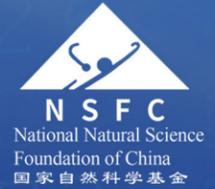




西安交通大学  
XI'AN JIAOTONG UNIVERSITY



1st International Conference on Sensing,  
Measurement and Data Analytics in the  
Era of Artificial Intelligence

**ICSMD2020**

**Program**



October 15-17, 2020, Xi'an, China  
Hosted by Xi'an Jiaotong University

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## Greetings from the General Chair



It's our great pleasure to invite you to join us for the 1st International Conference on Sensing, Measurement and Data Analytics in the Era of Artificial Intelligence (ICSMD 2020), which will invite experts and scholars in the vibrant field to meet and exchange ideas on the development of sensing methodologies, measurement technologies, and data analytics approaches with applications in various engineering domains in the era of artificial intelligence.

The ICSMD 2020 will be held in Xi'an, China on October 15-17, 2020. It is technically supported by the IEEE IMS TC-7 Signals and Systems in Measurement, the IEEE IMS TC-3 Condition Monitoring and Fault Diagnosis Instrument and the IEEE Instrumentation and Measurement

Society, and financially sponsored by National Natural Science Foundation of China, and it will be organized by Xi'an Jiaotong University.

The ICSMD2020 will be the 1st edition of the conference and beginning of the series. Nowadays, sensing is the basis of intelligence, and measurement is the premise of intelligence. With the rapid development of intelligent manufacturing and intelligent equipment, there is an urgent need for the support of the basic theory and technology of sensing and measurement. Highly integrated micro/nano sensor, high-speed and high-precision measurement, digital twin and big data analysis, fault detection and isolation, intelligent health management, and so on, are more closely related and reinforced each other, which is exactly the aim of ICSMD 2020.

Xi'an is one of the oldest cities in China, with a history of more than 3,100 years. Called Chang'an before the Ming Dynasty, Xi'an is one of the birthplaces of the ancient civilization in the Yellow River Basin area of the country. This city used to be the capital city of 13 dynasties, and Xi'an is also the eastern terminus of the Silk Road and home to the Terracotta Warriors.

We are looking forward to meeting you in the very beautiful city Xi'an, China, during October 15-17, 2020. Definitely ICSMD 2020 will provide you a pleasant experience, new contacts and happy stay in Xi'an.

*Rugang Yan*

Chairman of ICSMD 2020

## Registration Information

### Name Badges and On - Site Registration

Participants are required to wear name badges at all times in order to enter the conference area and to participate social activities. Participants can still make on-site registration at the registration desk located in the lobby of Empark Grand Hotel Shaanxi (3F). Service hours of registration desk are as below.

- Thursday, October 15: 12:00 pm – 9:00 pm
- Friday, October 16: 7:30 am – 5:00 pm
- Saturday, October 17: 7:30 am – 12:30 pm

### Registration Fees

	Until September 10, 2020	After September 10, 2020
Registration Type	Advanced	Regular and On-Site
IEEE I&M Member	3000 RMB	3500 RMB
IEEE Member	3500 RMB	4000 RMB
Non-Member	4000 RMB	4500 RMB
Student	1500 RMB	2000 RMB

### Note

Registration includes access to all technical sessions, tutorials, registration kit, and a digital copy of the Proceedings. Each full registration can cover one accepted paper. A paper fee of 1000 RMB will apply for each additionally accepted paper. Student registration does not cover the paper publication fee in IEEE explore.

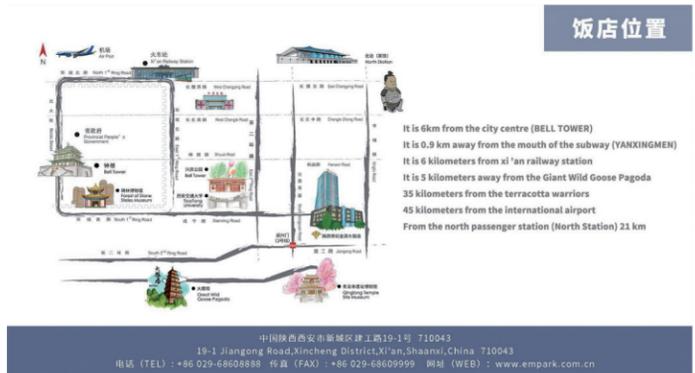
# Conference Overview

ICSMD2020 Program Schedule					
Time	15 Oct 2020	16 Oct 2020			17 Oct 2020
08:20-08:40		Registration			Registration
08:40-09:00		Opening Ceremony			
09:00-09:50		Keynote Speech 1			Keynote Speech 3
09:50-10:10		Keynote Speech 2			Refreshment Break (20min)
10:10-10:30		Refreshment Break (20min)			
10:30-10:50		Refreshment Break (20min)			
10:50-11:10		Oral (Main Hall) Session 4	Oral (International Hall) Session 6	Oral (No.7 Meeting Room) Session 12	Oral (No.8 Meeting Room) Session 9
11:10-11:30					
11:30-11:50					
11:50-12:10					
12:10-12:30					
12:30-13:00		Lunch			Lunch
13:00-14:00					Poster Presentation (Main Hall Lobby)
14:00-14:20		Oral (Main Hall) Session 5	Oral (International Hall) Session 6	Oral (No.7 Meeting Room) Session 12	Oral (No.8 Meeting Room) Session 11
14:20-14:40					
14:40-15:00					
15:00-15:20	Registration				
15:20-15:40					
15:40-16:00		Refreshment Break (20min)			Refreshment Break (20min)
16:00-16:20					
16:20-16:40		Oral (Main Hall) Session 2	Oral (International Hall) Session 3	Oral (No.7 Meeting Room) Session 13	Oral (No.8 Meeting Room) Session 8&15&others
16:40-17:00					
17:00-17:20					
17:20-17:40					
17:40-18:00					
18:00-18:30	Dinner	Break (30min)			Dinner
18:30-20:00		Banquet			

# Conference Recommended Hotel

## Location

The ICSMD2020 will be held at Empark Grand Hotel in Xi'an City, Shaanxi Province, China. Xi'an, as a capital of 13 dynasties in Chinese history, has numerous interesting places. We are sure that your stay in the city will be a very enjoyable one.



## Conference Location: Empark Grand Hotel

Hotel: Empark Grand Hotel (Chinese Name: 陕西世纪金源大酒店)  
 Address: NO.19-1 JianGong Road, XinCheng District, Xi'an, China  
 西安新城区 建工路 19-1 号  
 Tel: (029)68608888

## To Empark Grand Hotel:

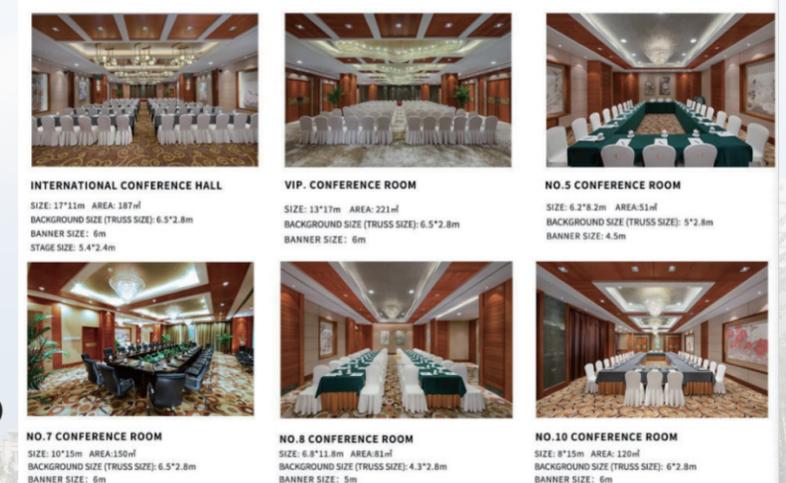
**From Xi'an Xianyang International Airport:** the hotel is 50 kilometers away from the airport. It takes 60 minutes to reach the hotel by a taxi; or take an airport intercity line to Xi'an North Railway Station and transfer to Metro Line 4 to Dayantan, and transfer to Metro Line 3 to Yanxingmen and then reach the hotel.

**From Xi'an North Railway Station:** the hotel is 25 kilometers away from the North Railway station. It takes 45 minutes by a taxi; or take Metro Line as mentioned above.

## Conference Venue

Friday, October 16  
 Venue 1: Main Hall (3F)  
 Venue 2: International Hall (3F)  
 Venue 3: NO.7 Meeting Room (5F)  
 Venue 4: NO.8 Meeting Room (5F)

Saturday, October 17  
 Venue 1: Main Hall (3F)  
 Venue 2: NO.7 Meeting Room (5F)  
 Venue 3: NO.10 Meeting Room (5F)



## Organization Committee

### Honory Chairs:

Prof. Asoke Nandi Brunel University London, UK  
Prof. Xuefeng Chen Xi'an Jiaotong University, China

### General Chairs:

Prof. Ruqiang Yan Xi'an Jiaotong University, China  
Dr. George Xiao National Research Council, Canada

### Technical Program Co-Chairs:

Prof. Datong Liu Harbin Institute of Technology, China  
Prof. Weihua Li South China University of Technology, China

### Special Session Co-Chairs:

Prof. Qingbo He Shanghai Jiaotong University, China  
Prof. Jinxing Liang Southeast University, China

### Publication Chair:

Dr. Yu Chen Xi'an Jiaotong University, China

### Publicity Chair:

Lingli Cui, Beijing University of Technology, China

### Local Arrangement Chair:

Prof. Liuyang Zhang Xi'an Jiaotong University, China

### Technical Support:

IEEE IMS TC-7 Signals and Systems in Measurement  
IEEE IMS TC-3 Condition Monitoring and Fault Diagnosis Instrument



### Keynote Speeches

#### Big Data Analytics for Intelligent Sensing and Measurement

Robert X. Gao, Ph.D.  
Cady Staley Professor and Chair  
Department of Mechanical and Aerospace Engineering  
Case Western Reserve University  
Cleveland, OH 44106-7222, USA  
Email: robert.gao@case.edu

#### Abstract

Continued advancement in sensing and measurement technologies has led to an ever-increasing amount of data of a broad variety of forms and physical natures to be acquired from virtually all aspects of industrial and commercial fields. As rich information are embedded within these “big data”, how to efficiently leverage them by means of effective data analytic methods to enhance manufacturing and contribute to economic development has become both a challenge and an opportunity.

This talk presents essential elements of and promising solutions enabled by big data analytics that complement measurement systems in the interpretation of high volume, broad variety, and low veracity data through enhanced pattern recognition and information extraction, with applications in machinery fault diagnosis, service life prognosis, and product quality control, to ultimately contribute to value creation. Case studies of machine learning methods such as deep learning in analyzing time series and image data and revealing mechanisms underlying manufacturing processes are discussed. Using assembly in manufacturing as a scenario, the talk highlights how multiphysics sensing and data analytics can be integrated for the recognition of current and prediction of future human actions during assembly operations to realize human-robot collaboration (HRC) in smart factories of the future.

#### Biographical Sketch



Dr. Gao is the Cady Staley Professor of Engineering and Department Chair of Mechanical and Aerospace Engineering at Case Western Reserve University in Cleveland, Ohio. Since receiving his Ph.D. degree from the Technical University of Berlin, Germany in 1991, he has been working on multi-physics sensing, design and modeling of instrument systems, and machine learning techniques for improving the observability of dynamical systems such as manufacturing equipment and processes. Dr. Gao is a Fellow of the Institute of Electrical and Electronic Engineers (IEEE), American Society of Mechanical Engineers (ASME), International Academy for Production Engineering (CIRP), and Society of Manufacturing Engineers (SME). He currently serves as a Senior Editor for the IEEE/ASME Transactions on Mechatronics, and is a recipient of the IEEE Best Application in Instrumentation and Measurement Award, IEEE Instrumentation and Measurement Society Technical Award, ASME Blackall Machine Tool and Gage Award, SME Eli Whitney Productivity Award, an NSF Early CAREER Award.

## High-speed 3D Optical Sensing, Information Processing, and Applications

Song Zhang, Ph.D.

Professor and Assistant Head for Experiential Learning

School of Mechanical Engineering

Purdue University

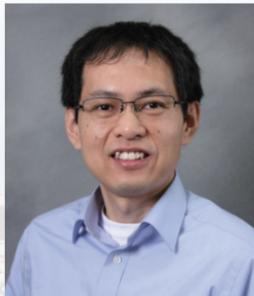
West Lafayette, IN 47907, USA

Email: szhang15@purdue.edu

### Abstract

Advances in optical imaging and machine/computer vision have provided integrated smart sensing systems for the manufacturing industry; and advanced 3D sensing could have profound impact on numerous fields, with broader applications including manufacturing, autonomous vehicles, and biomedical engineering. Our research addresses the challenges in high-speed, high-resolution 3D sensing and optical information processing. For example, we have developed a system that simultaneously captures, processes and displays 3D geometries at 30 Hz with over 300,000 measurement points per frame, which was unprecedented at that time (a decade ago). Our current research focuses on achieving speed breakthroughs by developing the binary defocusing techniques; and exploring novel means to store enormously large 3D data by innovating geometry/video compression methods. The binary defocusing methods coincide with the inherent operation mechanism of the digital-light-processing (DLP) technology, permitting tens of kHz 3D imaging speed at camera pixel spatial resolution. The novel methods of converting 3D data to regular 2D counterparts offer us the opportunity to leverage mature 2D data compression platform, achieving extremely high compression ratios without reinventing the whole data compression infrastructure. In this talk, I will present two platform technologies: 1) superfast 3D optical sensing; and 2) real-time 3D video communication. I will also cover some of the applications that we have been exploring including autonomous vehicles, biomedical engineering, forensic sciences, along with others.

### Biographical Sketch



Song Zhang is a Professor and the Assistant Head for Experiential Learning, School of Mechanical Engineering at Purdue University. He received his Ph.D. (2005) and M.S. (2003) degrees in Mechanical Engineering from Stony Brook University, and B.S. (2000) degree from University of Science and Technology of China. His primary research focuses on high-speed 3D optical sensing/imaging and optical information processing. He has over 200 publications including 130 journal articles and 2 books. 16 of his journal articles were selected as cover page highlights. His publications have been cited over 10,900 times with an h-index of 51. Besides being utilized in academia, technologies developed

by his team have been used by Radiohead (a rock band) to create a music video House of Cards; and by the law enforcement personnel to document crime scenes. He has received awards including AIAA Best Paper Award, IEEE ROBIO Best Conference Paper Award, Best of SIGGRAPH Disney Emerging Technologies Award, NSF CAREER Award, Stony Brook University's inaugural "Forty under 40 Alumni Award", Discovery in Mechanical Engineering award, CoE Early Career Faculty Research Excellence Award from Purdue and Iowa State University, Purdue University Faculty Scholar. He was a technical editor for IEEE/ASME Transactions on Mechatronics. He currently serves as an associate editor for Optics Express, as well as Optics and Lasers in Engineering. He is a fellow of SPIE and OSA.

## Digital Twin: State-of-the-art and Its Application

Fei Tao, Ph.D., Professor

School of Automation Science and Electrical Engineering

Beihang University, P.R.China

Email: ftao@buaa.edu.cn

### Abstract

The global academic research of digital twin (DT) is first investigated, and a comparative analysis of digital twin research in USA, Germany, and China is then given out. Ten industry applications of digital twin are then introduced, especially the application of digital twin shop-floor. In order to better understand and use digital twin, some hot topics related to digital twin will be discussed, such as the concept of digital twin, the applicable guideline of digital twin, standards of digital twin, and so on.

### Biographical Sketch



**Fei Tao** is currently a Professor at the School of Automation Science and Electrical Engineering, Beihang University (BUAA), Beijing, China. His current research interests are digital twin driven product design/manufacturing and service, and smart manufacturing service. In these fields, he has authored 4 monographs as the first author and published over 50 papers in Nature, CIRP Annals and IEEE/ASME Transactions, of which 20 are ESI high cited papers, and his publication has over 15000 citations in Google Scholar. Prof. Tao is a Global Highly Cited Researcher in 2019. He is currently the Editor-in-Chief of the International Journal of Service and Computing-Oriented Manufacturing (IJSCOM), the Associate Editor of Robotic and Computer Integrated Manufacturing (RCIM). He is also a CIRP Associate Member and IEEE Senior Member. He is currently the Vice-Dean of the Research Institute of Science and Technology of BUAA.

## How to Write and Publish a Scientific Paper in English

Fujun Liang, Ph.D

### Abstract

The talk of Dr. Fujun Liang includes the following points:

1. What is scientific writing?
2. Deciding the paper style.
3. Collecting the writing materials.
4. Planning the structures.
5. Writing in formal language.
6. Focusing on scientific content.
7. Creating new value.
8. Preparing paper submission.

### Biographical Sketch



**Fujun Liang**, member of the Democratic League of China, is currently a Senior Editor, quality director of CJME, part-time professor of Beijing University of Posts and Telecommunications, and National Science and Technology Expert. He teaches writing and editing skills for China Association for Science and Technology, China Editology Society of Science Periodicals, and China Machine Press. He has been invited to give lectures in universities, scientific research institutes and academic conferences for many times. He has published more than ten books, such as Writing and Submission of SCI papers, Standard Writing and Editing of Academic Papers, etc.

## Social Events

### Opening Ceremony

Date & Time:	08:40 – 9:00, October 16 <sup>th</sup> (Friday)
Location:	Main Hall, Empark Grand Hotel (3F)

### Meals

All meals are included with your registration fee.

### Banquet

Date & Time:	18:30 – 20:00, October 16 <sup>th</sup> (Friday)
Location:	Main Hall, Empark Grand Hotel (3F)

### Closing Ceremony

Excellent Paper Awards will be awarded at Closing Ceremony. All presenters are advised to attend the closing ceremony.

Date & Time:	17:20 – 17:40, October 17 <sup>th</sup> (Saturday)
Location:	Main Hall, Empark Grand Hotel (3F)

## Oral Presentations

### Friday, October 16, 2020

#### Keynote Speech 1 (9:00-9:45)

#### Big Data Analytics for Intelligent Sensing and Measurement

**Robert X. Gao, Ph.D.**

Cady Staley Professor and Chair

Department of Mechanical and Aerospace Engineering

Case Western Reserve University

#### Keynote Speech 2 (9:45-10:30)

#### High-speed 3D Optical Sensing, Information Processing, and Applications

**Song Zhang, Ph.D.**

Professor and Assistant Head for Experiential Learning

School of Mechanical Engineering

Purdue University

#### Venue 1: Main Hall

#### Session 4: Intelligent Sensing, Measurement & Data Analytics for Vehicles (10:50-12:30)

**Chairs: Zhongkui Zhu(Soochow University), Zaigang Chen(Southwest Jiaotong University)**

#### (10:50-11:10) A fuzzy logic-based method for proton exchange membrane fuel cell fault diagnosis

Mengliu Pei (University of Science and Technology of China), Chen Zhang (University of Science and Technology of China), Mingruo Hu (Shanghai Jiao Tong University), Lisa Jackson (Loughborough University), Lei Mao (University of Science and Technology of China)

#### (11:10-11:30) On-line fault diagnosis of polymer electrolyte membrane (PEM) fuel cell with polarization curve

Shuyou Wu (Wuhan Second Ship Design and Research Institute), Xu Peng (Wuhan Second Ship Design and Research Institute), Lei Mao (University of Science and Technology of China), Ao Liu (Wuhan Second Ship Design and Research Institute), Liang Dong (Wuhan Second Ship Design and Research Institute), Tong Wang (Wuhan Second Ship Design and Research Institute)

#### (11:30-11:50) Suppression of low-frequency magnetic interference on eddy current displacement sensor with nanometer resolution

Chengliang Pan (HeFei University of Technology), Shupeng Ren (HeFei University of Technology), Fei Yang (HeFei University of Technology), Chao Shi (HeFei University of Technology), Heng Zuo (Nanjing Institute of Astronomical Optics & Technology, Chinese Academy of Sciences), Zhihua Feng (University of Science and Technology of China)

#### (11:50-12:10) Vibration feature of locomotive axle box with a localized defect in its bearing outer race

Yuqing Liu (Southwest Jiaotong University)

#### (12:00-12:30) Buckling and Postbuckling Analysis Method of Stretchable and Flexible Sensor Networks Based on ABAQUS

Shuguang Hu (Nanjing University of Aeronautics and Astronautics), Yu Wang (Nanjing University of Aeronautics and Astronautics), Lei Qiu (Nanjing University of Aeronautics and Astronautics)

#### Session 5: Condition Detection and Evaluation, System Control and Protection, Data Mining of Railway Track-vehicle-grid System(14:00-15:40)

**Chairs: Zhigang Liu(Southwest Jiaotong University), Alfredo Núñez(Delft University of Technology)**

#### (14:00-14:20) Muscle Temperature Sensing and Control with A Wearable Device for Hand Rehabilitation of People after Stroke

Han Li (Southeast University), Jun Zhang (Southeast University), Chaojun Jiang (Southeast University), Qi Liu (Southeast University), Maozeng Zhang (Southeast University), Jingsong Zhou (Southeast University)

#### (14:20-14:40) Action-driven Reinforcement Learning for Improving Localization of Brace Sleeve in Railway Catenary

Junping Zhong (School of Electrical Engineering; Southwest Jiaotong University), Zhigang Liu (School of Electrical Engineering, Southwest Jiaotong University), Hongrui Wang (Section of Railway Engineering, Delft University of Technology), Wenqiang Liu (Southwest Jiaotong University), Cheng Yang (School of Electrical Engineering, Southwest Jiaotong University), Alfredo Núñez (Section of Railway Engineering, Delft University of Technology)

#### (14:40-15:00) An Automatic Defect Detection Method for Catenary Bracing Wire Components Using Deep Convolutional Neural Networks and Image Processing

Wenqiang Liu (Southwest Jiaotong University), Dan Wang (Southwest Jiaotong University), Cheng Yang (School of Electrical Engineering; Southwest Jiaotong University), Yuyang Li (Southwest Jiaotong University), Hui Wang (Southwest Jiaotong University), Zhigang Liu (School of Electrical Engineering; Southwest Jiaotong University)

#### (15:00-15:20) Pantograph Vibration Interference Signal Recognition Based on SVM Classification

Yuming Ding (China Academy of Railway Sciences), Jun Zhao (China Academy of Railway Sciences Corporation Limited), Jinzhao Liu (China Academy of Railway Sciences Corporation Limited), Wenxuan Zhang (China Academy of Railway Sciences Corporation Limited), Xiaodi Xu (China Academy of Railway Sciences Corporation Limited), Zhipeng Yang (China Academy of Railway Sciences Corporation Limited)

#### (15:20-15:40) Coupling Deep Models and Extreme Value Theory for Open Set Fault Diagnosis

Xiaolei Yu (Xi'an Jiaotong University), Zhibin Zhao (Xi'an Jiaotong University), Xingwu Zhang (Xi'an Jiaotong University), Chuang Sun (Xi'an Jiaotong University), Qiyang Zhang (Xi'an Jiaotong University), Xuefeng Chen (Xi'an Jiaotong University)

#### Session 2: Fault prognosis and life prediction(16:00-18:00)

**Chairs: Yi Qin(Chongqing University), Chuan Li(Chongqing Technology and Business University)**

#### (16:00-16:20) A KLIEP-based Transfer Learning Model for Gear Fault Diagnosis under Varying Working Conditions

Chao Chen (Southeast University), Fei Shen (Southeast University), Zhaoyan Fan (Oregon State University), Robert X. Gao (Case Western Reserve University), Ruqiang Yan (Xi'an Jiaotong University)

#### (16:20-16:40) Battery evaluation based on mechanism parameters

Xiaofang Cheng (University of Science and Technology of China), Mao Lei (University of Science and Technology of China), Li Wen (University of Science and Technology of China), Zhang Chen (University of Science and Technology of China), GuoWen Zhao (University of Science and Technology of China)

#### (16:40-17:00) A Comparative Study of Particle Filters and Its Variants in Lithium-ion Battery SOH Estimation

Dawei Pan (College of Information and Communication Engineering, Harbin Engineering University), Hengfeng Li (Harbin Engineering University), Yuchen Song (Harbin Institute of Technology)

**(17:00-17:20) The Mathematical Construction of the Battery Mechanism Function**

Wen Li (Dept.of Thermal Science and Energy Engineering, University of Science and Technology of China), Mao Lei (University of Science and Technology of China), Zhang Chen (University of Science and Technology of China), Xiaofang Cheng (University of Science and Technology of China)

**(17:20-17:40) Attention-based Convolutional Neural Networks for Diesel Fuel System Fault Diagnosis**

Yijing Xie (Air and Missile Defense College Of Air Force Engineering University), Tianlin Niu (Air and Missile Defense College Of Air Force Engineering University), Siyu Shao (Air and Missile Defense College Of Air Force Engineering University), Yuwei Zhao (Air and Missile Defense College Of Air Force Engineering University), Yuemeng Cheng (Air and Missile Defense College Of Air Force Engineering University)

**(17:40-18:00) RUL Prediction for Turbine Disc Based on High-Order Particle Filtering\***

Yang Fu (State Key Laboratory for Manufacturing Systems Engineering; Xi'an Jiaotong University), Hongrui Cao (Xi'an Jiaotong University; State Key Laboratory for Manufacturing Systems Engineering)

**Venue 2: International Hall**

**Session 6: Advanced sensors and intelligent signal processing methods for navigation(10:50-12:30)**

**Chairs: Haoqian Huang(Hohai University), Di Liu(Southeast University)**

**(10:50-11:10) Visual Inertial Calibration of Mobile Robotic System Based on Reinforcement Learning**

Wenxing Zhu (Southeast University), Lihui Wang (Southeast University)

**(11:10-11:30) Geomagnetic matching navigation for aircraft based on improved iterative closest contour point algorithm**

Ninghui Xu (Southeast University), Lihui Wang (Southeast University),

**(11:30-11:50) An Improved Interacting Multiple Model Algorithm for INS/DVL Integrated Navigation System**

Lanhua Hou(Key Laboratory of Micro-Inertial Instrument and Advanced Navigation Technology, Ministry of Education, School of Instrument Science and Engineering, Southeast University) Xiaosu Xu (Southeast University), Yiqing Yao (Southeast University), Di Wang (Southeast University)

**(11:50-12:10) The Implementation and Comparison Between Kalman Filter-based and Vector Tracking Loops**

Zhe Yan (Southeast University; School of Instrument Science and Engineering), Xiyuan Chen (Southeast University), Xinhua Tang (Southeast University), Xuefen Zhu (Southeast University)

**(12:10-12:30) A Tilt-induced Yaw Error Model based on Time Gate LSTM for Polarization Navigation**

Donghua Zhao (North University of China), Xiaochen Liu(North University of China), Shan Li(North University of China), Xindong Wu(North University of China), Jiawei Zhang(North University of China), Jun Tang(North University of China), Jun Liu(North University of China), Chenguang Wang(North University of China), Chong Shen(North University of China)

**Session 6: Advanced sensors and intelligent signal processing methods for navigation (14:00-15:40)**

**Chairs: Haoqian Huang(Hohai University), Di Liu(Southeast University)**

**(14:00-14:20) A Novel Polarized Light Compass Aided by GPS Module**

chengshuai Zhao (North University of China), Liu Xiaojie (North University of China), Zhao jing (North University of China), Zhao Huijun (North University of China), Yan Baolong (North University of China), Zhao Donghua (North University of China), Wang Chenguang (North University of China), Shen Chong (North University of China), Tang Jun (North University of China), Liu Jun (North University of China)

**(14:20-14:40) Structural Design and Simulation Analysis of Silicon Micro Triaxial Wheeling Gyroscope**

Huiliang Cao (North University of China), Qi Cai (North University of China), Li Liu (Jinzhou 777 Microelectronics Co., Ltd), Rui Zhao (North University of China), Yunbo Shi (North University of China)

**(14:40-15:00) A Novel State Estimation Algorithm Based on Variational Bayesians Method Applied to AUV**

Haoqian Huang (Hohai University), Jiacheng Tang (Hohai University), Chao Wang (Hohai University)

**(15:00-15:20) A novel INS/CNS/GNSS integrated navigation algorithm**

Di Liu (Southeast University; School of Instrument Science and Engineering), Xiyuan Chen (Southeast University), Xiao Liu (Southeast University), Zhe Yan (Southeast University; School of Instrument Science and Engineering)

**(15:20-15:40) Method for estimating the location of a low-frequency target in a shallow sea based on a single vector hydrophone**

Xianbin Sun (Qingdao University of Technology), Xinming Jia (Qingdao University of Technology), Yi Zheng (Instrumentation, Shandong Academy of Sciences), Zhen Wang (Instrumentation, Shandong Academy of Sciences)

**Session 3: Advanced sensors and intelligent signal processing methods for navigation(16:00-18:00)**

**Chairs: Yuyong Xiong (Shanghai Jiao Tong University), Dong Wang(Shanghai Jiao Tong University)**

**(16:00-16:20) Sub-Sampled Two-Dimensional SAR Imaging Method Based On MIMO FMCW Radar**

Zesheng Ren (Shanghai Jiao Tong University; China), Yuyong Xiong (Shanghai Jiao Tong University; China), Songxu Li (Shanghai Jiao Tong University; China), Dong Wang (Shanghai Jiao Tong University & The State Key Laboratory of Mechanical Systems and Vibration; China), Zhike Peng (Shanghai Jiaotong University; China)

**(16:20-16:40) Principal Component Analysis Based Kullback-Leibler Divergence for Die Cracks Detection**

Sha Wei (Shanghai Jiao Tong University; The State Key Laboratory of Mechanical System and Vibration), Dong Wang (Shanghai Jiao Tong University; The State Key Laboratory of Mechanical System and Vibration), Zhike Peng (Shanghai Jiao Tong University; The State Key Laboratory of Mechanical System and Vibration)

**(16:40-17:00) Research on Inductively Coupled Full Duplex Communication Method with Power Transmission**

Tao Zhang (Chongqing university), Deqi Zhang (Chongqing university), Wenbin Huang (Chongqing university)

**(17:00-17:20) Ultra-micro Vibration Measurement Method Using CW Doppler Radar**

Songxu Li (Shanghai Jiao Tong University), Yuyong Xiong (Shanghai Jiao Tong University), Zesheng

Ren (Shanghai Jiao Tong University), Changzhan Gu (Shanghai Jiao Tong University), Zhike Peng (Shanghai Jiao Tong University)

**(17:20-17:40) A selective anchor node method based on tetrahedral volume for three-dimensional DFL node self-localization**

Huang Binghua (Nanjing University of Science and Technology), XuLiang Qin (Nanjing University of Science and Technology), JiaXing Yang (Nanjing University of Science and Technology), Manyi Wang (Nanjing University of Science and Technology)

**(17:40-18:00) Cantilever-Pendulum for Multi-directional Broadband Energy Harvesting**

Jiawen Xu (Southeast University), Ruqiang Yan (Xi'an Jiaotong University)

**Venue 3: No. 7 Meeting Room**

**Session 12: Intelligent Sensing and High Precision Measurement for Aerospace (10:50-12:30)**

**Chairs: Guangcun Shan(Beihang University), Yong Zhang(Xi'an Jiaotong University)**

**(10:50-11:10) Graph Theory Based Localization of Wireless Sensor Networks for Radio Irregularity Cases**

Xiaofeng Ma (Beihang University (Beijing University of Aeronautics and Astronautics)), Ning Yu (Beihang University (Beijing University of Aeronautics and Astronautics)), Tianle Zhou (Beihang University (Beijing University of Aeronautics and Astronautics)), Renjian Feng (Beihang University (Beijing University of Aeronautics and Astronautics)), Yinfeng Wu (Beihang University (Beijing University of Aeronautics and Astronautics))

**(11:10-11:30) An Efficient Target Detection and Recognition Method in Aerial Remote-sensing Images Based on Multiangle Regions-of-Interest**

Guangcun SHAN (Beihang University), Hongyu Wang (Beihang University (Beijing University of Aeronautics and Astronautics)), Wei Liang (School of Electronic, Electrical and Communication Engineering, University of Chinese Academy of Sciences), Congcong Liu (Yantai Yundu Haiying UAV Application Technology Co., Ltd.), Qizhi MA (School of Instrumentation Science and Optoelectronics Engineering Beihang University), Quan Quan (Beihang University)

**(11:30-11:50) High Precision Measurement of Dynamic Angular Rate for Turntable in the Calibration Application of Airborne Inertial Sensor**

Xuejun He (Changcheng Institute of Metrology and Measurement), Aijun Wang (Changcheng Institute of Metrology and Measurement), Tianle Zhou (Beihang University (Beijing University of Aeronautics and Astronautics)), Xuxing Zhao (Beihang University), Ning Yu (Beihang University (Beijing University of Aeronautics and Astronautics))

**(11:50-12:10) Design method of the heating system for controllable heating humidity sensor**

Chun Hu (Beihang University), DaPeng Li (Beihang University), Peng Peng (Chongqing Dexin Robot Testing Center Limited Company), DeZhi Zheng (Beihang University (Beijing University of Aeronautics and Astronautics))

**(12:10-12:30) A Condition-Based Calibration Method for Flight Test Measuring Equipment**

Renjian Feng (Beihang University (Beijing University of Aeronautics and Astronautics)), Ruoyan Xing (Beihang University (Beijing University of Aeronautics and Astronautics)), Yinfeng Wu (Beihang University (Beijing University of Aeronautics and Astronautics)), Ning Yu (Beihang University (Beijing University of Aeronautics and Astronautics))

**Session 12: Intelligent Sensing and High Precision Measurement for Aerospace (14:00-15:40)**

**Chairs: Guangcun Shan(Beihang University), Yong Zhang(Xi'an Jiaotong University)**

**(14:00-14:20) Development of Photoelectron Emission Yield Measurement System for Metal Materials**

Yu Chen (Xi'an Jiaotong University), Guorui Huang (Xi'an Jiaotong University), Yan Yang (Xi'an Jiaotong University), Hanzhi Li (Xi'an Jiaotong University), Changxi Li (Xi'an Jiaotong University), Shuang Wang (Xi'an Jiaotong University), Yonghong Cheng (Xi'an Jiaotong University)

**(14:20-14:40) Analysis of Secondary Electron Yield and Energy Spectrum of Metal Materials based on Furman Model**

Zecai Chen (Xi'an Jiaotong University), Yu Chen (Xi'an Jiaotong University), Guorui Huang (Xi'an Jiaotong University), Changxi Li (Xi'an Jiaotong University), Shuang Wang (Xi'an Jiaotong University), Qingyun Shi (Xi'an Jiaotong University)

**(14:40-15:00) Theoretical Calculation of Photoemission Yield Spectrum of Space Metal Materials**

Changxi Li (Xi'an Jiaotong University), Yu Chen (Xi'an Jiaotong University), Yan Yang (Xi'an Jiaotong University), Zecai Chen (Xi'an Jiaotong University), Hanzhi Li (Xi'an Jiaotong University), Shuang Wang (Xi'an Jiaotong University)

**(15:00-15:20) Development of a Measurement System for the Secondary Electron Emission Yield Spectrum of Space Materials**

Yu Chen (Xi'an Jiaotong University), Yan Yang (Xi'an Jiaotong University), Guorui Huang (Xi'an Jiaotong University), Qingyun Shi (Xi'an Jiaotong University), Zecai Chen (Xi'an Jiaotong University), Shuang Wang (Xi'an Jiaotong University), Yonghong Cheng (Xi'an Jiaotong University)

**(15:20-15:40) In-pipe detection system based on magnetic flux leakage and eddy current detection**

Xiaolin Liu (Beihang University (Beijing University of Aeronautics and Astronautics)), Chun Hu (Beihang University (Beijing University of Aeronautics and Astronautics)), Peng Peng (Chongqing Dexin Robot Testing Center Limited Company), Rui Li (petrochina pipeline company), Xiaoming Zhao (petrochina pipeline company), Dezhi Zheng (Beihang University (Beijing University of Aeronautics and Astronautics))

**Session 13: Intelligent Anomaly Detection, Fault Diagnosis and Prognostics for Aero-engines(16:00-18:00)**

**Chairs: Jianzhong Sun(Nanjing University of Aeronautics and Astronautics), Liansheng Liu(Harbin Institute of Technology)**

**(16:00-16:20) Enhancing the reliability of the quadrotor by formulating the control system model**

Zhuo ZHI (Harbin Institute of Technology), Liansheng Liu(Harbin Institute of Technology), Datong Liu (Harbin Institute of Technology)

**(16:20-16:40) An SOC and SOP joint estimation method of lithium-ion batteries in unmanned aerial vehicles**

Wanqing Cheng (Harbin Institute of Technology), Zhiheng Yi (Harbin Institute of Technology), Jun Liang (Harbin Institute of Technology), Yuchen Song (Harbin Institute of Technology), Datong Liu (Harbin Institute of Technology)

**(16:40-17:00) UAV Anomaly Detection Using Active Learning and Improved S3VM Model**

Dawei Pan (Harbin Engineering University), Longqiang Nie(Harbin Engineering University), Weixin Kang(Harbin Engineering University), Zhe Song(Harbin Engineering University)

**(17:00-17:20) Research on multivariate variational mode decomposition method and its application to bearing fault diagnosis**

Qiuyu Song (Soochow University), Xingxing Jiang (Soochow University), Jun Wang (Soochow University), Changqing Shen (Soochow University), Juanjuan Shi (Soochow University), Weiguo Huang (Soochow University), Zhongkui Zhu (Soochow University)

**(17:20-17:40) Development and Application of Aero-engine Experimental Data Mining Algorithm Library**

Yan Zichen (Nanjing University of Aeronautics and Astronautics; College of Civil Aviation), Haonan Zhang (University of Chinese Academy of Sciences), Jianzhong Sun (Nanjing University of Aeronautics and Astronautics), Yang Yi (Nanjing University of Aeronautics and Astronautics), Guangwei Xia (AECC Hunan Aviation Powerplant Research Institute)

**(17:40-18:00) Differentiable Architecture Search for Aeroengine Bevel Gear Fault Diagnosis**

Zheng Zhou (Xi'an Jiaotong University), Ruqiang Yan (Xi'an Jiaotong University), Tianfu Li (Xi'an Jiaotong University), Zhibin Zhao (Xi'an Jiaotong University), Chuang Sun (Xi'an Jiaotong University), Xuefeng Chen (Xi'an Jiaotong University)

**Venue 4: No. 8 Meeting Room**

**Session 9: Quartz MEMS devices and technologies (10:50–12:30)**

**Chairs: Jing Ji(Xidian University)**

**(10:50-11:10) Design of the Self-test Structure of QVBA**

Shengshou LIN (Southeast University), Jinxing LIANG (Southeast University)

**(11:10-11:30) Performance improvement of wavelet noise reduction based on new threshold function**

Shiqi Yu (Tongji University), Yongrui Qin (Xi'an Jiaotong-liverpool University), Jiabin Gao (Tongji University), Shiqi Hou (Tongji University), Fuyong Lyu (GTongji University), Xuefeng Li (Tongji University)

**(11:30-11:50) Review of quartz anisotropic wet etching simulation**

Meng ZHAO (Xidian University), Jing JI (Xidian University), Toshitsugu Ueda (Waseda University)

**(11:50-12:10) Optimal Design of New Supporting structure for High-Frequency Quartz Resonators**

Jing JI (Xidian University), Meng ZHAO (Xidian University), Toshitsugu Ueda (Waseda University)

**(12:10-12:30) Behavior Anomaly Detection Fused with Features of Mel Frequency Cepstrum Coefficients**

Lyu Fuyong (College of Electronic and Information Engineering; Tongji University), Zhouhang Yang (College of Electronic and Information Engineering; Tongji University), Lujie Wang (College of Electronic and Information Engineering; Tongji University), Qi Zhou (College of Electronic and Information Engineering; Tongji University), Shiqi Hou (College of Electronic and Information Engineering; Tongji University), Xuefeng Li (College of Electronic and Information Engineering; Tongji University)

**Session 11: Advanced Sensing, Monitoring and Diagnosis in Smart Grid**

**(14:00-15:40)**

**Chairs: Yu Chen(Xi'an Jiaotong University), Zhe Li(Shanghai Jiaotong University)**

**(14:00-14:20) Fault Accurate Location Method in UHV GIL Based on Transient Voltage Travelling Wave**

Yong Wang (Guangzhou Power Supply Co. Ltd Electric Power Test & Research Institute), Dengwei Ding (Sichuan Energy Internet Research Institute, Tsinghua University), Lu Zhu (Guangzhou Power Supply Co. Ltd Electric Power Test & Research Institute), Wenxiong Mo (Guangzhou Power Supply Co. Ltd Electric Power Test & Research Institute), Weinan Fan (Guangzhou Power Supply Co. Ltd Electric Power Test & Research Institute), Ziwei Zhang (Sichuan Energy Internet Research Institute, Tsinghua University)

**(14:20-14:40) An Optical Partial Discharge Localization Method Based on Simulation and Machine learning in GIL**

Yiming Zang (SHANGHAI JIAO TONG UNIVERSITY), Qian Yong (Shanghai Jiao Tong University), Wang Hui (Shanghai Jiao Tong University), Xu Antian (Fudan University), Sheng Gehao (Shanghai Jiao Tong University), Jiang Xiuchen (Shanghai Jiao Tong University)

**(14:40-15:00) Test Research on Poor Contact Defect Detection of GIS Based on Temperature and Vibration**

Min Li (State Grid Nanchong Power Supply Company), Jichang Bai (State Grid Nanchong Power Supply Company), Leran Xu (Tsinghua Sichuan Energy Internet Research Institute), Haotian Xia (Tsinghua Sichuan Energy Internet Research Institute), Dengwei Ding (Tsinghua Sichuan Energy Internet Research Institute), Chengjun Ren (State Grid Nanchong Power Supply Company)

**(15:00-15:20) The 500kV Oil-filled Submarine Cable Temperature Monitoring System Based on BOTDA Distributed Optical Fiber Sensing Technology**

Yu Chen (Xi'an Jiaotong University), Shuang Wang (Xi'an Jiaotong University), Yi Hao (Xi'an Jiaotong University), Kai Yao (Xi'an Jiaotong University), Hanzhi Li (Xi'an Jiaotong University), Feng Jia (Xi'an Jiaotong University), Qingyun Shi (Xi'an Jiaotong University), Dongli Yue (Xi'an Jiaotong University), Yonghong Cheng (Xi'an Jiaotong University)

**(15:20-15:40) Stator Inter-turns Short Circuit Fault Detection in DFIG using Empirical Mode Decomposition Method on Leakage Flux**

Attiq Ur Rehman (Xi'an Jiaotong University), Yu Chen (Xi'an Jiaotong University), Guorui Huang (Xi'an Jiaotong University), Yan Yang (Xi'an Jiaotong University), Shuang Wang (Xi'an Jiaotong University), Yihan Zhao (Xi'an Jiaotong University), Yong Zhao (Xi'an Thermal Power Research Institute Co. Ltd), Dongli Yue (Xi'an Jiaotong University), Yonghong Cheng (Xi'an Jiaotong University), Toshikatsu Tanaka (Waseda University)

**Session 8: Flexible sensing and intelligent diagnosis/prognosis for rolling bearings & Session 15 NDT&E and Intelligent Monitoring & Others (16:00-18:00)**

**Chairs: Hongrui Cao(Xi'an Jiaotong University), Yuhua Cheng(University of Electronic Science and Technology of China)**

**(16:00-16:20) Rolling Bearing Fault Diagnosis based on Horizontal Visibility Graph and Graph Neural Networks**

Chenyang Li (Southeast University; School of Instrument Science and Engineering), Lingfei Mo (Southeast University), Ruqiang Yan (Xi'an Jiaotong University)

**(16:20-16:40) Decoupled Feature-Temporal CNN: Explaining Deep Learning-Based Machine Health Monitoring**

Rui Zhao (Harveston Asset Management), zhenghua chen (Institute for Infocomm Research), chaoyi zhu (Beihang University (Beijing University of Aeronautics and Astronautics)), zery chan (Institute for Infocomm Research), jinjiang wang (China University of Petroleum-Beijing), Ruqiang Yan(Xi'an Jiaotong Univeristy)

**(16:40-17:00) Deep Feature-aligned Convolutional Neural Network for Machinery Fault Diagnosis**

Junbin Chen (South China University of Technology), Longcan Liu (South China University of Technology), Ruyi Huang (South China University of Technology), Weihua Li (South China University of Technology)

**(17:00-17:20) Research on Defects Recognition Method Based on Impedance Information**

Xu Zhang (University of Electronic Science and Technology of China), Jian Zhang (Shanghai Space Propulsion Technology Research Institute), Libing Bai (University of Electronic Science Technology of China), Lulu Tian (University of Electronic Science and Technology of China), Jie Zhang (University of Electronic Science and Technology of China), Yuhua Cheng (University of Electronic Science and Technology of China)

**(17:20-17:40) Telemetry Data-based Spacecraft Anomaly Detection Using Generative Adversarial Networks**

Yue Song (Beihang University), Jinsong Yu (Beihang University (Beijing University of Aeronautics and Astronautics)), Diyin Tang (Beihang University (Beijing University of Aeronautics and Astronautics)), Danyang Han (Beihang University (Beijing University of Aeronautics and Astronautics)), Sen Wang (Beijing Aerospace Automatic Control Institute)

**(17:40-18:00) Workpiece Detection Based on Image Processing and Convolutional Neural Network**

wocheng chen (South China University of Technology), Xifan Yao(South China University of Technology), Yi Lei(South China University of Technology), Min Liu(South China University of Technology), Junming Zhang (South China University of Technology)

## Saturday, October 17, 2020

### Keynote Speech 3 (9:00-9:50)

#### Digital Twin: State-of-the-art and Its Application

**Fei Tao, Ph.D., Professor**

School of Automation Science and Electrical Engineering  
Beihang University, P.R.China

### Lecture- How to Write and Publish a Scientific Paper (16:00-17:20)

**Fujun Liang**

Senior Editor, quality director of CJME, part-time professor of Beijing University of Posts and Telecommunications, and National Science and Technology Expert

**Venue 1: Main Hall**

### Session 1: Advanced sensing and intelligent computation for medical signals (10:10-12:10)

**Chairs: Chengyu Liu(Southeast University), Zhi Tao(Soochow University)**

#### (10:10-10:30) A Bayesian Fusion Model for Heart Rate Annotations

Jianan Di (Southeast University), Chengyu Liu (Southeast University), Jianqing Li (Southeast University)

#### (10:30-10:50) Continuous Estimation of Left Ventricular Hemodynamic Parameters Based on Heart Sound and PPG Signals Using Deep Neural Network

Tengfei Feng (Dalian University of Technology), Hong Tang (Dalian University of Technology), Miao Wang (Dalian University of Technology), Chi Zhang (Dalian University of Technology), Hongkai Wang (Dalian University of Technology), Fengyu Cong (Dalian University of Technology)

#### (10:50-11:10) Voice pathology detection and multi-classification using machine learning classifiers

Yuanbo Wu (Soochow University), changwei zhou (Soochow University), Ziqi Fan (Soochow University), Yihua Zhang (Soochow University), xiaojun Zhang (Soochow University), Zhi Tao (Soochow University)

#### (11:10-11:30) Classification of Normal and Pathological Voices Using Convolutional Neural Network

Changwei Zhou (Soochow University), Lili Zhang (Soochow University), Xiaojun Zhang (Soochow University), Yuanbo Wu (Soochow University), Di Wu (Soochow University), Zhi Tao (Soochow University)

#### (11:30-11:50) Modeling Voice Pathology Detection Using Imbalanced Learning

Ziqi Fan (Soochow University), Jinyang Qian (Soochow University), Di Wu (Soochow University), Yishen Xu (Soochow University), Baoyin Sun (Soochow University), Zhi Tao (Soochow University)

#### (11:50-12:10) Multi-label Feature Selection for Long-term Electrocardiogram Signals

Yuwen Li (Southeast University), Zhimin Zhang (Science and Technology on Information Systems Engineering Laboratory), Fan Zhou Fan Zhou), Yantao Xing (Southeast University), Jianqing Li (Nanjing Medical University), Chengyu Liu (Southeast University)

### Session 1: Advanced sensing and intelligent computation for medical signals & Others (14:00–15:40)

**Chairs: Chengyu Liu(Southeast University ), Zhi Tao(Soochow University)**

**(14:00-14:20) A Portable neuECG Monitoring System for Cardiac Sympathetic Nerve**

**Activity Assessment**

Yantao Xing (Southeast University ), Jianqing Li (Southeast University), Zhengyuan Hu (Southeast University), Yuwen Li (Southeast University), Yike Zhang (Medical University), Chang Cui (Medical University), Cheng Cai (Medical University), Chengyu Liu (Southeast University)

**(14:20-14:40) An Octave Convolution Neural Network-based QRS Detector**

Wei Liu (Southeast University), Yelin Deng (Southeast University), Chris Yuan (Southeast University), Chris Yuan (Southeast University), Chris Yuan (Southeast University), Chengyu Liu (Southeast University)

**(14:40-15:00) Capacitance Measurement of Molten Metal Level in Continuous Casting System**

Zhe Zhuang (Xi'an Jiaotong University), Tonghao Zhou (Xi'an Jiaotong University), Yu Zhang (Shanghai Hinner Information Technology Co., Ltd), Shengchang Ji (Xi'an Jiaotong University)

**(15:00-15:20) Application of Wire Mesh Sensor to Identify Gas-liquid Flow Patterns in a Horizontal Pipe**

Shuai Liu (Shanghai Jiao Tong University), Li Liu (Shanghai Jiao Tong University), Jiarong Zhang (Shanghai Jiao Tong University), Hanyang Gu (Shanghai Jiao Tong University), Qi Zhang (Shanghai Jiao Tong University)

**(15:20-15:40) Flow visualization of centrifugal pump by the combination of LIF and PIV**

Qi Zhang (Shanghai Jiao Tong University), Hanyang Gu (Shanghai Jiao Tong University), Shuai Liu (Shanghai Jiao Tong University), Junlong Li (Shanghai Jiao Tong University), Sichao Tan (Harbin Engineering University), Jianke Su (support Center of Nuclear Technology, CAEA)

### Venue 2: No.7 Meeting Room

### Session10: Advanced Measurement and Data Processing for Aerospace (10:10–12:10)

**Chairs: Jingli Yang(Harbin Institute of Technology), Lianlei Lin(Harbin Institute of Technology)**

**(10:10-10:30) A Robotic Sensor Node for Mechanical Property Detection of Material on Asteroid Surface**

JUN ZHANG (Soochow University), Maozeng Zhang (Soochow University), Yizhuang Ding (Soochow University), Liuchen Chen (Soochow University), Qixuan Li (Soochow University), Minghan Qin (Soochow University)

**(10:30-10:50) Research and Verification of Multi-Satellite Thermal Vacuum Test Method**

Xiaofeng ZHANG (Innovation Academy for Microsatellites of CAS), Li WU (Innovation Academy for Microsatellites of CAS), Hong LIU (Innovation Academy for Microsatellites of CAS), Jianchao FENG (Innovation Academy for Microsatellites of CAS), Meijuan XU (Innovation Academy for Microsatellites of CAS), Rui CHENG (Innovation Academy for Microsatellites of CAS)

**(10:50-11:10) Satellite Control and Data Processing Unit Software Design based on Multi-core Processor**

Junwang HE (Shanghai Engineering Center for Microsatellites), Luyang XU (University of Science and Technology of China), Dongxiao XU (Shanghai Engineering Center for Microsatellites), Shunjing

YU (Shanghai Engineering Center for Microsatellites), Kaige WANG (School of Information Science and Engineering), Liang CHANG (Shanghai Engineering Center for Microsatellites)

**(11:10-11:30) Analysis of Ionospheric Scintillation Detection based on Machine Learning**

Lin Mengying (Southeast University), Zhu Xuefen (Southeast University), Luo Yimei (Southeast University), Yang Fan (Southeast University)

**(11:30-11:50) Detection Method of Solar Radio Bursts Based on Support Vector Machine Model**

Yimei Luo (School of Instrument Science and Engineering, Southeast University), Zhu Xuefen (School of Instrument Science and Engineering, Southeast University), Lin Mengying (School of Instrument Science and Engineering, Southeast University), Yang Fan (School of Instrument Science and Engineering, Southeast University)

**(11:50-12:10) Optimal placement of blade tip timing sensors considering multi-mode vibration using evolutionary algorithms**

Jinghui Xu (Xi'an Jiaotong University), Baijie Qiao (Xi'an Jiaotong University), Zhibo Yang (Xi'an Jiaotong University), Yuanchang Chen (University of Massachusetts Lowell), Xuefeng Chen (Xi'an Jiaotong University)

### Session 14: THz Testing and Intelligent Sensing & Others (14:00-15:00)

**Chairs: Liuyang Zhang(Xi'an Jiaotong University), Shuncong Zhong(Fuzhou University)**

**(14:00-14:20) Corrugated Metasurface Integrated Microchannel Terahertz Liquid Sensor**

Yi Huang (Fuzhou University), Shuncong Zhong (Fuzhou University)

**(14:20-14:40) Sensitive Detection of Trace Pesticide Residue Implemented by Terahertz All-Dielectric Metamaterial**

Cui Zijian (Key Laboratory of Ultrafast Photoelectric Technology and Terahertz Science in Shaanxi, Xi'an University of Technology), Yue Wang (Key Laboratory of Ultrafast Photoelectric Technology and Terahertz Science in Shaanxi, Xi'an University of Technology), Key Laboratory of Engineering Dielectrics and Its Application, Ministry of Education, Harbin University of Science and Technology, Xiaojun Zhang (Key Laboratory of Ultrafast Photoelectric Technology and Terahertz Science in Shaanxi, Xi'an University of Technology), Lisha Yue (Key Laboratory of Ultrafast Photoelectric Technology and Terahertz Science in Shaanxi, Xi'an University of Technology), Xinmei Wang (School of Automation and Information Engineering, Xi'an University of Technology), Chen Yang (School of Automation and Information Engineering, Xi'an University of Technology), Hui Hu (Key Laboratory of Ultrafast Photoelectric Technology and Terahertz Science in Shaanxi, Xi'an University of Technology), Kuang Zhang (Department of Microwave Engineering Harbin Institute of Technology)

**(14:40-15:00) Super-Resolution Imaging Using Very Deep Convolutional Network in Terahertz NDT Field**

Qiang Wang (Air Force Engineering University), Hongbin Zhou (Air Force Engineering University), Yi Wang (Air Force Engineering University), Ruicong Xia (Air Force Engineering University), Qiuhan Liu (Air Force Engineering University), Boyan Zhao (Air Force Engineering University)

### Venue 3: No. 10 Meeting Room

#### Session 15: NDT&E and Intelligent Monitoring (10:10–12:10)

**Chairs: Yuhua Cheng(University of Electronic Science and Technology of China), Liuyang Zhang(Xi'an Jiaotong University)**

##### (10:10-10:30) Eddy Current Thermography for the Detection of Conductive Defects in Composite Insulators

Yanxin Tu (Tsinghua Shenzhen International Graduate school), Chenjun Guo (Electric Power Research Institute of Yunnan Power Grid Co.), Hongwei Mei (Tsinghua Shenzhen International Graduate school), Lishuai Liu (Tsinghua Shenzhen International Graduate school), Chenglong Cong (Tsinghua Shenzhen International Graduate school), Liming Wang (Tsinghua Shenzhen International Graduate school)

##### (10:30-10:50) Model-Based Parameter Estimation Method for Terahertz Signals

Yafei Xu (Xi'an Jiaotong University), Liuyang Zhang (Xi'an Jiaotong University), Xuefeng chen (Xi'an Jiaotong University), Zhen Zhang (Xi'an Jiaotong University), Zhonglei Shen (Xi'an Jiaotong University), Donghai Han (Xi'an Jiaotong University)

##### (10:50-11:10) Battery state of health estimation with incremental capacity analysis technique

Yuanyuan Li (University of Electronic Science and Technology of China), Hanmin Sheng (University of Electronic Science and Technology of China), Yuhua Cheng (University of Electronic Science and Technology of China)

##### (11:10-11:30) Convolutional LSTM networks for vibration-based defect identification of the composite structure

Ruiheng Zhang (University of Electronic Science and Technology of China), Rui Li (Shanghai Space Propulsion Technology Research Institute), Libing Bai (University of Electronic Science Technology of China), Lulu Tian (University of Electronic Science Technology of China), Jie Zhang (University of Electronic Science Technology of China), Zhen Liu (University of Electronic Science and Technology of China)

##### (11:30-11:50) Study on the lowest spatial resolution of magnetic flux leakage testing for weld cracks

Chunrui Feng (University of Electronic Science Technology of China), Zhen Zhang (Shanghai Space Propulsion Technology Research Institute), Libing Bai (University of Electronic Science Technology of China), Lulu Tian (University of Electronic Science Technology of China), Jie Zhang (University of Electronic Science Technology of China), Yuhua Cheng (University of Electronic Science and Technology of China)

##### (11:50-12:10) Application of Tensor Decomposition Methods In Eddy Current Pulsed Thermography Sequences Processing

Yiping Liang (University of Electronic Science and Technology of China), libing Bai (University of Electronic Science and Technology of China), Jinliang Shao (University of Electronic Science and Technology of China), Yuhua Cheng (University of Electronic Science and Technology of China)

#### Session7: Intelligent sensing and data analytics for smart manufacturing & Others (14:00–15:40)

**Chairs: Yongbo Li(Northwestern Polytechnical University), Siliang Lu(Anhui University)**

##### (14:00-14:20) Generative Model Driven Sampling Strategy for High Efficient Measurement of Complex Surfaces on Coordinate Measuring Machines

Jieji Ren (Shanghai Jiaotong University), Mingjun Ren (Shanghai Jiaotong University), Lijian Sun (Zhejiang Lab)

##### (14:20-14:40) Architecture and Implementation of IoT Middleware for Ground Support Systems in Launch Site

Litian Xiao (Beijing Special Engineering Design and Research Institute), Nan Xiao (S China Aerospace Academy of System Science and Engineering), Mengyuan Li (Beijing Special Engineering Design and Research Institute), Shanshan Xie (Information Support Lab, Equipment Department, Aerospace System Ministry), Kewen Hou (Beijing Special Engineering Design and Research Institute), Yuliang Li (Beijing Special Engineering Design and Research Institute)

##### (14:40-15:00) Dual-lane Phononic Crystal for Low-frequency Elastic Wave Attenuation

Jiawen Xu (Southeast University), Ruqiang Yan (Xi'an Jiaotong University)

##### (15:00-15:20) Research Progress of Intelligent Lightning Protection Based on Internet of Things Technology

Qibin Zhou(Shanghai University), Feipeng Tang (Shanghai University), Xin Huang (Shanghai University), Hongxiang Yang (Shanghai University), Huahui Chen(Shanghai Meteorological Bureau)

##### (15:20-15:40) Parameter Study of the Variable Reluctance Energy Harvester for Smart Railway Axle Box Bearing

Yun Gong (Chongqing university), Sijia Wang (Chongqing university), Zhengqiu Xie (Chongqing university), Wenbin Huang (Chongqing university)

## Poster Presentations

**Venue: Main Hall Lobby**

**Time: 13:00-14:00, 17<sup>th</sup> October, 2020**

**Chairs: Datong Liu (Harbin Institute of Technology)**

**Yu Chen(Xi'an Jiaotong University)**

**P-01: Bimodal Anxiety State Assessment Based on Electromyography and Electroencephalogram**

Diancong Zhang (Qufu Normal University), Jiashuai Wang (Qufu Normal University), Jingyu Zhang (Qufu Normal University), Dianguo Cao (Qufu Normal University)

**P-02: Performance Degradation Prediction of Rolling Bearing based on KJADE and Holt-Winters**

Ran Wei (College of Electrical Engineering and Automation; Anhui University), Yawei Hu (Anhui University), Changbo He(Anhui University), Zheng Cao (Anhui University), Siliang Lu(Anhui University), Fang Liu(Anhui University), Yongbin Liu (Anhui University)

**P-03: Fault diagnosis of wind turbine bearing using variational nonlinear chirp mode decomposition and order analysis**

Zhichao Wu(Anhui University), Jiahao Niu (Anhui University), Siliang Lu (Southwest Jiaotong University), Fang Liu (Anhui University), Yongbin Liu (Anhui University)

**P-04: Compressed sensing-based blade tip-timing vibration reconstruction under variable speeds**

Hao Sheng (Hunan University of Technology), Zhongsheng chen (Hunan University of Technology), Yemei Xia (Hunan University of Technology), Weimin Wang (Beijing University of Chemical Technology)

**P-05: Online Intelligent Evaluation of Dispensing Quality Based on Entropy Weight Fuzzy Comprehensive Evaluation Method and Machine learning**

Liping ZHAO (Xi'an Jiaotong University), Xiangqian CHENG (Xi'an Jiaotong University), Yiyong YAO (Xi'an Jiaotong University)

**P-06: A Deep Reinforcement Learning Based Control Approach for suspension systems of Maglev Trains**

Sun Yougang (Tongji University), Xu Junqi (Tongji University), Chen Chen (Tongji University), Hu Wei (CRRC Zhuzhou locomotive Co., Ltd.,)

**P-07: Broadband Aperture Extension of a Passive Sonar Array Using Multi-Dimension Autoregression Model**

Yuning Qian (Nanjing Research Institute of Electronics Technology; Key Laboratory of IntelliSense Technology; CETC), Yawei Chen (Nanjing Research Institute of Electronics Technology; Key Laboratory of IntelliSense Technology; CETC), Xinrong Cao (Nanjing Research Institute of Electronics Technology; Key Laboratory of IntelliSense Technology; CETC), Jun Sun (Nanjing Research Institute of Electronics Technology; Key Laboratory of IntelliSense Technology; CETC)

**P-08: Improved rotating speed estimation and bearing fault diagnosis using multi-channel vibration signals**

Xiaoxian Wang (Southwest Jiaotong University), Jiahao Niu (Anhui University), Siliang Lu (Southwest Jiaotong University), Fang Liu (Anhui University), Yongbin Liu (Anhui University)

**P-09: Incremental learning of bearing fault diagnosis via style-based generative adversarial networks**

Yinjun Wang(Chongqing university), Liling Zeng (Chongqing university), Xiaoxi Ding (Chongqing university), Liming Wang (Chongqing university), Yimin Shao (Chongqing university)

**P-10: Recovery of Under-sampled Signal During High-speed Machining Condition Monitoring Using Approximate Sparsity in Frequency Domain**

yang li (Shool of Aerospace Engineering, Xiamen University), Binqiang Chen (XiaMen University), nianyin Zeng (XiaMen University)

**P-11: A novel weak fault diagnosis method based on sparse representation and empirical wavelet transform for rolling bearing**

Wei lu (Beijing University of Chemical Technology), Liuyang Song (Beijing University of Chemical Technology), Lingli Cui (Laboratory of Advanced Manufacturing Technology Beijing University of Technology), Huaqing Wang (Beijing University of Chemical Technology)

**P-12: A weak fault diagnosis method based on sparsity overlapping group lasso for rolling bearing**

Li Qiu (School of mechanical and electrical engineering Beijing University of Chemical Technology), Xiaoming Wang (School of mechanical and electrical engineering Beijing University of Chemical Technology), Zhengcai Guo (School of mechanical and electrical engineering Beijing University of Chemical Technology), Guoan Yang (School of mechanical and electrical engineering Beijing University of Chemical Technology)

**P-13: A Novel Fault Diagnosis Method for Planetary Gearboxes under Imbalanced Data**

Tianyu Gao (Harbin Institute of Technology), Jingli Yang(Harbin Institute of Technology), Shouda Jiang (Harbin Institute of Technology)

**P-14: An Impedance-based Structural Health Monitoring by Using Piezoelectric Transducers**

Jiawen Xu (Southeast University), Xin Zhang (Southeast University), Ruqiang Yan(Xi'an Jiaotong University)

**P-15: Tip timing based non-contact vibration measurement of aero-engine turbine blades**

Meiru Liu (Xi'an Jiaotong University), Weiqiang Gao (AECC Sichuan Gas Turbine Establishment), Xiao Xiao (AECC Sichuan Gas Turbine Establishment), Guangrong Teng (AECC Sichuan Gas Turbine Establishment), Chunyan Ao (Xi'an Jiaotong University), Baijie Qiao (Xi'an Jiaotong University)

**P-16: Distributed Space Remote Sensing and Multi-satellite Cooperative on-board Processing**

Yang LIU (Innovation Academy for Microsatellites, Chinese Academy of Sciences), Yuanyuan DAI (Innovation Academy for Microsatellites, Chinese Academy of Sciences), Guohua LIU (Harbin Institute of Technology), Jingli YANG (Innovation Academy for Microsatellites, Chinese Academy of Sciences), Longfei TIAN (Innovation Academy for Microsatellites, Chinese Academy of Sciences), Hua LI (Shanghai Jiaotong University)

**P-17: A method of antenna gain testing without standard gain antenna**

GAO Kuo (Innovation Academy for Microsatellites, Chinese Academy of Sciences), LIU HuiJie (Innovation Academy for Microsatellites, Chinese Academy of Sciences), LIU Lei (Innovation Academy for Microsatellites, Chinese Academy of Sciences), PAN XiaoTong (Innovation Academy for Microsatellites, Chinese Academy of Sciences), WANG Hao (Innovation Academy for Microsatellites, Chinese Academy of Sciences), LIU Yang (Innovation Academy for Microsatellites, Chinese Academy of Sciences)

**P-18: Design and Application on Complicated Power System Operation Cockpit Technologies**

Zhiyong Li (CSG Power Dispatching and Control Center), Chunxiao Liu (CSG Power Dispatching and Control Center)

**P-19: Study on Energy Harvesting of Open-close Current Transformer**

ChiTan(Xi'an Jiaotong University),YanzhenZhao(Xi'an Jiaotong University),ZijianTang(Xi'an Jiaotong University)

**P-20: Mining Association Rules of Distribution Network Equipment Based on Genetic Algorithm**

Wenxiong Mo (Guangzhou Power Supply Co., Ltd.), Zhong Xu (Guangdong Power Grid Co., Ltd Guangzhou power supply), Simin Luo (Guangdong Power Grid Co., Ltd Guangzhou power supply), Chao Chen (Xi'an Jiaotong University), Yiming Kong (Xi'an Jiaotong University), Xuanda Lai(Xi'an Jiaotong University)

**P-21: Automatic Detection of Transmission Line on UAV Inspection Images with the Statistics Approach in the DCT Domain**

Min Zhang (Northwest University), Khalid Abubakar(Xi'an Jiaotong University), Yifan Li (Xi'an Jiaotong University), Yu Chen (Xi'an Jiaotong University)

**P-22: Risk Grading of Distribution Network Equipment Group Based on Fuzzy Clustering Factor Analysis**

Hongbin Wang (Guangdong Power Grid Co.; Ltd;Guangzhou power supply), Le Luan (Guangzhou Power Supply Co.; Ltd.), Kai Zhou (Guangdong Power Grid Co., Ltd), Xuayan Chai (School of Electrical Engineering; Xi'an Jiaotong University; Shaanxi Key Laboratory of Smart Grid & the State Key Laboratory of Electrical Insulation and Power Equipment), Xue Li School of Electrical Engineering; Xi'an Jiaotong University; Shaanxi Key Laboratory of Smart Grid & the State Key Laboratory of Electrical Insulation and Power Equipment), Minghui Xie (School of Electrical Engineering; Xi'an Jiaotong University; Shaanxi Key Laboratory of Smart Grid & the State Key Laboratory of Electrical Insulation and Power Equipment)

**P-23: Temperature online monitoring system for aerospace manufacturing process based on gradient boosting decision tree (GBDT) algorithm**

Liliang Wang (Beihang University), Jiaqi Qu (Beihang University), Zheng Qian (Beihang University)

**P-24: A Temperature and Humidity Compensation Method for On-board NOx sensors with LSTM Network**

Anran Huang (Beihang University (Beijing University of Aeronautics and Astronautics)), Yingming Lyu (Beijing Machinery Industry Bureau), Xiangyang Zhao (Beihang University (Beijing University of Aeronautics and Astronautics)), Zicheng Guo (Beihang University (Beijing University of Aeronautics and Astronautics))

**P-25: A Three-Dimensional Metamaterial Resonator in Low Terahertz Frequency**

Shengnan Li(Xi'an Jiaotong University), Zhonglei Shen (Xi'an Jiaotong University), Donghai Han(Xi'an Jiaotong University), Liuyang Zhang (Xi'an Jiaotong University)

**P-26: Modified Generative Adversarial Network for Super-Resolution of Terahertz Image**

Zhen Zhang (Xi'an Jiaotong University), Liuyang Zhang (Xi'an Jiaotong University), Xuefeng Chen (Xi'an Jiaotong University), Yafei Xu (Xi'an Jiaotong University)

**P-27: A thermal-imaging-based method for 2D electric current distribution measurement**

Chao Ren (University of Electronic Science and Technology of China), Lijian Zhu (hanghai Space Propulsion Technology Research Institute), Libing Bai (University of Electronic Science and Technology of China), Lulu Tian (University of Electronic Science and Technology of China), Jie Zhang (University of Electronic Science and Technology of China), Zhen Liu (University of Electronic Science and Technology of China)

**P-28: CycleGANs for semi-supervised defects segmentation**

Libing Bai(University of Electronic Science Technology of China), Jiangshan Ai (University of Electronic Science Technology of China)

**P-29: BP-Neural-Network-Based Aging Degree Estimation of Power Transformer Using Acoustic Signal**

Yukun Zhang (Shaanxi Normal University), Jisheng Li (Shaanxi Normal University), Hanchao Liu (Shaanxi Normal University), Rong Liu (Shaanxi Normal University), Fan Yang (Shaanxi Normal

University), Ting Li (Shaanxi Normal University)

**P-30: The Control Method of Tying Shoelaces for Robotic Hand Based on Angular Velocity Sensor**

Li Zhigang(Southeast University), Cui Jianwei(Southeast University), Lu Pudong(Southeast University), Jiang Huice (Southeast University)

**P-31: Design and Performance Analysis of a Moveable Groove-tracking Milling Machine for Repairing Thread of Marine Steering**

Guiping Lu (Beijing Institute of technology, Zhuhai), Zhiyong Xiao (Beijing Institute of technology, Zhuhai), Zhensheng Zhong (Beijing Institute of technology, Zhuhai), Jiaran Liang (Beijing Institute of technology, Zhuhai), Zhili Xiang (Beijing Institute of technology, Zhuhai), Zhiyang Tang (Beijing Institute of technology, Zhuhai)

**P-32: Research on the Method of Rub-Impact Fault Recognition Based on the Conditional Generative Adversarial Nets**

Jing Li (Southeast University), Aidong Deng (Southeast University), Yong Yang (Southeast University), Jing Zhu (Southeast University), Minqiang Deng (Southeast University)

**P-33: Analysis of Real-time Noise Signal Characteristics of Power Transformer Based on All-phase Fast Fourier Transform**

Xiaojuan Zhao (State Grid Chongqing Electric Power Research Institute), Yaqi Zhou(State Grid Hubei Transmission and Transformation Engineering CO.LTD), Xue Wang (32620 Army), Ruilin Xu (State Grid Chongqing Electric Power Research Institute), Shihai Han (State Grid Chongqing Electric Power Research Institute), Xin Chen (State Grid Hubei Transmission and Transformation Engineering CO.LTD)