and optical nano-imaging via microsphere. By fine tuning laser processing parameters, feature sizes down to 20 nm are achieved. To enhance laser nano-patterning speed, fs laser micro-lens array (MLA) lithography is developed to achieve parallel, maskless and non-contact surface patterning to push current laser precision engineering resolution down to sub-100 nm over a large area (cm scale) at a high speed (millions of micro-devices to be created in a few minutes). Meanwhile, we can also insert a microsphere between sample surface and objective lens to enhance optical imaging resolution in both contact and non-contact modes. Feature sizes down to 25 nm are observed successfully. By microsphere engineering, fs laser illumination and multiple microspheres design, this optical microscope nanoscope would be able to process and image much smaller feature sizes in ambient environment.

**Biography:** Prof. Hong Minghui specializes in optical engineering. He is invited to serve as an Editor of *Light: Science and Applications*, Associate Editor of *Science China G*, Editor of *Laser Micro/nanoengineering*, and Executive Editor-in-chief of *Opto-Electronic Advances*. Prof. Hong is Fellow of Academy of Engineering, Singapore (FSEng), Fellow of *Optical Society of America (OSA)*, Fellow of *International Society for Optics and Photonics (SPIE)*, Fellow of *International Academy of Photonics and Laser Engineering (IAPLE)* and Fellow of *Institute of Engineers, Singapore (IES)*. Prof. Hong is currently a Full Professor and the Director of Optical Science and Engineering Centre (OSEC), Department of Electrical and Computer Engineering, National University of Singapore. He is also the Chairman of an NUS spin-off company *Phaos Technology Pte. Ltd.*

13:00-13:50 June 26 Plenary Presentation 4  
Crystal hall, floor 5

■ **Plenary Presentation 4**

**Title: Some milestones in the design, development and manufacture of freeform optics**

**Speaker: William T. PLUMMER**



**Abstract:** Freeform optics are lenses or mirrors with surfaces having no rotational symmetry. They were conceived more than a century ago, but have recently received new attention for solving design problems. The special methods needed to manufacture them have included direct cam driven or digital grinding or milling, hot glass sagging, casting, injection molding, and fast-tool diamond turning. More recently, precision 3D printing and nano-crystalline powder compression molding have offered promising new capabilities for inexpensive high-volume commercial production in the

future. Applications of freeform optics have included progressive spectacle lenses, focus adjusting devices, and aperture phase masks for special purposes. These design applications and manufacturing capabilities have been related to each other in interesting ways, and will be illustrated through a selection of patents and photographs of commercial products.

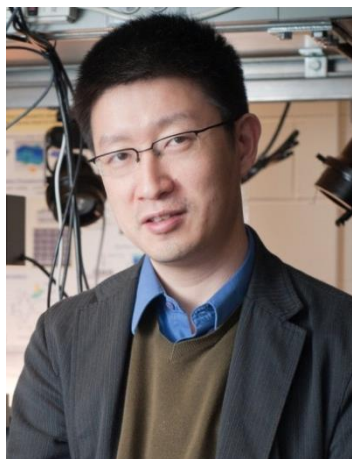
**Biography:** William Plummer received his PhD in physics from Johns Hopkins. He has taught optics at Hopkins, the University of Massachusetts, and Tufts, is a Senior Lecturer at MIT, and has 102 US patents. During three decades at Polaroid he was Senior Director for optical engineering. He has awards from the OSA, is an elected member of the National Academy of Engineering, and is an Advisory Board member at BMF Material Technology, Shenzhen.

13:50-14:40 June 26 Plenary Presentation 5  
Crystal hall, floor 5

■ Plenary Presentation 5

**Title:** Three dimensional photonic manufacturing: from architected metamaterials to freeform optics design

**Speaker:** Nicholas Xuanlai FANG



**Abstract:** Three-dimensional metamaterial building blocks, through the combination of microscale geometric patterning and novel photo-responsive materials, show promise to revolutionize the ability to dissipate energy and manipulate wave propagation. Such materials are desirable for a broad array of applications for custom integrated optical assemblies incorporating mechanical, electronic, and optoelectronic components.

In this plenary talk, I will present our development of three-dimensional micro/nanofabrication techniques, to enable design and exploration of complex functional micro-optical components. As an example, I will show that the microscale resolution and multi-material capabilities of projection microstereolithography as a versatile method of designing and fabricating architected components and assemblies for combined functions, including tunable thermal expansion, magnetic actuation/morphing, and transparent micro-scale bioreactors for tissue engineering. I will also discuss the potential of this additive manufacturing technology for rapid tooling of freeform optical elements with minimal alignment and assembly.

**Biography:** Nicholas Xuanlai Fang is currently a professor of Mechanical Engineering at MIT. He also serves as chief scientist of BMF Material Technologies, a technical startup spunoff from his research group of 3D micronanomanufacturing and nanophotonics at MIT. He received his BS and MS in physics from Nanjing University, and his PhD in mechanical engineering from University of California Los Angeles. Professor Fang's areas of research look at nanophotonics and nanofabrication. His recognitions include the ASME Chao and Trigger Young Manufacturing Engineer Award (2013); the ICO prize from the International Commission of Optics (2011); an invited participant of the Frontiers of Engineering Conference by National Academies in 2010; the NSF CAREER Award (2009) and MIT Technology Review Magazine's 35 Young Innovators Award (2008).

**15:10-16:00 June 26 Plenary Presentation 6**  
**Crystal hall, floor 5**

■ **Plenary Presentation 6**

**Title: Solar Adaptive Optics in IOE**

**Speaker: CHANGHUI RAO**



**Abstract:** The Research and Development on Adaptive Optics in China began in 1979. In 1980, the first laboratory on Adaptive Optics (AO) in China was established in the Institute of Optics and Electronics (IOE), Chinese Academy of Sciences (CAS). Until now, more than one hundred sets of AO systems had been successfully developed in the fields of the astronomical observations, Inertial Confinement Facilities, and human vision sciences, laser communications, etc. This presentation concentrates on solar AO developments in IOE, CAS. In China, several solar AO systems had been built

since 2000. The first solar tilt-correction system was developed for the 43-cm solar telescope of Nanjing University in 2002. A 37-element AO experiment system for the 26-cm solar fine structure telescope at Yunnan Astronomical Observatories was built in 2009. Two generations of AO systems for NVST had been developed from 2012 to 2015. In order to enlarge the correction Field of View, a GLAO prototype system was built at the 1-meter NVST and made the first light in January 2016. In January 2017, a MCAO experiment system was set up and tested at the NVST on October 5th, 2017. Currently, a 1.8-m solar telescope with more than 400-element AO system and seven-wavelength high resolution imaging system from visible to near Infrared bands are being developed for solar physics research and space weather prediction. Moreover, a new MCAO system based on our proposed MCAO configuration with a high order ground layer adaptive optics and two low order high altitude corrections will be developed for the NVST as an a regularly operating instrument for scientific observations of the sun. In this talk, the solar AO systems will be introduced and the observation results are presented.

**Biography:** Prof. Changhui Rao was born in 1971. He received his BS degree in Electric Engineering from Wuhan University of Surveying and Mapping, his MASc and Ph.D. degrees in Optical Engineering from Institute of Optics and Electronics, Chinese Academy of Sciences, in 1993, 1997 and 2001 respectively. He is the member of SPIE and OSA. He has been engaged in the research on adaptive optics and solar high resolution imaging. More than 200 papers have been published. He won two National Technical Invention Awards, six Provincial Science and Technology Advancement Awards, National Excellent Doctoral Dissertation Award, Chinese Youth Science and Technology award, and Young Scientist award of Chinese Academy of Sciences. He is the vice director of the Institute of Optics and Electronics, Chinese Academy of Sciences, and the vice director of The Key Laboratory on Adaptive Optics, Chinese Academy of Sciences.

■ Plenary Presentation 7

**Title: The European Southern Observatory – giant optical telescopes of the present and future**

**Speaker: Adrian RUSSELL**



**Abstract:** Present an overview of the current ESO Optical/IR facilities in Chile and the plans for their future instrumentation, followed by a status report on the construction of the 39m E-ELT on Armazones in Chile.

**Biography:** Dr Adrian Russell is Director of Programmes at the European Southern Observatory (ESO) in Garching, Germany.

Adrian graduated from the University of Sheffield in 1983 with a 1st Class Honours degree in Electrical and Electronic Engineering, before undertaking a Ph.D. in Astronomy at the University of Cambridge (Mullard Radio Astronomy Observatory), on millimetre-wave heterodyne instrumentation and molecular-line studies of outflows in star-formation regions. In 1987 he joined the Royal Observatory Edinburgh (ROE), with a three-year tour of duty as a support scientist for the James Clerk Maxwell Telescope (JCMT) in Hawaii. In 1990 Adrian spent a two-year sabbatical with Professor Reinhard Genzel's group at the Max Planck Institute for Extraterrestrial Physics, working on very high frequency submillimetre instrumentation for the JCMT. He became Head of the JCMT Instrumentation Programme at the ROE in 1992, and was UK Project Manager for the Gemini twin 8-metre telescopes project from 1995 to 2001. In 1996 he was made Deputy Director of the ROE, and became the first Director of the U.K. Astronomy Technology Centre in Edinburgh in 1998. In January 2005, Adrian joined the US National Radio Astronomy Observatory as North American Project Manager for the Atacama Large Millimeter/submillimeter Array (ALMA), subsequently becoming the North American ALMA Project Director. He joined ESO in July of 2010.

*Conferences and Chairs***Conference 1: Large Mirror and Telescopes**

The theme of this conference is mainly about the research of large telescope and primary mirror, including the testing and manufacturing technology of primary mirror, the development and application of new materials, the related technologies of telescope, etc. The goal of this topic is to develop high-resolution astronomical telescopes and space telescopes, especially to develop the primary mirrors in telescope. This conference is to exchange the latest progresses and breakthroughs in the field of telescope, and discuss the application of new materials, new manufacturing and testing technologies of primary mirror. This topic is mainly divided into the following parts: large astronomical telescope and space telescope, light-weight mirror technology, deployable primary mirror and telescope, the testing and manufacturing technology of large primary mirror, supporting structure and system of primary mirror, new material of primary mirror.

- Mirrors for large astronomical and space telescopes
- Light-weight mirror technology
- Large deployable mirror and telescopes
- Innovative mirror and telescope designs
- Advanced testing methods for large mirror
- Support systems and structures
- New material for large mirrors
- Innovative concepts and designs

**Conference Chairs:**

**Wenhan Jiang**, Academician, Chinese Academy of Engineering; Institute of Optics and Electronics, CAS

**Myung K. Cho**, National Optical Astronomy Observatory (USA)

**Hao Xian**, Institute of Optics and Electronics, CAS

**Bin Fan**, Institute of Optics and Electronics, CAS



## June 27 Conference 1: Large Mirror and Telescopes WuHou hall, floor 5

| Date    | Time        | Name        | Organization                                                                           | Title                                                                                                                                                  | Remark  |
|---------|-------------|-------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| June 27 | 08:30-09:20 | Baoyan DUAN | Xidian University                                                                      | On innovation, simulation, mode experiments and engineering of the five hundred meters aperture spherical radio telescope (FAST)                       | Invited |
|         | 09:20-09:50 | Wei YANG    | Institute of Optics and Electronics, Chinese Academy of Sciences                       | Imaging quality and analysis of membrane defraction telescope system                                                                                   | Invited |
|         | 09:50-10:20 | Jiyou ZHANG | China Academy of Space Technology                                                      | Characteristics and optical manufacturing technology development of space optical elements                                                             | Invited |
|         | 10:20-10:30 | Tea Time    |                                                                                        |                                                                                                                                                        |         |
|         | 10:30-10:45 | Qichang AN  | Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences | Mirror seeing and its evaluation                                                                                                                       |         |
|         | 10:45-11:00 | Yufeng TAN  |                                                                                        | Application of scaling test in primary mirror for large aperture telescope                                                                             |         |
|         | 11:00-11:15 | Donglin MA  | Huazhong University of Science and Technology                                          | A recommended conceptual optical system design for china's large optical-infrared telescope (LOT)                                                      |         |
|         | 11:15-11:30 | Bo WANG     | Harbin Institute of Technology                                                         | Study of ultra-precision polishing of electroless nickel molding dies for the backdrop project of enhanced X-ray timing and polarimetry mission (eXTP) |         |
|         | 11:30-11:45 | Weiyan LI   | Academy of Opto-electronics, Chinese Academy of Sciences                               | Thermal control focusing device for Space camera secondary mirror                                                                                      |         |
|         | 11:45-12:00 | Haifei HU   | Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences | Research on bonding multiple pads to large mirrors                                                                                                     |         |

|            |             |                  |                                                                                        |                                                                                                                                   |         |
|------------|-------------|------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------|
| June<br>27 | 12:00-13:00 | Lunch            |                                                                                        |                                                                                                                                   |         |
|            | 13:00-13:30 | Zhanshan<br>WANG | Tongji University                                                                      | Development of nested conical approximation Wolter-I type X-ray focusing telescope with sub-arcminute angular resolution          | Invited |
|            | 13:30-14:00 | He DONG          | Institute of Optics and Electronics, Chinese Academy of Sciences                       | Acquisition technology for optical ground stations in satelliteground quantum experiments                                         | Invited |
|            | 14:00-14:30 | Daojing<br>LI    | Institute of Electrics, Chinese Academy of Sciences                                    | 基于衍射与相阵原理的 10 米口径新型激光雷达望远镜概念                                                                                                      | Invited |
|            | 14:30-15:00 | Haitao<br>LIU    | Institute of Optics and Electronics, Chinese Academy of Sciences                       | Asperic and freeform optical fabrication by computer controlled polishing technology                                              | Invited |
|            | 15:00-15:15 | Haifei Hu        | Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences | Epoxy strength reliability between metal and glass and feasibility for bonding face-down TMT M3M OAP                              |         |
|            | 15:15-15:30 | Yuming<br>ZHOU   | Beijing Institute of Space Mechanics and Electricity                                   | Application of the gravity turning method for testing large aperture optical components                                           |         |
|            | 15:30-15:45 | Tea Time         |                                                                                        |                                                                                                                                   |         |
|            | 15:45-16:00 | Ke<br>ZHANG      | Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences | Fabricating of 4m CIOMP-SiC mirror blank                                                                                          |         |
|            | 16:00-16:15 | Fei<br>YANG      | Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences | 30 米望远镜第三镜设计进展                                                                                                                    |         |
|            | 16:15-16:30 | Haifeng<br>CAO   | University of Chinese Academy of Sciences                                              | Analysis and correction about measurement error of edge sensor caused guide flexure applied in the support system assembly of TMT |         |



### ***Conference 2: Advanced Optical Manufacturing Technologies***

Advanced optical manufacturing is a technology using computer and precise machine with the help of optical CAD, digital optical measurement, etc., to manufacture optical components and systems in high-efficiency, low-cost and high-accuracy level. This conference chapter refers to optical design, ultra-precision optical processing, optical coating and opto-mechanical integration, especially, ultra-precision polishing technology with nanometer accuracy. This chapter is to exchange the latest development and breakthrough in manufacturing technology and discuss optical design, processing and integration. This chapter mainly includes 12 sessions: Advanced optical manufacturing technologies, Aspheric design, Processing and metrology, High-precision freeform surface design, Machining and metrology, Ultra-precision optical processing, Optical thin film technology, Advanced diamond polishing technology, Magnetorheological optical processing, Advanced ion beam refinement and plasma technology, EEM and CVM processing technology, Optical technology, simulation software and tools, Integration and manufacturing of optoelectronic components, Opto-mechanical components and equipment.

- Advanced optical manufacturing technologies
- Aspheric optics design, manufacturing and testing
- Ultra-precision freeform surfaces design, manufacturing and testing
- Super-precision optical manufacturing
- Optical thin film coatings
- Advanced diamond turning technology
- Magnetorheological optical processing
- Advanced ion beam finishing and atmospheric plasma technology
- EEM (Elastic Emission Machining) and CVM (Chemical Vaporization Machining) processing technology for super smooth surface with atomic lever
- Optical design, simulation software and tools
- Optoelectronics components, modules integration and manufacturing
- Optomechanics components and devices
- Laser manufacturing technology and equipment

#### **Conference Chairs:**

**Junhua Pan**, Academician, Chinese Academy of Engineering; Soochow University

**William T. Plummer**, Member of the National Academy of Engineering, WTP Optics. Inc. (USA)

**Shengyi Li**, National University of Defense Technology

**Qiao Xu**, China Academy of Engineering Physics

## June 27 Conference 2: Advanced Optical Manufacturing Technologies GaoXin hall, floor 5

| Date    | Time        | Name          | Organization                                                                           | Title                                                                                                                            | Remark  |
|---------|-------------|---------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------|
| June 27 | 08:30-08:50 | Shengfei WANG | China Academy of Engineering Physics                                                   | Formation and suppression of KDP surface defects generated in fly-cutting process                                                | Invited |
|         | 08:50-09:10 | Chenhui AN    | China Academy of Engineering Physics                                                   | Dynamic error detection and error source analysis for ultra-precision flycutting machine tools                                   | Invited |
|         | 09:10-09:25 | Qianwen DUAN  | Institute of Optics and Electronics, Chinese Academy of Sciences                       | Stability control of the electro-optical tracking system based on improved smith predictor                                       |         |
|         | 09:25-09:40 | Enguo CHEN    | Fuzhou University                                                                      | Study on the micro-dot distribution design and white-balance optimization of quantum-dot light guide plate for LCD backlight     |         |
|         | 09:40-09:55 | Shengfei WANG | China Academy of Engineering Physics                                                   | Influences of fly-cutting parameters on the laser-induced damage performance of DKDP crystal                                     |         |
|         | 09:55-10:10 | Weijie DENG   | Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences | Research on ion beam figuring system with five-axis hybrid mechanism for complex optical surface                                 |         |
|         | 10:10-10:20 | Tea Time      |                                                                                        |                                                                                                                                  |         |
|         | 10:20-10:35 | Jiaqing XIE   | Beijing Institute of Technology                                                        | Simulation and experimental study on the precision glass molding for microstructures on optical glass based on relaxation effect |         |

# Conference Program



| Date    | Time        | Name          | Organization                                                      | Title                                                                                                            | Remark  |
|---------|-------------|---------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------|
| June 27 | 10:35-10:50 | Qiongqiong GU | Sichuan University                                                | Regional effects and mechanisms of nanoparticle removal from Si substrate by laser plasma shock waves            |         |
|         | 10:50-11:05 | Guoqing ZHANG | Shenzhen University                                               | Cutting force modeling of ultra-precision fly cutting of groove                                                  |         |
|         | 11:05-11:20 | Xiaowen CAO   | Jilin University                                                  | Single-pulse writing of a concave microlens array                                                                |         |
|         | 11:20-11:35 | Xueqing LIU   | Tsinghua University                                               | Dry-etching assisted femtosecond laser fabrication for construction of three-dimensional silicon microstructures |         |
|         | 11:35-11:50 | Linlin SHI    | Taiyuan University of Technology                                  | Optimization of ultrathin silver transparent electrode and its application in organic solar cells                |         |
|         | 12:00-13:00 | Lunch         |                                                                   |                                                                                                                  |         |
|         | 13:00-13:20 | Yun ZHANG     | Institute of Optics and Electronics, Chinese Academy of Sciences  | Advanced fabrication techniques and applications on manufacturing sub-nanometer accuracy aspheres                | Invited |
|         | 13:20-13:40 | Shun ZHOU     | Xi'an Technological University                                    | The preparation, properties and application of specialty optical thin film                                       | Invited |
|         | 13:40-13:55 | Yaguo LI      | China Academy of Engineering Physics                              | Ion beam planarization of diamond turned metal surface                                                           |         |
|         | 13:55-14:10 | Tianxiang SUN | Dalian Institute of Chemical Physics, Chinese Academy of Sciences | Research on super smooth aspheric surface fabrication of computer controlled optical surfacing                   |         |
|         | 14:10-14:25 | Jiachang GUO  | Beijing University of Technology                                  | New taper optics for excimer laser convergence                                                                   |         |
|         | 14:25-14:40 | FeiXIE        | Jinan University                                                  | Chiral nanostructures enabled by monochromatic dual-beam super-resolution lithography                            |         |
|         | 14:40-14:55 | Defeng LIAO   | China Academy of Engineering Physics                              | Improvement of the surface shape error of the pitch lap to a deterministic continuous polishing process          |         |
|         | 14:55-15:10 | Fei ZHANG     | China Academy of Engineering Physics                              | Research on the highly accurate deposition of films on wedged                                                    |         |

|            |             |               |                                                                              |                                                                                                  |  |
|------------|-------------|---------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--|
| June<br>27 |             |               |                                                                              | sampling mirrors by e-beam evaporation                                                           |  |
|            | 15:10-15:25 | Defeng MO     |                                                                              | Inert gas packaging of InGaAs detector with multistage thermoelectric cooler                     |  |
|            | 15:25-15:40 | Tea Time      |                                                                              |                                                                                                  |  |
|            | 15:40-15:55 | Jianpeng WANG | National University of Defense Technology                                    | The opto-mechanical design and analysis of aluminum - based space camera                         |  |
|            | 15:55-16:10 | Liquan WANG   | China Academy of Engineering Physics                                         | Kilo-joule Laser facility back lighting terminal system                                          |  |
|            | 16:10-16:25 | Huijun WANG   | Beijing Institute of Space Mechanics and Electricity                         | Study on edge-trimming experiment of reflective mirror                                           |  |
|            | 16:25-16:40 | Zhengfei WANG | Beijing University of Technology                                             | Experimental investigation on processing conical holes with 248nm excimer laser                  |  |
|            | 16:40-16:55 | Chen DAI      | Beijing Institute of Space Mechanics and Electricity                         | Optical surfacing and testing of $\phi 628\text{mm}$ aspheric SiC mirror                         |  |
|            | 16:55-17:10 | Fengfeng SHEN | Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences | Ultra-precision optical processing and simple laser performance of Yb:LuScO <sub>3</sub> crystal |  |
|            | 17:10-17:25 | Wei YANG      | Chengdu Fine Optical Engineering Research Centre                             | Molecular growth kinetics analysis associated with the sol-gel coatings uniformity               |  |
|            | 17:25-17:40 | Xiang HE      | Chengdu Fine Optical Engineering Research Centre                             | Investigation on the control technique of surface roughness for silicate glass                   |  |
|            | 17:40-17:55 | Wanli ZHANG   | National University of Defense Technology                                    | Research on combined surface modification of single crystal silicon cylindrical mirror           |  |
|            | 17:55-18:10 | Xinlei LI     | National University of Defense                                               | Fabrication of a high precision aluminum alloy cylinder mirror with combined polishing process   |  |
|            | 18:10-18:25 | Jianpeng WANG | National University of Defense Technology                                    | The opto-mechanical design and analysis of aluminum - based space camera                         |  |

## June 28 Conference 2: Advanced Optical Manufacturing Technologies GaoXin hall, floor 5

| Date    | Time        | Name                     | Organization                                                                           | Title                                                                                                              | Remark  |
|---------|-------------|--------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------|
| June 28 | 08:00-08:20 | Feng SHI                 | National University of Defense Technology                                              | High-precision & low-defect manufacturing technology of single-crystalline silicon cylindrical reflector           | Invited |
|         | 08:20-08:40 | Deping YU                | Sichuan University                                                                     | A predictive model of critical depth of cut for ultrasonic elliptical vibration cutting of brittle materials       | Invited |
|         | 08:40-08:55 | Jingling YU              |                                                                                        | Effect of weld toe geometry on fatigue strength of nickel based C-276 weld joint by laser welding with filler wire |         |
|         | 08:55-09:10 | Yaowei YU                | Chengdu Fine Optical Engineering Research Center                                       | Growth properties and optical properties for HfO <sub>2</sub> thin films deposited by atomic layer deposition      |         |
|         | 09:10-09:25 | Xiangzhao ZHANG          | Fudan University                                                                       | Ultra-precision robotic sub-aperture polishing of curved mirrors                                                   |         |
|         | 09:25-09:40 | Magomed A. ABDULKADY ROV | JSC Lytkarino Optical Glass Factory                                                    | Defining of aspherical surfaces decentering with respect to the geometrical center by means of CGH                 |         |
|         | 09:40-09:55 | Wa TANG                  | Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences | Ion beam figuring high gradient optical aspherical surface                                                         |         |
|         | 09:55-10:10 | Tea Time                 |                                                                                        |                                                                                                                    |         |
|         | 10:10-10:25 | Vinod MISHRA             | CSIR-Central Scientific Instruments Organisation                                       | Development of flexible pad polishing setup for freeform optics                                                    |         |
|         | 10:25-10:40 | Jun CAO                  | Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences           | Research of the mist phenomenon on Nd-doped glass surface                                                          |         |

|            |             |             |                                                                             |                                                                                                             |  |
|------------|-------------|-------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--|
| June<br>28 | 10:40-10:55 | Zhuochen MA | Jilin University                                                            | Femtosecond laser direct writing enabled fabrication and integration of metallic micro/nanostructures       |  |
|            | 10:55-11:10 | Zhibin WANG | 西安应用光学研究所                                                                   | Selection the coating for low Tg glass precision glass molding                                              |  |
|            | 11:10-11:25 | Bo ZHONG    |                                                                             | Relationship between slurry flow pattern and removal characteristics based on a novel polishing tool        |  |
|            | 11:25-11:40 | Zhihai PANG | Xi'an Institute of optical precision machinery, Chinese Academy of Sciences | Design and fabrication of CGH for 820mm diameter tertiary mirror surface figure testing without center hole |  |
|            | 11:40-11:55 | Lele REN    | Harbin Institute of Technology                                              | Investigation on the compression behavior of polishing lap in continuous polishing                          |  |
|            | 11:55-12:10 | Zuocai DAI  | National University of Defense Technology                                   | Investigation of fused silica surface etching during obliquely incident inductively coupled plasma          |  |
|            | 12:10-12:25 | Zhifan LIN  | National University of Defense Technology                                   | Effect of magnetorheological finishing on laser damage properties of calcium fluoride                       |  |

### ***Conference 3: Optical Test, Measurement Technology and Equipments***

Optical metrology is to gain physical quantities (profile, figure, roughness, etc) of tested object by analyzing and processing optical signal (intensity, phase and polarization, etc). Optical metrology and instrument, the foundation of modern optical engineering and industry, promotes advanced optical manufacturing technology. This chapter is focused on the latest development and the future trend in optical metrology and instrument for advanced optical manufacturing, including new theory, new principle, new technology, new method, new application and new instrument. This chapter consists of 8 sessions: freeform surface metrology, aspheric metrology, ultra-precision optical metrology, ultra-smooth surface metrology, infrared metrology, surface-damage detector, nanometer testing, new testing technology and instrument, simulation model.

- Test for optical freeform surface
- Test for aspheric optical surface
- Test for super-precision optical surface
- Measurement for super smooth surface
- Measurement of optical thin film
- Test with infrared technologies
- Optical contamination
- Optical test and measurement for nanometer technology
- New and innovative metrology and equipment
- Analysis and modeling tools/software

#### **Conference Chairs:**

**Yudong Zhang**, President of Chengdu Branch of Chinese Academy of Sciences

**Wei Gao**, Tohoku University (Japan)

**Min Xu**, Fudan University



## June 27 Conference 3: Optical Test, Measurement Technology and Equipments QingYang hall, floor 5

| Date    | Time        | Name           | Organization                                             | Title                                                                                                                          | Remark  |
|---------|-------------|----------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------|
| June 27 | 08:30-08:50 | Jian BAI       | Zhejiang University                                      | Long Focal-length Measurement using divergent beam and two gratings of different periods                                       | Invited |
|         | 08:50-09:10 | Shanyong CHEN  | National University of Defense Technology                | Variable optical null technique towards flexible surface interferometry                                                        | Invited |
|         | 09:10-09:30 | Chao WANG      | University of Electronic Science and Technology of China | Nitride semiconductor epitaxial growth on-line monitoring technology                                                           | Invited |
|         | 09:30-09:45 | Da XU          | Army Academy of Armored Forces                           | The laser screen technology research of the firing dispersion and initial velocity test of the high shooting frequency weapons |         |
|         | 09:45-10:00 | Juan DU        | Zhejiang University                                      | Composition and accuracy analysis of interferometric star tracker                                                              |         |
|         | 10:00-10:15 | Jingdong ZHANG | Chongqing University                                     | High performance $\phi$ -OTDR for distributed vibration sensing based on optical pulse modulation                              |         |
|         | 10:15-10:30 | Guolu YIN      | Chongqing University                                     | Intensity-modulated directional torsion sensor based on in-line optical fiber Mach-Zehnder interferometer                      |         |
|         | 10:30-10:40 | Tea Time       |                                                          |                                                                                                                                |         |
|         | 10:40-10:55 | Hua ZHENG      | Chongqing University                                     | Pump frequency modulated fast BOTDA for high spatial resolution/ long-distance distributed dynamic strain sensing              |         |
|         | 10:55-11:10 | Shaoqi ZENG    | Beijing Institute of Control Engineering                 | Research on surface quality measurement technology for small surface structure                                                 |         |
|         | 11:10-11:25 | Xiting ZHAO    | Beijing Institute of Space Mechanics and Electricity     | Research on computer-aided alignment for an afocal off-axis optical system                                                     |         |

# Conference Program



|            |             |                    |                                                                                        |                                                                                                       |         |
|------------|-------------|--------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------|
| June<br>27 | 11:25-11:40 | Xiangchao<br>ZHANG | Fudan University                                                                       | Full field scanning measurement of surface defects using flexible digital holographic microscopy      |         |
|            | 11:40-11:55 | Dongcheng<br>WU    |                                                                                        | Gravity deformation of high-precision subaperture stitching under the three-point support             |         |
|            | 11:55-13:00 | Lunch              |                                                                                        |                                                                                                       |         |
|            | 13:00-13:20 | Haiyang<br>QUAN    | Institute of Optics and Electronics, Chinese Academy of Sciences                       | Interferometric measurement of thin-parallel plate optics with low uncertainty                        | Invited |
|            | 13:20-13:40 | Zhiliang<br>ZHAO   | Chengdu TYGGO                                                                          | Research on adaptive interferometric examination of complex vibration environment                     | Invited |
|            | 13:40-13:55 | Yang<br>WANG       | Shanghai Institute of technical Physics, Chinese Academy of Sciences                   | Research of suppressing stray light of cold shield with different black coating                       |         |
|            | 13:55-14:10 | Lei SHI            | Fudan University                                                                       | Polarization-resolved momentum-space imaging spectroscopy                                             |         |
|            | 14:10-14:25 | Xing<br>PENG       | Fudan University                                                                       | A preliminary study of in-situ defects measurement for additive manufacturing based on multi-spectrum |         |
|            | 14:25-14:40 | Panyu<br>ZHOU      | Fudan University                                                                       | 3D measurement of microstructures by using plenoptic microscope                                       |         |
|            | 14:40-14:55 | Jidong LIU         | Beijing Institute of Technology                                                        | Point target space location measurement methods based on ultra-sparse image                           |         |
|            | 14:55-15:10 | Cong<br>WANG       | Beijing Institute of Space Mechanics and Electricity                                   | Research on testing technology of large aspheric lens in the phase of optical grinding                |         |
|            | 15:10-15:25 | Erhui QI           | Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences | Study on pentaprism scanning technology for testing large flat mirrors                                |         |
|            | 15:25-15:35 | Tea Time           |                                                                                        |                                                                                                       |         |

|            |             |                |                                                                                        |                                                                                                                                 |  |
|------------|-------------|----------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--|
| June<br>27 | 15:35-15:50 | Yao HU         | Beijing Institute of Technology                                                        | Flatness and diffractive wavefront measurement of liquid crystal computer-generated hologram based on photoalignment technology |  |
|            | 15:50-16:05 | Jianheng HUANG | Shenzhen University                                                                    | X-ray phase-contrast imaging using cascade Talbot-Lau interferometers                                                           |  |
|            | 16:05-16:20 | Guanghua YANG  | Academy of Opto-Electronics Chinese Academy of Sciences                                | The angular measurement of the motion direction of the stack stages based on the dual-frequency laser interferometer            |  |
|            | 16:20-16:35 | Jing MA        | Academy of Opto-Electronics Chinese Academy of Sciences                                | Analyze the influence of grating constant error on measurement accuracy of grating displacement sensor                          |  |
|            | 16:35-16:50 | Xinxue MA      | Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences | The research on phase-diversity phase retrieval in testing the large-aperture telescope                                         |  |
|            | 16:50-17:05 | Ruiyang WANG   | Sichuan University                                                                     | Study on eliminating the effect of parasitic reflection on deflectometry measurement of planar optical element surface figure   |  |
|            | 17:05-17:20 | Yingying ZHANG | Hunan University                                                                       | High accuracy determination of viscoelastic properties of optical glass in lens molding process                                 |  |
|            | 17:20-17:35 | Jie LI         | Research Center of Laser Fusion, China Academy of Engineering Physics                  | Optimal modified lateral shearing interferometer for in-line damage morphology measurement                                      |  |
|            | 17:35-17:50 | Zhigeng FEI    | Zhengzhou University of Light Industry                                                 | The inner-cone angle measurement of aero-engine nozzle based on conoscopic holography                                           |  |
|            | 17:50-18:05 | Lei ZHANG      | Anhui University                                                                       | Optical free form surface metrology in adaptive polarized interferometry                                                        |  |

## June 28 Conference 3: Optical Test, Measurement Technology and Equipments JinFuRong hall, floor 6

| Date    | Time        | Name           | Organization                                                          | Title                                                                                                                               | Remark |
|---------|-------------|----------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------|
| June 28 | 13:00-13:15 | Huimin YUE     | University of Electronic Science and Technology of China              | Inspection of specular object surface defects eliminating dust based on polarized fringe structured illumination                    |        |
|         | 13:15-13:30 | Haijuan JU     | Xi'an Institute of Optics and Precision Mechanics                     | A Mueller matrix measurement technique based on a division-of-aperture polarimetric camera                                          |        |
|         | 13:30-13:45 | Yinbo ZHENG    | Research Center of Laser Fusion, China Academy of Engineering Physics | Multi-wavelength investigation of the influence of polarization orientation on bulk damage resistance of type I double KDP crystals |        |
|         | 13:45-14:00 | Xiaohong WEI   | Research Center of Laser Fusion, China Academy of Engineering Physics | Fresnel zone plate method for measuring lens transmission wavefront power spectral density                                          |        |
|         | 14:00-14:15 | Qinong HE      | Institute of Optics and Electronics, Chinese Academy of Sciences      | A feedforward control method for optical tracking system based on eddy current sensor                                               |        |
|         | 14:15-14:30 | Guoqing GU     | Yancheng Institute of Technology                                      | An integrated single-camera digital speckle pattern interferometry for simultaneous full-field 3D displacements measurement         |        |
|         | 14:30-14:45 | Shuiqin WU     | Institute of Optics and Electronics, Chinese Academy of Sciences      | Research of the fiber coupling efficiency based on SPGD control algorithm                                                           |        |
|         | 14:45-15:00 | Xiangdong ZHOU | Zhejiang University                                                   | Description of complex optical surface based on sparse radial basis function approximation with spatially variable shape parameters |        |
|         | 15:00-15:15 | Kai SHI        | Xi'an Technological University                                        | Thin film thickness measurement based on laser heterodyne interferometry                                                            |        |
|         | 15:15-15:30 | Hongzhen JIANG | Research Center of Laser Fusion,                                      | Measurement for the structure of microcosmic defects on optical                                                                     |        |

|            |             |                  |                                                                             |                                                                                                           |  |
|------------|-------------|------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--|
| June<br>28 |             |                  | Chinese Academy of Engineering Physics                                      | surface with digital holographic microscopy                                                               |  |
|            | 15:30-15:40 | Tea Time         |                                                                             |                                                                                                           |  |
|            | 15:40-15:55 | Zhihai PANG      | Xi'an Institute of optical precision machinery, Chinese Academy of Sciences | The study of free form optical elements corrected aberrations of optical system                           |  |
|            | 15:55-16:10 | Guixia WANG      | Xi'an Technological University                                              | Spectrum-analysis of parameters associated with laser-induced air breakdown plasma                        |  |
|            | 16:10-16:25 | Lei ZHANG        |                                                                             | New indoor distance simulation detection device                                                           |  |
|            | 16:25-16:40 | Dali Ramu BURADA | Indian Institute of Technology                                              | Challenges involved in metrology of freeform optics                                                       |  |
|            | 16:40-16:55 | Li WU            | Xi'an Institute of optical precision machinery, Chinese Academy of Sciences | Research on key technology of the optical measurement device used in liquid oxygen tank of carrier rocket |  |
|            | 16:55-17:10 | Zijuan JI        | Hubei University of Education                                               | A variable divergence angle laser beam shaping system with aspherical lenses                              |  |
|            | 17:10-17:25 | Zhenzhen XU      | Fudan University                                                            | Research and design of functional microstructures with directional transport for bionic microfluidics     |  |

### ***Conference 4: Micro/Nano Optics and Subwavelength Electromagnetics***

This conference chapter refers to the study of various novel features of light at the micro-nanometer scale, including the generation, propagation, modulation, conversion and detection of light. The research objection of this conference chapter is to manipulate and control photons at micro-nanometer scale, and develop optical devices with all-light integration, small footprint, high integration, fast speed and low-energy consumption, which could provide physical platform and technical support for the next generation of information technology. The goal of this chapter is to exchange recent development and breakthrough in the micro-nano optics, including the fundamental physics governing their operation, the device design and fabrication, the novel application. This conference chapter manly includes seven session parts:

- Micro/Nano manufacturing technology
- Super-resolution imaging and high sensitivity sensing
- Surface plasmons and metamaterials
- Metasurfaces and planar optics
- Nonlinearity, quantum and topological optics
- Subwavelength electromagnetics
- Fiber-optical waveguide microstructure

#### **Conference Chairs:**

**Xiangang Luo**, Institute of Optics and Electronics, CAS

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

**Xiaodi Tan**, Beijing Institute of Technology

**Ting Xu**, Nanjing University

**Zheyu Fang**, Peking University

**Xinbin Cheng**, Tongji University

**Zinan Wang**, University of Electronic Science and Technology of China

**Mingbo Pu**, State Key Laboratory of Optical Technologies on Nano-Fabrication and Micro-Engineering, Institute of Optics and Electronics, CAS

**Xiong Li**, State Key Laboratory of Optical Technologies on Nano-Fabrication and Micro-Engineering, Institute of Optics and Electronics, CAS

**Conference 6: Extreme Manufacturing Technology**

Extreme manufacturing technologies focus on the manufacturing structures, devices and systems with extreme dimensions and properties under extreme conditions, including micro/nanoscale manufacturing, ultra-precision manufacturing, complexed manufacturing and giant system manufacturing. The advances of laser technology and its integration with the other advanced manufacturing technologies lead to the generation of various advanced technologies for the manufacturing of functional micro/nanoscale, giant scale and complexed structures, ultra-precision manufacturing and so on. Furthermore, the emergent technologies including complex energy source manufacturing, four dimensional printing technology as well as manufacturing in orbit will expand the applications of extreme manufacturing technology.

- Manufacturing with extreme condition
- Manufacturing for extreme scale
- Manufacturing with complex energy source
- Manufacturing for complex structures
- Manufacturing in orbit (zero-gravity)
- Four-dimensional printing technology
- Application of extreme manufacturing

**Conference Chairs:**

**Xuanming Duan**, Chongqing Institute of Green and Intelligent Technology, CAS

**Lin Li**, University of Manchester (UK)

**Dicheng Li**, Xi'an Jiaotong University

**Lan Jiang**, Beijing Institute of Technology

**Wenwu Zhang**, Institute of Advanced Manufacturing, Ningbo Institute of Industrial Technology, CAS

## June 27 Conference 4: Micro/Nano Optics and Subwavelength Electromagnetics JinJiang hall, floor 5

| Date    | Time        | Name          | Organization                                                                   | Title                                                                                        | Remark  |
|---------|-------------|---------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------|
| June 27 | 08:30-09:00 | Chengwei QIU  | National University of Singapore                                               | Intelligent metasurfaces for human and biomedical applications                               | Invited |
|         | 09:00-09:30 | Lei ZHOU      | Fudan University                                                               | High-efficiency, multifunctional, and tunable metasurfaces                                   | Invited |
|         | 09:30-10:00 | Xiangping LI  | Jinan University                                                               | Diatomic metasurfaces for vectorial and multifunctional holography                           | Invited |
|         | 10:00-10:30 | Lei ZHANG     | Northwestern Polytechnical University                                          | Manipulation of light with mode hybridization                                                | Invited |
|         | 10:30-10:45 | Tea Time      |                                                                                |                                                                                              |         |
|         | 10:45-11:00 | Guoxing ZHENG | Wuhan University                                                               | A 4*4 beam splitter based on geometric metasurfaces                                          |         |
|         | 11:00-11:15 | Xue JIANG     | Chongqing University                                                           | A THz quarter-wave plate based on all-dielectric metasurface                                 |         |
|         | 11:15-11:30 | Zhongquan WEN | Chongqing University                                                           | A terahertz wave imaging lens based on metasurfaces                                          |         |
|         | 11:30-11:45 | Siqi LI       | Xi'an Institute of Optics and Precision Mechanics, Chinese Academy of Sciences | Complete phase and amplitude control on all-dielectric metasurface                           |         |
|         | 11:45-12:00 | Qingkun XIE   | Xi'an Institute of Optics and Precision Mechanics, Chinese Academy of Sciences | Practical super-oscillation lens excogitation for far field complex objects imaging          |         |
|         | 12:00-13:00 | Lunch         |                                                                                |                                                                                              |         |
|         | 13:00-13:30 | Hansik YUN    | Seoul National University                                                      | Plasmonic and metasurface nanostructures for optical imaging                                 | Invited |
|         | 13:30-14:00 | Tao LI        | Nanjing University                                                             | Dispersion engineering in metasurfaces for applicable optical devices                        | Invited |
|         | 14:00-14:30 | Jiaming HAO   | Shanghai Institute of Technical Physics of the Chinese                         | Spatial and frequency selective plasmonic metasurfaces for long wavelength infrared spectral | Invited |



|            |             |               |                                                                  |                                                                                                                      |         |
|------------|-------------|---------------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------|
| June<br>27 |             |               | Academy of Sciences                                              | region                                                                                                               |         |
|            | 14:30-15:00 | Zhangkai ZHOU | Sun Yat-sen University                                           | Functional nanostructures for subwavelength image and its application                                                | Invited |
|            | 15:00-15:15 | Hao CHEN      | Chongqing University                                             | Sub-diffraction focusing of THz wave with a dielectric metalens                                                      |         |
|            | 15:15-15:30 | Tea time      |                                                                  |                                                                                                                      |         |
|            | 15:30-16:00 | Tao DING      | Wuhan University                                                 | Plasmon-directed polymerization with subwavelength precision                                                         | Invited |
|            | 16:00-16:30 | Wenxin WANG   | Technische Universität Ilmenau                                   | Non-lithographic fabricating plasmonic metastructures and their second-order optical nonlinearities                  | Invited |
|            | 16:30-17:00 | Xiaoliang MA  | Institute of Optics and Electronics, Chinese Academy of Sciences | Polarization manipulation based on metasurface                                                                       | Invited |
|            | 17:00-17:15 | Fei QIN       | Jinan University                                                 | Ultrathin planar metalens for sub-diffractive limit focusing and imaging                                             |         |
|            | 17:15-17:30 | Wangwang LI   | North University of China                                        | A high-precision optical fiber adaptive lithography method for vertical integration of optical fiber and planar chip |         |
|            | 17:30-17:45 | Jinliang ZANG | Beijing Institute of Technology                                  | Research on properties of anisotropic gratings fabricated by polarization holography                                 |         |
|            | 17:45-18:00 | Shaolin ZHOU  | South China University of Technology                             | Rapid prototyping of infrared & terahertz metasurface device by one-step photo-lithography                           |         |

**June 28 Conference 4: Micro/Nano Optics and Subwavelength Electromagnetics**  
**Conference 6: Extreme Manufacturing Technology**  
**JinJiang hall, floor 5**

| Date       | Time        | Name       | Organization                    | Title                                                                                    | Remark  |
|------------|-------------|------------|---------------------------------|------------------------------------------------------------------------------------------|---------|
| June<br>28 | 08:30-09:00 | Lan JIANG  | Beijing Institute of Technology | Multiscale measurement of electron dynamics in femtosecond laser-material interactions   | Invited |
|            | 09:00-09:30 | Minglie HU | Tianjin University              | Fiber femtosecond laser with few cycle pulse and its application in micro/nano structure | Invited |

# Conference Program



|            |             |                  |                                                                                        |                                                                                                                                                           |         |
|------------|-------------|------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| June<br>28 | 09:30-10:00 | Meiling<br>ZHENG | Technical Institute<br>of Physics and<br>Chemistry                                     | Super-resolution achieved in<br>femtosecond laser<br>micro/nanofabrication technique                                                                      | Invited |
|            | 10:00-10:30 | Rongshi<br>XIAO  | Beijing University<br>of Technology                                                    | Laser beam welding of high<br>strength aluminum-lithium<br>alloys—problems and solutions                                                                  | Invited |
|            | 10:30-10:45 | Tea Time         |                                                                                        |                                                                                                                                                           |         |
|            | 10:45-11:00 | Jingsong WEI     | Shanghai Institute<br>of Technical<br>Physics of the<br>Chinese Academy<br>of Sciences | Laser heat-mode lithography:<br>principle and methods                                                                                                     |         |
|            | 11:00-11:15 | Hongzhong<br>CAO | Chongqing Institute<br>of Green and<br>Intelligent<br>Technology, CAS                  | Multi-photon laser lithography of<br>AR-N4340 photoresist with spatial<br>resolution at nanoscale                                                         |         |
|            | 11:15-11:30 | Bo CHENG         | Dalian University of<br>Technology                                                     | Effect of water cooling on the<br>microstructure and property of laser<br>welding of nickel-based<br>alloy/austenitic stainless steel with<br>filler wire |         |
|            | 11:30-11:45 | Zhennan<br>TIAN  | Jilin University                                                                       | Application of femtosecond laser<br>direct writing technology in<br>fabrication of micro optical devices                                                  |         |
|            | 11:45-12:00 | Qiankun LI       | Jilin University                                                                       | Sub-wavelength anti-reflective<br>structures on sapphire fabricated by<br>femtosecond laser writing and<br>etching                                        |         |
|            | 12:00-13:00 | Lunch            |                                                                                        |                                                                                                                                                           |         |
|            | 13:00-13:30 | Jianwen<br>DONG  | Sun Yat-sen<br>University                                                              | All-dielectric valley photonic<br>crystals: paving the way to<br>topological nanophotonics                                                                | Invited |
|            | 13:30-14:00 | Renmin MA        | Peking University                                                                      | Plasmonics: friend or foe for laser<br>miniaturization?                                                                                                   | Invited |
|            | 14:00-14:30 | Mingbo PU        | Institute of Optics<br>and Electronics,<br>Chinese Academy<br>of Sciences              | Extraordinary Young's interference<br>and its application in metasurface<br>fabrication                                                                   | Invited |
|            | 14:30-15:00 | Dangyuan<br>LEI  | The Hong Kong<br>Polytechnic<br>University                                             | Optical chirality generation and<br>amplification in plasmonics<br>nanostructures                                                                         | Invited |
|            | 15:00-15:30 | Jun WANG         | Shanghai Institute<br>of Optics and Fine                                               | Nonlinear absorption and nonlinear<br>refractive index of 2D transition                                                                                   | Invited |

|            |             |                |                                                                            |                                                                                                                                  |         |
|------------|-------------|----------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------|
| June<br>28 |             |                | Mechanics, Chinese Academy of Sciences                                     | metal dichalcogenides                                                                                                            |         |
|            | 15:30-15:45 | Tea time       |                                                                            |                                                                                                                                  |         |
|            | 15:45-16:15 | Xifeng REN     | Shanghai Institute of Technical Physics of the Chinese Academy of Sciences | Quantum plasmonic N00N state in a silver nanowire                                                                                | Invited |
|            | 16:15-16:30 | Dezhuan HAN    | Chongqing University                                                       | Topological interface states in system of spoof surface plasmon polaritons                                                       |         |
|            | 16:30-16:45 | Guangxing WU   | Nanjing University                                                         | Strain tunable surface second harmonic generation in optical fiber nanowires                                                     |         |
|            | 16:45-17:00 | Xusheng CAI    | Tsinghua University                                                        | Suspended-graphene-based cavity optomechanical system                                                                            |         |
|            | 17:00-17:15 | Kangle YONG    | Sichuan University                                                         | Thermal blooming effect of plus vortex pulse laser beam propagating through the atmosphere                                       |         |
|            | 17:15-17:30 | Siqing ZHANG   | Xidian University                                                          | Theoretical study of strained black phosphorus photodetector integrated with silicon waveguide                                   |         |
|            | 17:30-17:45 | Xueying OUYANG | Jinan University                                                           | Saturation scattering inspired single-wavelength super-resolution imaging of gold nanoparticles                                  |         |
|            | 17:45-18:00 | Si ZHANG       | Fudan University                                                           | Broadband enhancement of photoluminance from colloidal metal halide perovskite nanocrystals on plasmonic nanostructured surfaces |         |

## June 28 Conference 4: Micro/Nano Optics and Subwavelength Electromagnetics WuHou hall, floor 5

| Date       | Time        | Name           | Organization                         | Title                                                                                 | Remark  |
|------------|-------------|----------------|--------------------------------------|---------------------------------------------------------------------------------------|---------|
| June<br>28 | 08:30-09:00 | Zhiyuan LI     | South China University of Technology | Mesosopic and microscopic strategies for engineering plamon enhanced Raman scattering | Invited |
|            | 09:00-09:30 | Shunping ZHANG | Wuhan University                     | Nanocavity plasmons: strong light-matter interaction and sensing                      | Invited |

# Conference Program



|            |             |                   |                                                                        |                                                                                                                   |         |
|------------|-------------|-------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------|
| June<br>28 | 09:30-10:00 | Chongjun<br>JIN   | Sun Yat-sen<br>University                                              | Micro-structured plasmonic<br>materials for optical hydrogen<br>sensors and polarization rotators                 | Invited |
|            | 10:00-10:15 | Jianping SHI      | Anhui Normal<br>University                                             | Surface plasmon resonance in<br>bowl-like pore array of Ag-Au<br>alloy and Sactivity research                     |         |
|            | 10:15-10:30 | Long WEN          | Jinan University                                                       | Surface lattice resonance<br>enhanced optical sensor with high<br>sensitivity and direct<br>electrical-readout    |         |
|            | 10:30-10:45 | Tea time          |                                                                        |                                                                                                                   |         |
|            | 10:45-11:15 | Yu LUO            | Nanyang<br>Technological<br>University                                 | Plasmonics using structured<br>dispersion                                                                         | Invited |
|            | 11:15-11:45 | Hua LU            | Northwestern<br>Polytechnical<br>University                            | Fano resonances in plasmonic<br>nanostructures                                                                    | Invited |
|            | 11:45-12:00 | Yihong<br>FANG    | Guangdong University<br>of Technology                                  | Fano resonance based on a<br>subwavelength<br>semi-annular-rectangular cavity<br>resonator                        |         |
|            | 12:00-13:00 | Lunch             |                                                                        |                                                                                                                   |         |
|            | 13:00-13:30 | Weiqliang<br>DING | Harbin Institute of<br>Technology                                      | Enhanced optical manipulation<br>using the eigenmodes of photonic<br>structures                                   | Invited |
|            | 13:30-14:00 | Lei SHI           | Fudan University                                                       | Observation of polarization<br>vortices in momentum space                                                         | Invited |
|            | 14:00-14:30 | Xiong LI          | Institute of Optics and<br>Electronics, Chinese<br>Academy of Sciences | Catenary optics and its<br>applications                                                                           | Invited |
|            | 14:30-15:00 | Jicheng<br>WANG   | Jiangnan University                                                    | Perfect absorption and magnetic<br>polaritons of graphene-based<br>silicon carbide grating structures             | Invited |
|            | 15:00-15:30 | Yun LAI           | Nanjing University                                                     | Optical “anti-doping” effect<br>induced by parity-time symmetry                                                   | Invited |
|            | 15:30-15:45 | Tea time          |                                                                        |                                                                                                                   |         |
|            | 15:45-16:00 | Yunping QI        | Northwest Normal<br>University                                         | Extraordinary optical<br>transmission of “回” shaped<br>metal nanocomposite structures                             |         |
|            | 16:00-16:15 | Yang LU           | Lanzhou University                                                     | Long range symmetrical hybrid<br>plasmonic waveguide with high<br>confinement and centimeter-scale<br>propagation |         |

|            |             |                |                                       |                                                                                         |  |
|------------|-------------|----------------|---------------------------------------|-----------------------------------------------------------------------------------------|--|
| June<br>28 | 16:15-16:30 | Yan LIU        | Xidian University                     | Highly doped silicon graded grating strips for rainbow trapping at the terahertz range  |  |
|            | 16:30-16:45 | Yunyun MU      | Beijing University of Technology      | Gold-silver alloy nanoclusters assembled waveguided metallic photonic crystals          |  |
|            | 16:45-17:00 | Xin YE         | China Academy Of Engineering Physics  | The mechanism of regulating electromagnetism field by subwavelength structure           |  |
|            | 17:00-17:15 | Min WANG       | Northwestern Polytechnical University | Enhance the absorption of organic-inorganic perovskite film by nano-surface engineering |  |
|            | 17:15-17:30 | Jinglong ZHANG | Tongji University                     | Ultrabroadband reflector based on double layer subwavelength gratings                   |  |

### ***Conference 5: Meta Surface-wave and Surface Plasmon Lithography***

Recently, extraordinary electromagnetic wave phenomena associated with noble metals, semiconductors and subwavelength structures inspired a great deal of interests, like enhanced optical transmission, light beaming, directional light propagation, localized light enhancement, Fano resonances. Deep investigations reveal that those abnormal behaviors are usually resulted from the specific surface and/or localized electromagnetic wave modes, such as surface plasmon polaritons, localized surface plasmons and Bloch waves, which could be generally termed as metasurface waves. The mechanisms and principles behind those behaviors help us to engineer complex light features in subwavelength scale, including wavevector, amplitude, phase, angular momentum and spectrum, simply by actively and passively manipulating geometrical structures and material properties. Those methods were further utilized to design a great number of artificial materials and devices with variant innovative functionalities, like negative refraction materials, perfect lenses, perfect light absorption, invisible cloaks, vector beams and surface enhanced Raman spectrum, which have been applied in super resolution imaging, sub-diffraction optical lithography, ultra-thin absorbers and planar subwavelength antennas etc. In this conference, we cordially invite researchers in those areas to present their latest investigation results, share and enjoy achievements, discuss and preview future developments and applications.

- Super-resolution imaging
- Super-resolution lithography
- Vectorial electromagnetic manipulation
- Ultra-thin absorption
- Metasurface antenna
- Liquid crystal based light control technology

#### **Conference Chairs:**

**Minghui Hong**, National University of Singapore (Singapore)

**Mohsen Rahmani**, Australian National University (Australia)

**Song Hu**, Institute of Optics and Electronics, CAS

**Changtao Wang**, State Key Laboratory of Optical Technologies on Nano-Fabrication

and Micro-Engineering, Institute of Optics and Electronics, CAS

**Xiaoliang Ma**, State Key Laboratory of Optical Technologies on Nano-Fabrication and Micro-Engineering, Institute of Optics and Electronics, CAS

**Cheng Huang**, State Key Laboratory of Optical Technologies on Nano-Fabrication and Micro-Engineering, Institute of Optics and Electronics, CAS

**Qing Zhao**, University of Electronic Science and Technology of China

## June 27 Conference 5: Meta Surface-wave and Surface Plasmon Lithography ChengHua hall, floor 5

| Date    | Time        | Name           | Organization                                                     | Title                                                                                                             | Remark  |
|---------|-------------|----------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------|
| June 27 | 08:00-08:30 | Mohsen RAHMANI | The Australian National University                               | Nonlinear nanophotonics via metallic,dielectric, and semiconductor nanostructures                                 | Invited |
|         | 08:30-09:00 | Douguo ZHANG   | University of Science and Technology of China                    | Wide field super-resolution imaging of plasmons propagating along a silver nanowire                               | Invited |
|         | 09:00-09:30 | Gang CHEN      | Chongqing University                                             | A far-field optical label-free super-oscillation microscopy based on sub-diffraction quasi-nondiffraction beam    | Invited |
|         | 09:30-10:00 | Fangwen SUN    | University of Science and Technology of China                    | Super-resolution microscopy for quantum sensing with NV center in diamond                                         | Invited |
|         | 10:00-10:30 | Luru DAI       | The National Center for Nanoscience and Technology               | None user biased single molecule identification algorithm in super resolution imaging and other methods           | Invited |
|         | 10:30-10:45 | Tea Time       |                                                                  |                                                                                                                   |         |
|         | 10:45-11:15 | Yanqin WANG    | Institute of Optics and Electronics, Chinese Academy of Sciences | Far field imaging with super oscillation optics                                                                   | Invited |
|         | 11:15-11:45 | Lianwei CHEN   | National University of Singapore                                 | Meta-surfaces: breaking the limits in imaging and information processing                                          | Invited |
|         | 11:45-12:00 | Zhixiang WU    | Chongqing University                                             | Sub-diffraction hollow ring generated by super-oscillatory lens based on high transmission dielectric metasurface |         |
|         | 12:00-13:00 | Lunch          |                                                                  |                                                                                                                   |         |

# Conference Program



|            |             |                  |                                                                        |                                                                                                               |         |
|------------|-------------|------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------|
| June<br>27 | 13:00-13:30 | Weijie<br>KONG   | Institute of Optics and<br>Electronics, Chinese<br>Academy of Sciences | Surface imaging by ultra-thin<br>plasmonic illumination                                                       | Invited |
|            | 13:30-13:45 | Ruxue<br>WANG    | University of Science and<br>Technology of China                       | Excititing and shaping the<br>Bloch surface waves                                                             |         |
|            | 13:45-14:15 | Zongsong<br>GAN  | Huazhong University of<br>Science and Technology                       | Super resolution imaging based<br>on triexciton fluorescence of<br>quantum dot                                | Invited |
|            | 14:15-14:45 | Liang<br>WANG    | University of Science and<br>Technology of China                       | Near field optical lithography<br>using ultra-small gap bowtie<br>apertures                                   | Invited |
|            | 14:45-15:15 | Changtao<br>WANG | Institute of Optics and<br>Electronics, Chinese<br>Academy of Sciences | Plasmonic lithography beyond<br>diffraction limit and its<br>applications                                     | Invited |
|            | 15:15-15:25 | Tea Time         |                                                                        |                                                                                                               |         |
|            | 15:25-15:55 | Jing FENG        | Jilin University                                                       | Micro/nano fabrication and<br>light manipulation in organic<br>optoelectronic devices                         | Invited |
|            | 15:55-16:25 | Qidai<br>CHEN    | Jilin University                                                       | High performance Micro-optics<br>fabricated by femtosecond<br>lasers                                          | Invited |
|            | 16:25-16:55 | Fang LIU         | Tsinghua University                                                    | Metal nano-honeycomb<br>fabricated by colloidal<br>assembly and<br>femtosecond-laser annealing                | Invited |
|            | 16:55-17:25 | Zongwei<br>XU    | TianjinUniversity                                                      | Ion beam nano manufacturing<br>and its application in nano<br>optics                                          | Invited |
|            | 17:25-17:55 | Tian<br>YANG     | Shanghai Jiaotong<br>University                                        | Surface plasmon cavities on<br>optical fiber end-facets for<br>biomolecule and ultrasound<br>detection        | Invited |
|            | 17:55-18:10 | Gaofeng<br>LIANG | Chongqing University                                                   | Super resolution lithography<br>with a photonic crystal structure                                             |         |
|            | 18:10-18:25 | Xuexin<br>LAN    | Tianma Microelectronics<br>Co., Ltd.                                   | Improvement of resolution and<br>uniformity by FX-68s<br>lithography system for high PPI<br>LCD manufacturing |         |
|            | 18:25-18:40 | Bin HU           | Beijing Institute of<br>Technology                                     | Demagnification imaging<br>improved by mask in a<br>hyperlens photolithography<br>system                      |         |



## June 28 Conference 5: Meta Surface-wave and Surface Plasmon Lithography ChengHua hall, floor 5

| Date   | Time        | Name             | Organization                                                      | Title                                                                                                    | Remark  |
|--------|-------------|------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------|
| June28 | 08:30-09:00 | Jinghua<br>TENG  | Institute of Materials<br>Research and<br>Engineering             | Optical wavefront control by<br>photon sieves                                                            | Invited |
|        | 09:00-09:30 | Qiwen<br>ZHAN    | University of<br>Shanghai for Science<br>and Technology           | Magnified photonic spin-Hall<br>effect and applications                                                  | Invited |
|        | 09:30-10:00 | Xueqian<br>ZHANG | TianjinUniversity                                                 | Terahertz wavefront control<br>based on dielectric metasurface                                           | Invited |
|        | 10:00-10:15 | Tea Time         |                                                                   |                                                                                                          |         |
|        | 10:15-10:45 | Shaoqiu<br>XIAO  | University of<br>Electronic Science<br>and Technology of<br>China | Index-modulated sub-wavelength<br>patches for antenna performance<br>improvement                         | Invited |
|        | 10:45-11:15 | Kai CHEN         | Jinan University                                                  | Scalable aluminum metamaterial<br>perfect absorber by colloidal<br>lithography                           | Invited |
|        | 11:15-11:30 | Jiao JIAO        | University of<br>Electronic Science<br>and Technology of<br>China | Design of nano superlens capable<br>of dynamic manipulative focal<br>length                              |         |
|        | 11:30-11:45 | Fen ZHAO         | Chongqing University                                              | A broadband metasurface device<br>with reduced chromatic<br>dispersion                                   |         |
|        | 11:45-12:00 | Yuyan LI         | Chongqing University                                              | Reflective quarter-wave plate<br>based on cross-shaped<br>nano-antenna                                   |         |
|        | 12:00-13:00 | Lunch            |                                                                   |                                                                                                          |         |
|        | 13:00-13:15 | Yifeng<br>XIANG  | University of Science<br>and Technology of<br>China               | Manipulating the plasmonic<br>modes of silver nanowire with a<br>photonic band gap structure             |         |
|        | 13:15-13:30 | Xing LI          | Shandong<br>NormalUniversity                                      | An experimental solution for<br>the plasmonic and photonic mode<br>waves launched by metal<br>nano-slits |         |
|        | 13:30-13:45 | Ying<br>XIANG    | Guangdong<br>University of<br>Technology                          | 液晶中微观结构的形成和调控                                                                                            |         |
|        | 13:45-14:15 | Yiping           | Shenzhen University                                               | Femtosecond-laser-inscribed                                                                              | Invited |

## Conference Program



|            |             |              |                                                          |                                                                                                                                       |         |
|------------|-------------|--------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------|
| June<br>28 |             | WANG         |                                                          | fiber Bragg gratings and applications                                                                                                 |         |
|            | 14:15-14:45 | Fei XU       | Nanjing University                                       | Second harmonic generation in optical microfibers                                                                                     | Invited |
|            | 14:45-15:15 | Baicheng YAO | University of Electronic Science and Technology of China | Gate-tunable frequency combs in graphene-nitride microresonators                                                                      | Invited |
|            | 15:15-15:45 | Weihong BI   | Yanshan University                                       | Preparation and application of superimposed photonic crystal fiber gratings                                                           | Invited |
|            | 15:45-16:00 | Tea Time     |                                                          |                                                                                                                                       |         |
|            | 16:00-16:30 | Yikun LIU    | Sun Yat-sen University                                   | Ultrafast light field manipulation using cholesteric liquid crystals                                                                  | Invited |
|            | 16:30-17:00 | Wei HU       | Nanjing University                                       | Optically addressed liquid spatial light modulator                                                                                    | Invited |
|            | 17:00-17:15 | Hongru GUO   | University of Electronic Science and Technology of China | Research review on the development of liquid crystal optical phased array device on the application of free space laser communication |         |
|            | 17:15-17:30 | Ting CHEN    | Wuhan Polytechnic University                             | Study on the low temperature dependence of viscosity for high-birefringence liquid crystals used in high frequency                    |         |
|            | 17:30-17:45 | Xiaoxiao WU  | Xiamen Tianma Microelectronics Co., Ltd.                 | High resolution LCD technology for VR                                                                                                 |         |
|            | 17:45-18:00 | Yize ZHAO    | University of Electronic Science and Technology of China | A voltage tunable metasurfaces as phase shifter at U-band based on liquid crystal                                                     |         |
|            | 18:00-18:30 | Ruiqi DUAN   | Sichuan University                                       | Local surface plasmon resonance biosensor and its medical applications                                                                | Invited |

***Conference 7: Innovative Manufacturing Technology***

The theme of this conference is mainly about the innovative manufacturing technology, including biological manufacturing, multi-scale manufacturing, flexible manufacturing, intelligent manufacturing, bionic manufacturing, virtual fusion manufacturing and green manufacturing. The goal of this topic is to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results on all aspects of innovative manufacturing technologies. It also provides a premier interdisciplinary platform for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns as well as practical challenges encountered and solutions adopted in the fields of innovative and disruptive manufacturing technologies.

- Biological manufacturing
- Multi-scale manufacturing
- Flexible manufacturing
- Intelligent manufacturing
- Bionic manufacturing
- Virtual fusion manufacturing
- Green manufacturing

**Conference Chairs:**

**Xingjiang Liu**, China Electronics Technology Group Corporation

**Xiaodong He**, Harbin Institute of Technology

**Rui Zhou**, Xiamen University

## June 27 Conference 7: Innovative Manufacturing Technology QingBaiJiang hall, floor 5

| Date    | Time        | Name          | Organization                                  | Title                                                                                                                                           | Remark  |
|---------|-------------|---------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| June 27 | 08:30-09:00 | Genquan HAN   | Xidian University                             | Negative capacitance transistors with sub-kT/q swing                                                                                            | Invited |
|         | 09:00-09:30 | Yaoyu CAO     | Jinan University                              | Super-resolution direct laser writing and its application in nanofabrication                                                                    | Invited |
|         | 09:30-10:00 | Dong WU       | University of Science and Technology of China | Integration of controllable microstructures inside a microfluidic chip by direct femtosecond laser writing                                      | Invited |
|         | 10:00-10:15 | Tea Time      |                                               |                                                                                                                                                 |         |
|         | 10:15-10:45 | Hongzhong LIU | Xi'an Jiaotong University                     | Template to induce self-assembly technology and application in biomimicry                                                                       | Invited |
|         | 10:45-11:15 | Yunfeng PENG  | Xiamen University                             | Investigation on the nonlinear relationship between relative velocity and material removal in bonnet polishing                                  | Invited |
|         | 11:15-11:45 | Dongjiang WU  | Dalian University of Technology               | Wear mechanism of Al <sub>2</sub> O <sub>3</sub> -ZrO <sub>2</sub> eutectic ceramic via ultrasonic-assisted laser engineered net shaping (LENS) | Invited |
|         | 11:45-14:00 | Lunch         |                                               |                                                                                                                                                 |         |
|         | 14:00-14:30 | Lingfei JI    | Beijing University of Technology              | Structural modifications induced by ultrafast IR laser pulses in sapphire                                                                       | Invited |
|         | 14:30-15:00 | Xiaohui LI    | Shaanxi Normal University                     | Ultrafast pulse based on few-layer Bismuthene via evanescent field interaction                                                                  | Invited |
|         | 15:00-15:30 | Feng XU       | Xi'an Jiaotong University                     | Micro- and nano-technologies for point-of-care diagnostics                                                                                      | Invited |
|         | 15:30-15:45 | Tea Time      |                                               |                                                                                                                                                 |         |
|         | 15:45-16:00 | Haiming XU    | Ningxia University                            | Research on hand-eye calibration method based on stereo vision for harvesting robot                                                             |         |
|         | 16:00-16:15 | Xiaojie LI    | Hunan University                              | Fabrication of superhydrophobic magnesium surface with durability                                                                               |         |
|         | 16:15-16:30 | Yitao LU      | Huazhong University of Science and Technology | Ge <sub>2</sub> Sb <sub>2</sub> Te <sub>5</sub> all-optical switch                                                                              |         |
|         | 16:30-16:45 | Wang PENG     | Xiamen University                             | Effect of process parameters on laser micromilling of SiC microchannels                                                                         |         |

**Conference 8: Flexible Materials and Devices**

Recent progresses in materials development, device engineering and mechanical design have given birth to photonic materials, devices and systems with unconventional functionalities such as mechanical flexibility, biocompatibility and resorbability. These novel features facilitate the integration of photonic and electronic devices with soft, elastic and/or curved substrates for various biomedical applications. Innovative material design and device architectures are being actively pursued to address the challenges associated with the multifunctional integration of organic/inorganic photonic components with various biological systems. Latest scientific and technical advances have broadened the palette of materials which spans from organic polymers to semiconductors, metals, ceramics, glasses, and hybrid materials across different structural hierarchies and length scales. Innovative processing and assembly, based on a clever combination of these new materials, have enabled a wide spectrum of optoelectronic devices like waveguides, LEDs, photodetectors and lasers to be integrated onto wearable and implantable platforms by leveraging non-classical fabrication methods include advanced 3D manufacturing, transfer printing, nanolithography and self-assembly. These bio-integrated systems open up emerging application venues include but are not limited to epidermal sensors, optogenetic probes, and implantable transient devices. This symposium provides a forum to discuss various approaches to realize advanced high performance flexible photonic materials, devices and systems. It will focus on functional material design, characterization and their applications in photonic devices for wearable and bio-implantable applications. The presentations and invited talks cover interdisciplinary fields including materials science, physics, chemistry, biology, mechanical engineering and electrical engineering.

- Flexible, stretchable and curved optoelectronic devices and systems
- Wearable devices
- Implantable devices
- Degradable devices
- Bio-inspired and bio-mimetic devices
- Optical neural interfaces
- Optoelectronic devices for biomedical system

# Conference Program



## Conference Chairs:

**Wei Huang**, Northwestern Polytechnical University

**Yonggang Huang**, Northwestern University (USA)

**Xue Feng**, Tsinghua University

## June 27 Conference 8: Flexible Materials and Devices XinDu hall, floor 5

| Date    | Time        | Name         | Organization                                                                 | Title                                                                                     | Remark  |
|---------|-------------|--------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------|
| June 27 | 8:30-9:00   | Yanlin SONG  | Institute of Chemistry<br>Chinese Academy of Sciences                        | Green printing for functional devices by droplet manipulation                             | Invited |
|         | 9:00-9:30   | Yongfeng MEI | Fudan University                                                             | Rolled-up nanomembranes: from fabrication to applications                                 | Invited |
|         | 9:30-10:00  | Caofeng PAN  | Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences | 基于压电光电子学效应的 ZnO 纳米线阵列应力传感与成像系统研究                                                          | Invited |
|         | 10:00-10:15 | Fengyu LI    | Institute of Chemistry<br>Chinese Academy of Sciences                        | Printed droplet manipulation for flexible multi-analysis electronics                      |         |
|         | 10:15-10:45 | Tea Time     |                                                                              |                                                                                           |         |
|         | 10:45-11:15 | Jianpu WANG  | Nanjing Tech University                                                      | High performance perovskite light-emitting diodes                                         | Invited |
|         | 11:15-11:45 | Xing SHENG   | Tsinghua University                                                          | Implantable optoelectronic devices for deep-brain neural modulation and sensing           | Invited |
|         | 11:45-12:00 | Qingxin TANG | Northeast Normal University                                                  | Conformal organic field-effect transistor array fabricated by photo-lithography           |         |
|         | 12:00-14:00 | Lunch        |                                                                              |                                                                                           |         |
|         | 14:00-14:30 | Guozhen SHEN | Institute of Semiconductors, CAS                                             | One-dimensional semiconducting nanostructures for flexible image sensors                  | Invited |
|         | 14:30-15:00 | Ruiwei LI    | Ningbo Institute of Industrial Technology, CAS                               | Flexible tactile sensor with digital output for E-skin                                    | Invited |
|         | 15:00-15:15 | Meng SU      | Institute of Chemistry<br>Chinese Academy of Sciences                        | Self-assembling of nanomaterials via droplet manipulation for multifunctional electronics |         |

|         |             |               |                                                            |                                                                                                                                       |         |
|---------|-------------|---------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------|
| June 27 | 15:15-15:45 | Tea Time      |                                                            |                                                                                                                                       |         |
|         | 15:45-16:15 | Weihua PEI    | Institute of Semiconductors<br>Chinese Academy of Sciences | Hybride-integrated flexible electrode on Sapphire-based $\mu$ LED optoelectrodes for high-spatiotemporal-accuracy optogenetic studies | Invited |
|         | 16:15-16:45 | Shih-Chi CHEN | Chinese University of Hong Kong                            | Ultra-precise roll-to-roll machine for fabricating next-generation flexible electronic devices                                        | Invited |
|         | 16:45-17:15 | Ni ZHAO       | The Chinese University of Hong Kong                        | Solution-Processed Energy Devices and Sensors                                                                                         | Invited |
|         | 17:15-17:30 | Miao YU       | University of Electronic Science and technology of china   | Enhancing the wettability of PEDOT:PSS layer with plasma treatment method in perovskite solar cells                                   |         |

## June 28 Conference 8: Flexible Materials and Devices XinDu hall, floor 5

| Date    | Time        | Name         | Organization                                             | Title                                                                                                      | Remark  |
|---------|-------------|--------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------|
| June 28 | 08:30-09:00 | Xue FENG     | Tsinghua University                                      | 类皮肤柔性生物器件                                                                                                  | Invited |
|         | 09:00-9:30  | Yuan LIN     | University of Electronic Science and Technology of China | Stretchable and flexible sensors based on oxide thin films                                                 | Invited |
|         | 09:30-10:00 | Youfan HU    | Peking University                                        | High-performance flexible electronics based on carbon nanotubes                                            | Invited |
|         | 10:00-10:30 | Yaping DAN   | Shanghai Jiao Tong University                            | Dynamics of charge carriers in silicon nanowire photoconductors revealed by photo Hall effect measurements | Invited |
|         | 10:30-10:45 | Tea Time     |                                                          |                                                                                                            |         |
|         | 10:45-11:15 | Xian HUANG   | TianjinUniversity                                        | High-throughput implantable flexible electronics devices                                                   | Invited |
|         | 11:15-11:45 | Jingquan LIU | Shanghai Jiao Tong University                            | Flexible MEMS neural interface devices                                                                     | Invited |
|         | 11:45-12:00 | Haochen LI   | Nanjing University of Science and Technology             | A novel flexible wireless pressure sensor for diagnosis of the osteofascial compartment syndrome           |         |

### ***Conference 9: Optoelectronic Materials and Devices for Sensing and Imaging***

This conference chapter refers to the study of optoelectronic materials and devices for sensing and imaging, including properties of optoelectronic materials, data acquisition and analysis of detector, image processing, new display technology, thin film transistor technology and organic and polymer storage equipment. The research objection of this conference is to design and manufacture devices for sensing and imaging with various optoelectronic materials, which could provide physical platform and technical support for the next generation of display technology. The goal of this chapter is to exchange recent development and breakthrough in the optoelectronic materials and devices for sensing and imaging, including properties of optoelectronic materials, the device design and fabrication, the novel application. This conference chapter mainly includes eleven session parts:

- Properties of optoelectronic materials
- Nanomaterials used in optoelectronic equipment
- Properties of imaging acceptance material
- Detector design, assembly and fusion
- Data acquisition and analysis of detector
- Image processing
- New display technology
- Organic and polymer light emitting devices for display and lighting
- Related technologies of LED and OLED
- Thin film transistor technology
- Organic and polymer storage equipment

#### **Conference Chairs:**

**Yadong Jiang**, Dean of School of Optoelectronic Information, University of Electronic Science and Technology of China

**Bernard Kippelen**, Vice Director, Center of Organic Photonics and Electronics, Georgia Institute of Technology (USA)

**Junsheng Yu**, State Key Laboratory of Electronic Thin Films and Integrated Devices



## June 28 Conference 9: Optoelectronic Materials and Devices for Sensing and Imaging

**QingYang hall, floor 5**

| Date    | Time        | Name          | Organization                                                               | Title                                                                                                  | Remark  |
|---------|-------------|---------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------|
| June 28 | 08:00-08:30 | Lu LI         | Chongqing University of Arts and Sciences                                  | Flexible solar cell via ultrasonic spray deposition                                                    | Invited |
|         | 08:30-09:00 | Zhenming PENG | University of Electronic Science and Technology of China                   | Study on rapid sensitivity of infrared radiation for the limb atmosphere based on the transport theory | Invited |
|         | 09:00-09:30 | Hua WANG      | Taiyuan University of Technology                                           | Designing and material properties of soluble OLED materials                                            | Invited |
|         | 09:30-10:00 | Jiang HUANG   | University of Electronic Science and Technology of China                   | Efficient perovskite solar cells with high open-circuit voltage based on thermal evaporating method    | Invited |
|         | 10:00-10:15 | Lingma SUN    | University of Electronic Science and Technology of China                   | A fast Lung segmentation method on CT image using a morphological analysis                             |         |
|         | 10:15-10:30 | Yuhan LIU     | University of Electronic Science and Technology of China                   | Connected component-based river detection using ULBP feature in infrared image                         |         |
|         | 10:30-10:40 | Tea Time      |                                                                            |                                                                                                        |         |
|         | 10:40-10:55 | Xifa SONG     | Research Institute of Highway Ministry of Transport                        | The BP neural network method applied on road crack recognition                                         |         |
|         | 10:55-11:10 | Xuexin LAN    | Tianma Microelectronics Co., Ltd.                                          | TFT with ultra-low temperature poly-silicon technology for flexible liquid crystal display             |         |
|         | 11:10-11:25 | Yifeng XIONG  | Nanjing University                                                         | Optical-fiber-compatible Graphene heterostructure photodetector                                        |         |
|         | 11:25-11:40 | Ran TAO       | Shanghai Institute of Technical Physics of the Chinese Academy of Sciences | An overview on theory and algorithm of light field imaging technology                                  |         |
|         | 11:40-11:55 | Wenxiu WANG   | Shanghai Institute of Technical Physics of                                 | A new blind-pixel detection method for 384×288 long-wave                                               |         |

# Conference Program



|            |             |                  |                                                                                     |                                                                                                                                         |         |
|------------|-------------|------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------|
| June<br>28 |             |                  | the Chinese Academy<br>of Sciences                                                  | infrared focal plane arrays<br>images                                                                                                   |         |
|            | 11:55-13:00 | Lunch            |                                                                                     |                                                                                                                                         |         |
|            | 13:00-13:30 | Zhigang ZANG     | Chongqing University                                                                | Synthesis and characterization<br>of perovskite CsPbBr <sub>3</sub><br>nanomaterials and their<br>optoelectronic applications           | Invited |
|            | 13:30-14:00 | Qiang PENG       | Sichuan University                                                                  | Wide bandgap donor and<br>acceptor materials for<br>nonfullerene organic solar cells                                                    | Invited |
|            | 14:30-15:00 | Shibin LI        | University of<br>Electronic Science<br>and Technology of<br>China                   | Optoelectronic devices based on<br>halide perovskite<br>semiconductors                                                                  | Invited |
|            | 15:00-15:15 | Yanping<br>ZHONG | Shanghai Institute of<br>Technical Physics,<br>Chinese Academy of<br>Sciences       | A self-adaptive ROIC for long<br>wavelength photoconductive<br>infrared detector                                                        |         |
|            | 15:15-15:30 | Houzhi CAI       | Shenzhen University                                                                 | X-ray detector with high<br>temporal resolution by using<br>pulse-dilation technology                                                   |         |
|            | 15:30-15:40 | Tea Time         |                                                                                     |                                                                                                                                         |         |
|            | 15:40-15:55 | Shengnan SUN     | Northeast Normal<br>University                                                      | Automatic detection system for<br>spring hooks on car seat back<br>based on feature detection and<br>line segment                       |         |
|            | 15:55-16:10 | Wenwei SONG      | Southwest Jiaotong<br>University                                                    | Weak image edge detection<br>based on improved fuzzy<br>inference                                                                       |         |
|            | 16:10-16:25 | Wusen LI         | Nanjing University of<br>Science and<br>Technology                                  | The signal processing system of<br>a differential capacitive<br>micro-displacement sensor for<br>the controlling of segmented<br>mirror |         |
|            | 16:25-16:40 | Bingxin HUAI     | University of<br>Electronic Science<br>and Technology of<br>China                   | Missing pins detection of power<br>equipment firmware based on<br>UAV image under complex<br>environment                                |         |
|            | 16:40-16:55 | Wei ZHOU         | Shanghai Institute of<br>Technical Physics of<br>the Chinese Academy<br>of Sciences | Design of mid-infrared (8-12<br>μm) absorption structures for<br>Mn-based oxides thin film<br>detectors                                 |         |

|            |             |             |                                                                   |                                                                                                                                        |  |
|------------|-------------|-------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--|
| June<br>28 | 16:55-17:10 | Rui PAN     | University of<br>Electronic Science<br>and Technology of<br>China | Ultra-highly responsivity<br>graphene-CuInS <sub>2</sub> QDs hybrid<br>photodetector                                                   |  |
|            | 17:10-17:25 | Ning LEI    | Beijing Institute of<br>Space Mechanics and<br>Electricity        | A research on real-time<br>non-uniformity correction and<br>blind pixels auto-searching and<br>compensation for IRFPA based<br>on FPGA |  |
|            | 17:25-17:40 | Weiwei MENG | University of<br>Electronic Science<br>and Technology of<br>China | A multi-band terahertz<br>metamaterial absorber with<br>novel structure                                                                |  |
|            | 17:40-17:55 | Dong WANG   | Beijing Institute of<br>Space Mechanics and<br>Electricity        | The timing analysis of double<br>sampling technique with<br>different pixel structure for area<br>array CMOS image sensors             |  |