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華南理工大學  
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CHINA UNIVERSITY OF MINING AND TECHNOLOGY



江苏省仪器仪表学会  
Jiangsu Internet and Control Society

IEEE  
INSTRUMENTATION  
& MEASUREMENT  
SOCIETY

# 2nd International Conference on Sensing, Measurement & Data Analytics in the Era of Artificial Intelligence

## ICSMD 2021

### Program

October 21-23, 2021, Nanjing, China

Hosted by Southeast University



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## Greetings from General Chairs

It's our great pleasure to invite you to join us for the 2nd International Conference on Sensing, Measurement & Data Analytics in the era of Artificial Intelligence (ICSMD 2021), which will provide a dedicated forum for researchers, scientists, engineers and practitioners throughout the world to present their latest research findings in the area of sensing technology, measurement methodology, and data analytics approaches in the fast-changing era of artificial intelligence.

Organized by Southeast University, the ICSMD 2021 will be held in Nanjing, China on October 21st-23rd, 2021. It is co-hosted by Xi'an Jiaotong University, South China University of Technology, China University of Mining and Technology, and technically supported by the IEEE instrumentation and Measurement Society.

The ICSMD 2021 will be the 2<sup>nd</sup> edition of the conference based on the great success of ICSMD 2020 held in Xi'an, China in 2020. In the era of artificial intelligence, 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. On the forum of ICSMD 2021, researchers, academicians and scientists are inspired to explore deeper and strive further in the field of basic theory and technology of sensing and measurement as well as data analytics.

Nanjing, called Ning for short, is located in the Yangtze River Delta. With a history of over 6,000 years, Nanjing has become a famous historical and cultural city since it was established 2,500 years ago. Nanjing is a city full of vigor and opportunities. It is a window for you to get a glimpse of real China. Touring, studying and living here, you may find it changing and growing every day, you may find it a city with Chinese tradition as the background and full of many modern qualities, and you may feel the hospitality of the people here.

We are looking forward to meeting you in the very beautiful city of Nanjing, China, during October 21st-23rd, 2021. Definitely, ICSMD 2021 will provide you with a pleasant experience, new contacts and happy stay in Nanjing.



General Chairs of ICSMD 2021



## 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 Shanshui Grand Hotel Nanjing (1F). Service hours of registration desk are as below.

Thursday, October 21: 12:00 pm – 9:00 pm

Friday, October 22: 7:30 am – 6:00 pm

Saturday, October 23: 7:30 am – 12:30 pm

### Registration Fees

	Until September 10, 2021	After September 10, 2021
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, registration kit, and a digital copy of the Proceedings. Each full registration can cover one accepted paper, a paper fee of 1000 RMB applies to each additionally accepted paper. Student registration does not cover the paper publication fee in IEEE explore.





## Conference Overview

ICSMD2021 Program Schedule									
Time	21 Oct 2021	22 Oct 2021			23 Oct 2021				
07:30-08:00		Registration			Registration				
08:00-08:30									
08:30-08:50		Opening Ceremony			Oral (Huaxia Hall) SS4	Oral (Yinhu Hall) Biomedical Measurement	Oral (Hongbaoshi Hall) Measurement Theory, Methodology and System		
08:50-09:00		Group Photo							
09:00-09:45		Keynote Speech 1							
09:45-10:05		Refreshment Break (20 Mins)							
10:05-10:10		Keynote Speech 2			Refreshment Break (20 Mins)				
10:10-10:30					Oral (Huaxia Hall) SS1+SS6		Oral (Yinhu Hall) SS3		Oral (Hongbaoshi Hall) Sensor Modeling, Sensors and Sensor Network, Remote Sensing
10:30-10:50									
10:50-11:20		Invited Speech			Oral (Huaxia Hall) SS1+SS6	Oral (Yinhu Hall) SS3	Oral (Hongbaoshi Hall) Sensor Modeling, Sensors and Sensor Network, Remote Sensing		
11:20-11:30		Poster Presentation (Huaxia Hall)							
11:30-12:00									
12:00-12:30									
12:30-13:30	Registration	Buffet Lunch & Poster Presentation			Awards and Closing Ceremony				
13:30-14:00					Buffet Lunch				
		Oral (Huaxia Hall) SS2	Oral (Yinhu Hall) Data Processing	Oral (Hongbaoshi Hall) SS8					
14:00-15:40		Refreshment Break (20 Mins)							
15:40-16:00		Keynote Speech 3 (Online)							
16:00-16:50		Oral (Huaxia Hall) AI Application in Engineering	Oral (Yinhu Hall) SS5	Oral (Hongbaoshi Hall) SS7					
16:50-18:30	Registration & Buffet Dinner Registration	Break (30 Mins)							
18:30-19:00		Banquet							
19:00-20:00									
20:00-21:00									





## Conference Venue

ICSMD 2021 will be held in Nanjing Shanshui Grand Hotel. Designed and constructed according to international Four-star standard, Nanjing Shanshui Grand Hotel is a theme hotel famous for the Stone Culture, and recognized by many enterprises and institutions for its service quality.

### Location

#### Conference Venue:

Nanjing Shanshui Grand Hotel (南京山水大酒店)

Address: No. 118, Longpan Middle Road, Xuanwu District, Nanjing, Jiangsu, China

Tel.: (025) 84898822/ 84811888

### Access to the Venue

#### 1. From Nanjing Lukou International Airport (about 40 KM)

(1) Bus: take Airport Shuttle Bus No. 1 from T2 Station to Xihuamen Station, walk for 910 meters to the hotel.

(2) Taxi: about 35 mins, 130 Yuan in RMB (For reference only)

#### 2. From Nanjing South Railway Station (about 10 KM)

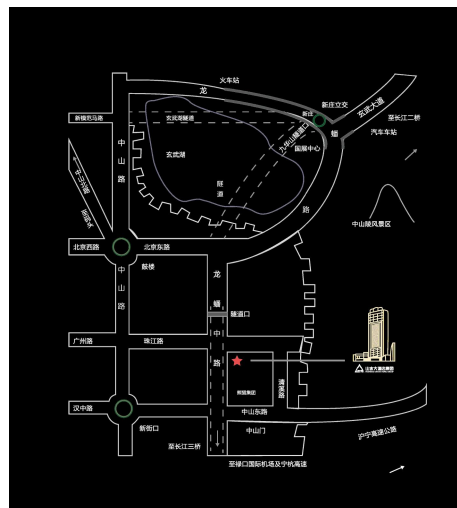
(1) Metro: take Metro Line 3 to Daxinggong Station, Transfer to Line 2 and get off from Xianmen Station from Exit 2, and then walk for 550 meters to the hotel.

(2) Taxi: about 20 mins, 35 Yuan in RMB (For reference only)

#### 3. From Nanjing Railway Station (about 8 KM)

(1) Metro: take Metro Line 3 to Daxinggong Station, Transfer to Line 2 and get off from Xianmen Station from Exit 2, and then walk for 550 meters to the hotel.

(2) Taxi: about 17 mins, 25 Yuan in RMB (For reference only)



### Conference Halls

Friday, October 22

Venue 1: Huaxia Hall (3F)

Venue 2: Yinhu Hall (3F)

Venue 3: Hongbaoshi Hall (2F)

Saturday, October 23

Venue 1: Huaxia Hall (3F)

Venue 2: Yinhu Hall (3F)

Venue 3: Hongbaoshi Hall (2F)



## Organization Committee

### Advisory Committee:

Prof. Robert X. Gao	Case Western Reserve University, USA
Prof. Salvatore Baglio	University of Catania, Italy
Prof. Asoke Nandi	Brunel University London, UK
Dr. George Xiao	National Research Council, Canada

### General Chairs:

Prof. Aiguo Song	Southeast University, China
Prof. Hui Ding	Southeast University, China

### Technical Program Chair:

Prof. Ruqiang Yan	Xi'an Jiaotong University, China
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### Technical Program Co-Chairs:

Prof. Chengyu Liu	Southeast University, China
Prof. Weihua Li	South China University of Technology, China
Prof. Gongbo Zhou	China University of Mining and Technology, China

### Special Session Co-Chairs:

Prof. Liuyang Zhang	Xi'an Jiaotong University, China
Prof. Zhi Tao	Soochow University, China
Assoc Prof. Jinxing Liang	Southeast University, China

### Local Committee Chairs:

Prof. Chengyu Liu	Southeast University, China
Prof. Xiyuan Chen	Southeast University, China

### Local Committee Members:

Prof. Liye Zhao	Southeast University, China
Assoc Prof. Xuefen Zhu	Southeast University, China
Assoc Prof. Jianwei Cui	Southeast University, China

### Publication Chairs:

Assoc Prof. Jiawen Xu	Southeast University, China
Assoc Prof. Shibing Wang	Xi'an Jiaotong University, China

### Foreign Contact Chair:

Assoc Prof. Hong Zeng	Southeast University, China
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### Domestic Contact Chair:

Assoc Prof. Chenxi Yang	Southeast University, China
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### Publicity Chair:

Prof. Shuguo Pan	Southeast University, China
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### Local Arrangement Chair:

Mr. Xiangyang Guo	Southeast University, China
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## Keynote Speeches

### Agents, IoT, Big Data, and Smart Systems

Professor Weiming Shen  
Huazhong University of Science and Technology, China

#### Abstract

Originated from distributed artificial intelligence, agents represent an exciting and promising approach to building a wide range of distributed software applications. The Internet of Things (IoT) refers to uniquely identifiable objects as well as their virtual representations in an Internet-like structure. It is related to a number of disciplines and technologies that enable the Internet to reach out into the real world of physical objects and their environments. It has been hailed as the most potentially disruptive technological revolution of our lifetime after the Web and mobile accessibility. It becomes even more promising with smart applications like smart cities, smart Grid, smart factories, smart buildings, smart homes, and smart cars. On the other hand, Big Data is a broad term for data sets so large or complex that traditional data processing technologies are inadequate. It has been considered as a technology and become a very active research area primarily involving topics related to machine learning, database, and distributed computing. Recent developments and fast advancements of Cloud/Fog/Edge Computing, Internet of Things, Cyber-Physical Systems, and Big Data provide new opportunities for applications of intelligent software agents, but also bring a lot of new research challenges. Based on 29 years of first-hand research experience on agents, Internet of Things (IoT), Big Data, and their industrial applications, this talk will provide an overview of agents, IoT and Big Data, including state-of-the-art and future trends, with a focus on how agents, IoT and Big Data are linked with and applied in various industrial domains and societies.

#### Biographical Sketch



Dr. Weiming Shen is a Professor at Huazhong University of Science and Technology (HUST), China. Prior to joining HUST, he worked for 20 years at National Research Council Canada as Research Officer, Senior Research Officer, and Principal Research Officer. He is a Fellow of Canadian Academy of Engineering, Fellow of IEEE, Fellow of Engineering Institute of Canada (EIC). He is an internationally-recognized expert on Agent-Based Collaborative Technologies and Applications. During the past three decades, he has been leading a number of major projects on Agents, IoT, and Big Data with smart applications. He has published several books and over 500 papers in scientific journals and international conferences in the related areas. His work has been cited over 15,000 times with an h-index of 59. He is the Co-Editor-in-Chief of IET Collaborative Intelligent Manufacturing, an Associate Editor or Editorial Board Member of over ten international journals (including IEEE Transactions on Automation Science and Engineering; IEEE Transaction on SMC: Systems; IEEE SMC Magazine; Advanced Engineering Informatics; Computational Intelligence; Intelligent Buildings International; Service Computing and Applications) and served as guest editor for several other international journals. He is the Co-Chair of the IEEE Technical Committee on Computer Supported Cooperative Work in Design, has been Program Committee Co-Chair of the CSCWD conferences since 2001, and served as General Chair/Co-Chair or Program Committee Chair/Co-Chair for over 30 international conferences.



## **Wearable and Implantable Bioelectronic Devices to Diagnosis and Treat Vital Functions**

Professor Mohamad Sawan  
Westlake University, China

### **Abstract**

Healthcare conditions such as the COVID-19 pandemic issues are calling upon worldwide authorities not only to find solutions but to improve detection mechanisms ahead of time before any new diseases can emerge. The corresponding various diseases are refractory to conventional solutions such as drugs and/or surgical treatment. Smart medical devices intended for the diagnostic, treatment and prediction of neurodegenerative diseases are becoming most effective way to bring solution to such complex diseases. It is then a multidisciplinary race to bring breakthroughs in mimicking brain when designing learning algorithms and corresponding hardware implementation. In particular, regular machine learning and advanced deep learning are occupying large parts of emerging healthcare chipsets. The later are intended to run either wearable or implantable medical devices intended for the diagnostic, treatment and prediction of neurodegenerative diseases. This talk covers artificial intelligence algorithms, circuits and systems intended to implement brain-microsystem interfaces dealing with multidimensional design challenges such as power management, low-power high-data rate wireless communication, and reliable harvesting energy methods. Application-specific system architectures will be demonstrated. Case studies include neurorecording intended for learning about the intracortical vision mechanism, and for spike onset detection of epileptic seizure for foci localization, cortical microstimulation for seizure abortion, and prediction to inform patient about the emergence of epileptic seizures.

### **Biographical Sketch**



Mohamad Sawan is Chair Professor in Westlake University, Hangzhou, China, and Emeritus Professor in Polytechnique Montreal, Canada. He is founder and director of the Cutting-Edge Net of Biomedical Research and INnovation (CenBRAIN) in Westlake University, Hangzhou, China. He received the Ph.D. degree from University of Sherbrooke, Canada. He is Co-Founder, Associate Editor and was Editor-in-Chief of the IEEE Transactions on Biomedical Circuits and Systems (2016-2019). He is founder of the Polystim Neurotech Laboratory, and Co-founder of the International IEEE-NEWCAS and the International IEEE-BioCAS Conference. He was General Chair of both the 2016 IEEE International Symposium on Circuits and Systems, and the 2020 IEEE International Medicine, Biology and Engineering Conference (EMBC). He was awarded the Canada Research Chair in Smart Medical Devices (2001-2015), and was leading the Microsystems Strategic Alliance of Quebec, Canada (1999-2018). Dr. Sawan published more than 900 peer reviewed papers, two books, 13 book chapters, and 12 patents and 15 other patents are pending. He received several awards, among them the Zhejiang Westlake Friendship Award, the Qianjiang Friendship Ambassador Award, the Shanghai International Collaboration Award, the Queen Elizabeth II Golden Jubilee Medal, and the Medal of Merit from the President of Lebanon. Dr. Sawan is Fellow of the IEEE, Fellow of the Canadian Academy of Engineering, Fellow of the Engineering Institutes of Canada, and “Officer” of the National Order of Quebec.

## **Multiphase Flow Metering and Combustion Process Monitoring through Data Driven Modelling**

Professor Yong Yan  
University of Kent, United Kingdom

### **Abstract**

Over the past ten years various machine learning techniques have been incorporated in a range of measurement systems for multiphase flow metering and combustion process monitoring. Such techniques in conjunction with low-cost sensors and sensor arrays provide either unique solutions to some measurement challenges or offer more cost-effective or complementary options to other possible methods. The established or potential applications of machine learning in measurement and instrumentation appear wide ranging, but the underlining principle, advantages and limitations are very similar. This presentation will review recent advances in the applications of data driven modelling techniques to the measurement of gas-liquid, gas-solids and liquid-solids mixture flows and the advanced monitoring of combustion processes. These include the mass flowrate measurement of air-oil two-phase flow, carbon dioxide two-phase flow, slurry flow and pneumatically conveyed pulverized fuel in a range of industrial sectors. Meanwhile, systems that incorporate machine learning algorithms for the on-line continuous identification of pulverized fuel, burner condition monitoring, and combustion plant optimization will be introduced. Results from recent experimental programmes and trials on industrial-scale test plants will be reported.

### **Biographical Sketch**



Yong Yan is a Professor of Electronic Instrumentation and Director of Innovation at the School of Engineering, University of Kent, U.K. He received the B.Eng. and M.Sc. degrees in instrumentation and control engineering from Tsinghua University, China in 1985 and 1988, respectively, and the Ph.D. degree in flow measurement from University of Teesside, U.K., in 1992. His research interests include sensors, instrumentation, measurement and condition monitoring. He has published over 480 papers in journals and conference proceedings with an h-index of 45 and 8000 citations. In recognition of his contributions to particle flow metering and burner flame imaging, he was named an IEEE Fellow in 2011 and elected as a Fellow of the Royal Academy of Engineering in 2020. He was awarded the gold medal in 2020 by IEEE Transactions on Instrumentation and Measurement as the most published author of all time from the U.K. He is a Distinguished Lecturer appointed by the IEEE Instrumentation and Measurement Society from 2012-2018 and from 2021-2024.





## Invited Speech

### Study on the Motion Control of SMA-Based Soft Actuator

Professor Shiwu Zhang

University of Science and Technology of China, China

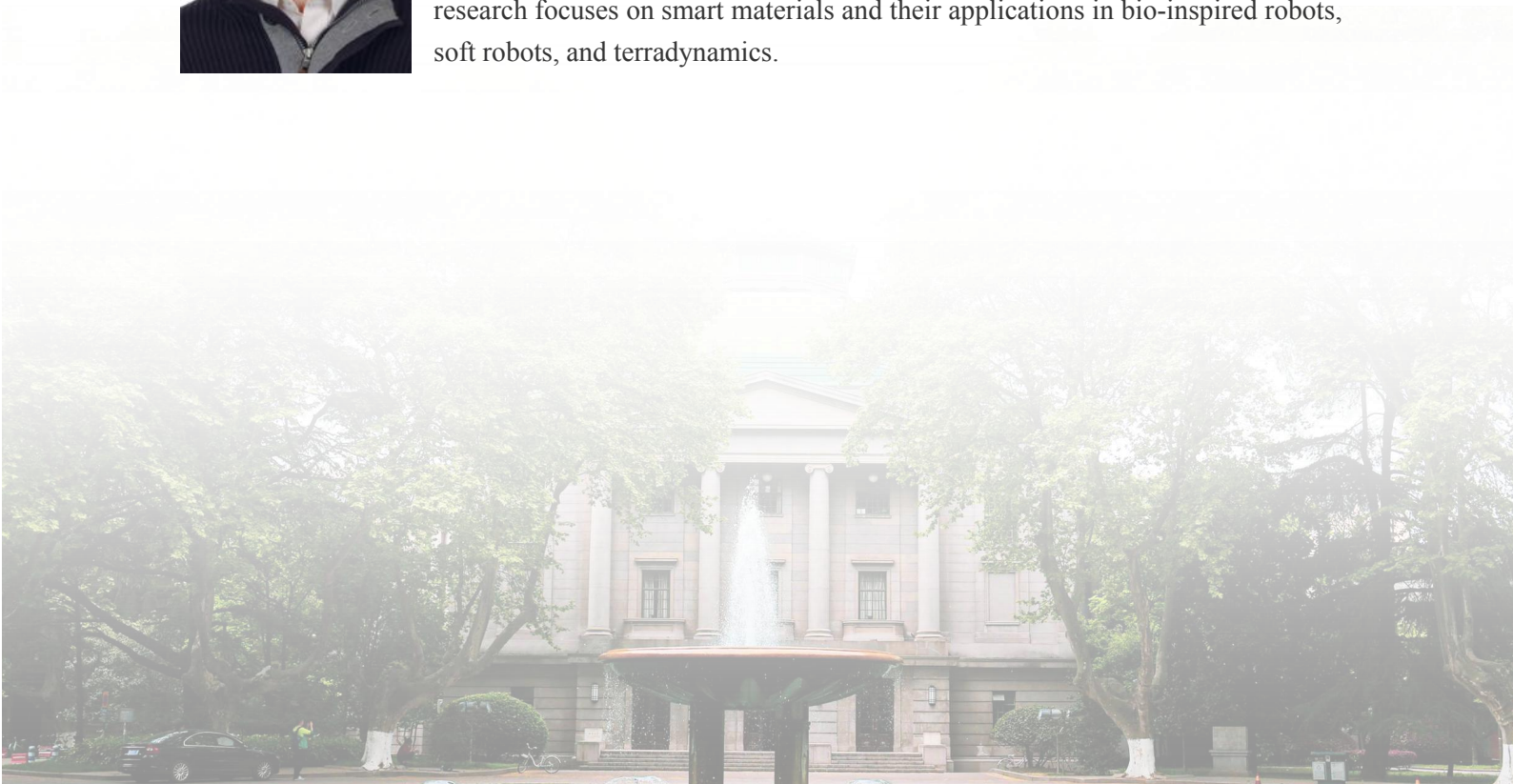
#### Abstract

Owing to their high power-to-weight ratio, large strain, and considerable large output force, shape memory alloys (SMAs) have great potential in the development of muscle-like compact soft actuators. This allows SMA-actuated soft robots assembled using multiple SMA actuators to perform dexterous manipulations and fulfil diverse locomotion task. Because of the complexity of the phase transformation of the SMA, the control of SMA-composite actuators is mainly fulfilled using a state transformation control between their initial actuating states, and maximum actuating states. The lack of control for the intermediate actuating states of the SPAs limits the controllability and capabilities of SMA-actuated soft robots. In this talk, a model-based feedback controller considering the constraints of the strain of the SMA, temperature increment of the actuator, and load increment will be introduced. This controller allows for feats such as step response, position tracking with constant angular speed, and motion control with and without load. Based on the motion control of the SMA composite actuators, a series of soft robots were developed, such as dexterous hand, soft gripper, and soft arm. In this talk, our study on the liquid metal actuating will also be introduced.

#### Biographical Sketch



Shiwu Zhang is currently a professor in the Department of Precision Machinery and Precision Instrumentation, University of Science and Technology of China (USTC). He received the BS degree (1997) in mechanical and electrical engineering from USTC, and the PhD degree (2003) in precision instrumentation and precision machinery from USTC, Hefei, China. He is the named author of over 100 papers in different journals and conferences. His research focuses on smart materials and their applications in bio-inspired robots, soft robots, and terradynamics.





## Social Events

### Opening Ceremony

<b>Date &amp; Time</b>	<b>08:30 – 8:50, October 22 (Friday)</b>
<b>Location</b>	Huaxia Hall, Shanshui Grand Hotel (3F)
<b>Chaired by</b>	Prof. Chengyu Liu, Southeast University, China
<b>Welcome Remarks 1</b>	Prof. Hui Ding, Southeast University, China
<b>Welcome Remarks 2</b>	Prof. Aiguo Song, Southeast University, China
<b>Welcome Remarks 3</b>	Prof. Ruqiang Yan, Xi'an Jiaotong University, China

### Banquet

<b>Date &amp; Time</b>	<b>19:00 – 21:00, October 22 (Friday)</b>
<b>Location</b>	Lanbaoshi Hall, Shanshui Grand Hotel (2F)

### Closing Ceremony

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

<b>Date &amp; Time</b>	<b>12:00 – 12:30, October 23 (Saturday)</b>
<b>Location</b>	Hongbaoshi Hall, Shanshui Grand Hotel (2F)

### Meals and Tea Break

All meals and tea breaks are included with your registration fee.



## Oral Presentations

### Friday, October 22, 2021

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

**Agents, IoT, Big Data, and Smart Systems**

**Speaker: Professor Weiming Shen**

Huazhong University of Science and Technology, China

*Chaired by: Prof. Gongbo Zhou China University of Mining and Technology, China*

#### Keynote Speech 2 (10:05-10:50)

**Wearable and Implantable Bioelectronic Devices to Diagnosis and Treat Vital Functions**

**Speaker: Professor Mohamad Sawan**

Westlake University, China

*Chaired by: Prof. Weihua Li South China University of Technology, China*

#### Keynote Speech 3 (16:00-16:50)

**Multiphase Flow Metering and Combustion Process Monitoring through Data Driven Modelling**

**Speaker: Professor Yong Yan**

University of Kent, United Kingdom

*Chaired by: Prof. Ruqiang Yan Xi'an Jiaotong University, China*

#### Invited Speech (10:50-11:20)

**Study on the Motion Control of SMA-based Soft Actuator**

**Speaker: Professor Shiwu Zhang**

University of Science and Technology of China, China

*Chaired by: Prof. Xiyuan Chen Southeast University, China*

### Venue 1: Huaxia Hall

#### Special Session 2: NDT&E and Intelligent Inspection System (14:00-15:40)

**Chair: Liuyang Zhang (Xi'an Jiaotong University)**

**(14:00-14:20) Highly-Efficient Damage Location for Freeform Structures Based on Flexible Piezoelectric Transducers**

Xiangdong Fang (Xi'an Jiaotong University), Wenkang Li (Xi'an Jiaotong University), Xuefeng Chen (Xi'an Jiaotong University), Liuyang Zhang (Xi'an Jiaotong University)

**(14:20-14:40) Real-time Minor Defect Recognition of Pseudo-Terahertz Images via the Improved YOLO Network**

Xingyu Wang (Xi'an Jiaotong University), Zhen Zhang (Xi'an Jiaotong University), Yafei Xu (Xi'an Jiaotong University), Liuyang Zhang (Xi'an Jiaotong University), Ruqiang Yan (Xi'an Jiaotong University), Xuefeng Chen (Xi'an Jiaotong University)



**(14:40-15:00) Feature Wavelength Selection in Near-Infrared Spectroscopy Based on Genetic Algorithm**

Fan Fan (Soochow University), Changwei Zhou (Soochow University), Xiaojun Zhang (Soochow University), Di Wu (Soochow University), Zhi Tao (Soochow University), Yishen Xu (Soochow University)

**(15:00-15:20) Fault Detection Based on Improved Cross-Correlation Order Spectrum of Sun Gear Instantaneous Angular Speed Signal**

Jianxiang Hua (Kunming University of Science Technology), Yu Guo (Kunming University of Science Technology)

**(15:20-15:40) Domain Adaptive Sparse Transformer for Aeroengine Bevel Gear Fault Diagnosis**

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

**Regular Session: AI Application in Engineering (16:50-18:30)**

**Chairs:** Juan Xu (Hefei University of Technology), Liuyang Song (Beijing University of Chemical Technology)

**(16:50-17:10) Robust Supervised Contrastive Learning for Fault Diagnosis Under Different Noises and Conditions**

Chenye Hu (Xi'an Jiaotong University), Jingyao Wu (Xi'an Jiaotong University), Chuang Sun (Xi'an Jiaotong University), Ruqiang Yan (Xi'an Jiaotong University), Xuefeng Chen (Xi'an Jiaotong University)

**(17:10-17:30) Denoising Fused Wavelets Net for Aeroengine Bevel Gear Fault Diagnosis**

Zuogang Shang (Xi'an Jiaotong University), Zhibin Zhao (Xi'an Jiaotong University), Zheng Zhou (Xi'an Jiaotong University), Chuang Sun (Xi'an Jiaotong University), Yu Sun (Xi'an Jiaotong University), Ruqiang Yan (Xi'an Jiaotong University)

**(17:30-17:50) Generative Zero-shot Learning Compound Fault Diagnosis of Bearing**

Juan Xu (Hefei University of Technology), Kang Li (Hefei University of Technology)

**(17:50-18:10) Multi-task Learning Based Classified-assisted Prediction Network for Useful Life Prediction**

Tianjiao Lin (Beijing University of Chemical Technology), Huaqing Wang (Beijing University of Chemical Technology), Liuyang Song (Beijing University of Chemical Technology), Bo Ma (Beijing University of Chemical Technology), Zuoyi Dong (Sinochem Fertilizer Co., Ltd)

**(18:10-18:30) Multisource Domain Transfer Learning for Bearing Fault Diagnosis**

Yu Xia (Soochow University), Changqing Shen (Soochow University), Zaigang Chen (Southwest Jiaotong University), Lin Kong (Chang Guang Satellite Technology Co., Ltd), Weiguo Huang (Soochow University), Zhongkui Zhu (Soochow University)





## Venue 2: Yinhu Hall

### Regular Session: Data Processing (14:00-15:40)

**Chairs:** Qiang Miao (Sichuan University), Datong Liu (Harbin Institute of Technology)

#### (14:00-14:20) A Fault Detection Method Based on Enhanced GRU

Bo Chen (Harbin Institute of Technology), Yu Peng (Harbin Institute of Technology), Binbin Gu (Beijing Institute of Electronic System Engineering), Yue Luo (Beijing Institute of Electronic System Engineering), Datong Liu (Harbin Institute of Technology)

#### (14:20-14:40) Analytical Model Based Fault Diagnosis Methods of Complex System: A Review

Zhiwei Zeng (Sichuan University), Heng Zhang (Sichuan University), Qiang Miao (Sichuan University)

#### (14:40-15:00) An Efficient Embedded Processing System for Remote Sensing Image Compression based on Heterogeneous Programmable MPSoC

Bowen Yao (Harbin Institute of Technology), Shengjian Liu (Harbin Institute of Technology), Yu Peng (Harbin Institute of Technology), Liansheng Liu (Harbin Institute of Technology), Xiyuan Peng (Harbin Institute of Technology)

#### (15:00-15:20) Support Vector Classifier Trained by Gradient Descent

Fengyu Gao (Fujian Polytechnic Normal University)

#### (15:20-15:40) Few Shot Learning for Novel Fault Diagnosis with an Improved Prototypical Network

Yibin Chen (Shenzhen University; Dongguan University of Technology), Ying Hong (Dongguan University of Technology), Jianyu Long (Dongguan University of Technology), Zhe Yang (Dongguan University of Technology), Yunwei Huang (Dongguan University of Technology), Chuan Li (Dongguan University of Technology)

### Special Session 5: Advanced Control, Navigation and Signal Processing Methods for Multiple Autonomous Unmanned Systems (16:50-18:30)

**Chairs:** Haoqian Huang (Hohai University), Yuan Yang (Southeast University)

#### (16:50-17:10) Brief Review of GNSS Spoofing and Anti-Spoofing Technology

Teng Hua (Southeast University), Xinhua Tang (Southeast University), Xuefen Zhu (Southeast University), Gangyi Tu (Nanjing University of Information Science and Technology), Xiyuan Chen (Southeast University)

#### (17:10-17:30) Vector-tracking-based GNSS/INS Deep Coupling and Experiment Platform for Urban Scenarios

Zhe Yan (Southeast University; University of Helsinki), Laura Ruotsalainen (University of Helsinki), Ning Gao (Southeast University), Xiyuan Chen (Southeast University)

#### (17:30-17:50) An Improved Initial Alignment Method Using Kalman Filtering of the Vectorized K-Matrix

Haoqian Huang (Hohai University), Jiaying Wei (Hohai University), Chao Jin (Hohai University), Jiacheng Tang (Hohai University)

#### (17:50-18:10) Magnetometer Error Compensation Algorithm Based on Immune Adaptation Particle Swarm Optimization Algorithm



Haoqian Huang (Hohai University), Peng Wang (Hohai University), Hanyi Shen (Hohai University)  
**(18:10-18:30) An Improved Retinex Algorithm for Underwater Image Enhancement Based on HSV Model**

Haoqian Huang (Hohai University), Yuanfeng Jin (Hohai University), Guanghui Li (Hohai University)

### Venue 3: Hongbaoshi Hall

#### Special Session 8: Machine Learning for Industrial Internet of Things (IIoT) (14:00-15:40)

**Chairs: Yanbing Yang (Sichuan University), Chaoyang Jiang (Beijing Institute of Technology)**

#### **(14:00-14:20) Multi-Feature Fused Bidirectional Long Short-Term Memory for Remaining Useful Life Prediction**

Ruibing Jin (Institute for Infocomm Research (I2R) A\*STAR), Zhenghua Chen (Institute for Infocomm Research (I2R) A\*STAR), Keyu Wu (Institute for Infocomm Research (I2R) A\*STAR), Min Wu (Institute for Infocomm Research (I2R) A\*STAR), Xiaoli Li (Institute for Infocomm Research (I2R) A\*STAR), Ruqiang Yan (Xi'an Jiaotong University)

#### **(14:20-14:40) Federated Learning for Bearing Fault Diagnosis with Dynamic Weighted Averaging**

Junbin Chen (South China University of Technology), Jipu Li (South China University of Technology), Ruyi Huang (South China University of Technology), Ke Yue (South China University of Technology), Zhuyun Chen (South China University of Technology), Weihua Li (South China University of Technology)

#### **(14:40-15:00) An Outlier-Robust GNSS-inertial-LiDAR Localization System**

Siwei Zhong (Beijing Institute of Technology), Chao Wei (Beijing Institute of Technology), Jibin Hu (Beijing Institute of Technology), Ting Zhang (Beijing Institute of Technology), Jie Yu (Beijing Institute of Technology), Yongdan Chen (China North Vehicle Research Institute)

#### **(15:00-15:20) A Method for Constructing Indoor Navigation Networks based on IMU**

Yujin Kuang (Southeast University), Yuan Yang (Southeast University), Yucheng Yao (Southeast University), Hang Lu (Southeast University), Haoran Yang (Southeast University), Xiaoguo Zhang (Southeast University)

#### **(15:20-15:40) A General Model for Dimmable Optical Camera Communication**

Qiuyu Wang (Sichuan University), Pinpin Zhang (Sichuan University), Yimao Sun (Sichuan University), Yanbing Yang (Sichuan University)

#### Special Session 7: Data-driven Engineering Practices in The Fields of Energy, Environment, and Biomedicine (16:50-18:30)

**Chairs: Hui Xiao (Tongji University), Xuefeng Li (Tongji University)**

#### **(16:50-17:10) A State Estimation Method for Nonlinear Systems Based on Uncertainty Fusion**

Yuhang Du (Harbin Institute of Technology), Yuchen Song (Harbin Institute of Technology), Datong Liu (Harbin Institute of Technology)

#### **(17:10-17:30) Method for Denoising Hyperspectral Images Based on Low Rank Theory-Sparse Representation**

Maocang Tian (Tongji University), Hanwei Liu (Tongji University), Zheng Ruan (Tongji University)



University), Qingfang Li (Sichuan Agricultural University), Xuefeng Li (Tongji University), Hui Xiao (Tongji University)

**(17:30-17:50) Design of Quartz Tuning Fork Sensor for Environmental Temperature Control**

Tianqi Zhao (Xidian University), Meng Zhao (Xidian University), Yinyu Yao (Xidian University), Jing Ji (Xidian University)

**(17:50-18:10) A Surface Roughness Measurement Method Based on Color Image Euclidean Distance**

Xinjia Zhao (Xidian University), Meng Zhao (Xidian University), Jing Ji (Xidian University), Xiangdong Xue (Xidian University), Huaian Yi (Guilin University of Technology)

**(18:10-18:30) A Novel Hybrid Models Based on Gaussian Process Regression for Short-Term Wind Power Forecasting**

Qingcheng Lin (Tongji University), Xuhai Chen (Tongji University), Hanwei Liu (Tongji University), Guangyu Liu (Harbin Engineering University), Xuefeng Li (Tongji University), Hui Xiao (Tongji University)

## Saturday, October 23, 2021

### Venue 1: Huaxia Hall

**Special Session 4: Weak Signal Processing and Incipient Fault Detection (8:30-10:10)**

**Chairs: Yi Qin (Chongqing University), Yi Wang (Chongqing University)**

**(8:30-8:50) An Enhanced Intelligent Fault Diagnosis Method to Combat Label Noise**

Hulin Ruan (Chongqing University), Yi Wang (Chongqing University), Yi Qin (Chongqing University), Baoping Tang (Chongqing University)

**(8:50-9:10) An Improved Symplectic Geometry Mode Decomposition Method for Rolling Bearing Fault Diagnosis under Variable Speed Conditions**

Guangyao Zhang (Chongqing University), Yi Wang (Chongqing University), Yi Qin (Chongqing University), Baoping Tang (Chongqing University)

**(9:10-9:30) Multi-Scale Mode Denoising (MSMD) Method for Weak Gear Fault Feature Extraction**

Dongchun Guo (Chongqing University), Hao Xiang (Chongqing University), Liling Zeng (Chongqing University), Minmin Xu (Chongqing University), Xiaoxi Ding (Chongqing University), Yimin Shao (Chongqing University)

**(9:30-9:50) Enhanced Sparse Regularization Approach for Gearbox Compound Fault Diagnosis**

Yi Liao (Soochow University), Weiguo Huang (Soochow University), Zhongkui Zhu (Soochow University), Jun Wang (Soochow University)

**(9:50-10:10) Weighted Basis Pursuit Denoising Algorithm and Its Application in Gear Fault Diagnosis**

Jiangnan Zhou (Xi'an Jiaotong University), Shibin Wang (Xi'an Jiaotong University), Chaowei Tong (Xi'an Jiaotong University), Zhibin Zhao (Xi'an Jiaotong University), Xuefeng Chen (Xi'an Jiaotong University)

### **Special Session 1: Intelligent Condition Monitoring, System Control & Data analytics for Linear Drives and MAGLEV Systems**

### **& Special Session 6: Intelligent Process Monitoring and Optimization for Advanced Manufacturing Systems (10:30-11:50)**

**Chairs:** Yougang Sun (Tongji University), Siliang Lu (Anhui University)

#### **(10:30-10:50) Vertical Vehicle Bridge Coupling Dynamic Response Analysis of Medium and Low Speed Maglev Train Based on Flexible Beam**

Chen Chen (The Key Laboratory of Road and Traffic Engineering Ministry of Education), Guobin Lin (Tongji University), Junqi Xu (Tongji University), Yougang Sun (Tongji University)

#### **(10:50-11:10) Active Disturbance Rejection Position Control of Permanent Magnet Linear Synchronous Motors Using Feedback Nonlinear State Error**

Yang Xiao (Shenzhen University), Sudan Huang (Shenzhen University), Guangzhong Cao (Shenzhen University), Huaizhi Wang (Shenzhen University), Junqi Xu (Tongji University)

#### **(11:10-11:30) Laser Induced Graphene in Situ Monitoring by CDBN**

Zhe Zhao (Wuhan University), Feilong Jiang (Wuhan University), Zheng Huang (Wuhan University), Haidong Shao (Hunan University), Yaowu Hu (Wuhan University), Min Xia (Lancaster University)

#### **(11:30-11:50) Dynamic Modeling of Gearbox Based on Virtual-physical Interaction**

Jingyan Xia (South China University of Technology), Ruyi Huang (South China University of Technology), Yixiao Liao (South China University of Technology), Zhuyun Chen (South China University of Technology), Weihua Li (South China University of Technology)

## **Venue 2: Yinhu Hall**

### **Regular Session: Biomedical Measurement (8:30-10:10)**

**Chair:** Zhi Tao (Soochow University), Lingfei Mo (Southeast University)

#### **(8:30-8:50) Non-Contact Capacitive ECG Signal Acquisition Using an Electrode Array**

Zhijun Xiao (Southeast University), Yantao Xing (Southeast University), Yumin Li (Southeast University), Chenxi Yang (Southeast University), Jianqing Li (Southeast University), Chengyu Liu (Southeast University)

#### **(8:50-9:10) Pathological Voice Detection Using Transfer Learning Methods**

Yihua Zhang (Soochow University), Xincheng Zhu (Soochow University), Yuanbo Wu (Soochow University), Xiaojun Zhang (Soochow University), Yishen Xu (Soochow University), Zhi Tao (Soochow University)

#### **(9:10-9:30) Pathological Voice Feature Generation Using Generative Adversarial Network**

Jinyang Qian (Soochow University), Denghuang Zhao (Soochow University), Ziqi Fan (Soochow University), Di Wu (Soochow University), Yishen Xu (Soochow University), Zhi Tao (Soochow University)

#### **(9:30-9:50) Research on Feature Selection of Human Physical Activity Recognition for IOT Wearable Devices**

Hongjie Yu (Southeast University), Lingfei Mo (Southeast University)

#### **(9:50-10:10) The Effects of Indoor Light Environment on Mood and Alertness through**



**Physiological Measurements**

Huiling Cai (Tongji University), Qingcheng Lin (Tongji University), Hanwei Liu (Tongji University), Shiqi Yu (Tongji University), Xuefeng Li (Tongji University), Hui Xiao (Tongji University)

**Special Session 3: Advanced Sensing, Monitoring and Diagnosis in Smart Grid (10:30-11:50)**

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

**(10:30-10:50) Fault Diagnosis of Inter-turn Short Circuit in Rotor Winding of Doubly-fed Generator Based on Data Fusion of Multi-flux Sensors**

Feng Liang (Xi'an Jiaotong University), Yu Chen (Xi'an Jiaotong University), Shouwang Zhao (Xi'an Jiaotong University), Attiq Ur Rehman (Xi'an Jiaotong University), Shuang Wang (Xi'an Jiaotong University), Yong Zhao (Xi'an Thermal Power Research Institute Co. Ltd), Wei Deng (Xi'an Thermal Power Research Institute Co. Ltd), Yong Ma (Xi'an Thermal Power Research Institute Co. Ltd), Yonghong Cheng (Xi'an Jiaotong University)

**(10:50-11:10) Damage Analysis of Oil-Filled Submarine Cable in Suspended State under Wave-Current Force Based on Finite Element Simulation**

Jingwen Zhang (Xi'an Jiaotong University), Yu Chen (Xi'an Jiaotong University), Feng Jia (Xi'an Jiaotong University), Yifang Zhou (Xi'an Jiaotong University), Hanzhi Li (Xi'an Jiaotong University), Changxi Li (Xi'an Jiaotong University), Xiaowei Huang (Guangzhou Bureau, EHV Transmission Company of China Southern Power Grid Co., Ltd), Qiang Guo (Guangzhou Bureau, EHV Transmission Company of China Southern Power Grid Co., Ltd)

**(11:10-11:30) Power Transmission Line Image Segmentation Method Based on Binocular Vision and Feature Pyramid Network**

Mingfeng Mao (Xi'an Jiaotong University), Yu Chen (Xi'an Jiaotong University), Wenxiang Chen (Xi'an Jiaotong University), Wei Du (Northwestern University), Min Zhang (Northwestern University), Tianqi Mao (Zunyi Power Supply Bureau, Guizhou Power Grid Corporation)

**(11:30-11:50) The Inter-turns Short Circuit Fault Detection based on External Leakage Flux Sensing and VMD-HHT Analytical Method for DFIG**

Shouwang Zhao (Xi'an Jiaotong University), Yu Chen (Xi'an Jiaotong University), Attiq Ur Rehman (Xi'an Jiaotong University), Feng Liang (Xi'an Jiaotong University), Shuang Wang (Xi'an Jiaotong University), Yong Zhao (Xi'an Thermal Power Research Institute Co. Ltd), Wei Deng (Xi'an Jiaotong University), Yong Ma (Xi'an Thermal Power Research Institute Co. Ltd), Yonghong Cheng (Xi'an Jiaotong University)

**Venue 3: Hongbaoshi Hall****Regular Session: Measurement Theory, Methodology and System (8:30-10:10)**

**Chair:** Xiyuan Chen (Southeast University), Shibin Wang (Xi'an Jiaotong University)

**(8:30-8:50) Dynamic Model-based Digital Twin for Crack Detection of Aeroengine Disk**

Yuangui Yang (Xi'an Jiaotong University), Meng Ma (Xi'an Jiaotong University), Zheng Zhou (Xi'an Jiaotong University), Chuang Sun (Xi'an Jiaotong University), Ruqiang Yan (Xi'an Jiaotong University)

**(8:50-9:10) An Improved U-Net Network and Its Application in Gear Pitting Measurement**

Sijun Wang (Chongqing University), Yi Qin (Chongqing University), Dejun Xi (Chongqing University)

**(9:10-9:30) Measurement of Radiation-induced Conductivity of Polyimide under Steady-state X-ray Irradiation**

Yu Chen (Xi'an Jiaotong University), Hui Zhong (Xi'an Jiaotong University), Yi Hao (Xi'an Jiaotong University), Dongli Yue (Xi'an Jiaotong University), Jingwen Zhang (Xi'an Jiaotong University), Shuang Wang (Xi'an Jiaotong University), Xiaofeng Zhu (China Academy of Engineering Physics), Guofu Cao (Chinese Academy of Sciences), Yonghong Cheng (Xi'an Jiaotong University)

**(9:30-9:50) Airborne Distributed Transfer Alignment Based on FBG**

Min Zhu (Southeast University), Junwei Wang (Southeast University), Xiyuan Chen (Southeast University), Zhen Ma (Southeast University)

**(9:50-10:10) Remaining Useful Life Estimation Under Variable Failure Behaviors via Transferable Metric Learning**

Jichao Zhuang (Southeast University), Minping Jia (Southeast University), Yifei Ding (Southeast University), Peng Ding (Southeast University)

**Regular Session: Sensor Modelling, Sensors and Sensor Network, Remote Sensing (10:30-11:50)**

**Chair: Chengliang Pan (Hefei University of Technology), Liansheng Liu (Harbin Institute of Technology)**

**(10:30-10:50) Measurement of True Secondary Electron Emission Yields of Kapton**

Yu Chen (Xi'an Jiaotong University), Qingyun Shi (Xi'an Jiaotong University), Guorui Huang (Xi'an Jiaotong University), Liang Feng (Xi'an Jiaotong University), Shuang Wang (Xi'an Jiaotong University), Yonghong Cheng (Xi'an Jiaotong University), Shulin Liu (Chinese Academy of Sciences)

**(10:50-11:10) Cloud Detection Using Fully Convolutional Network with Zynq SoC for Spaceborne Application**

Ximing Yu (Harbin Institute of Technology), Yu Peng (Harbin Institute of Technology), Liansheng Liu (Harbin Institute of Technology)

**(11:10-11:30) Transient Motion Analysis of a Piezoelectric Motor Based on Resonant-type Impact Drive Mechanism**

Chengliang Pan (Hefei University of Technology), Anhui Feng (Hefei University of Technology), Jiahao Wu (Hefei University of Technology), Mingang Hu (Hefei University of Technology), Chao Shi (Hefei University of Technology), Haojie Xia (Hefei University of Technology)

**(11:30-11:50) Range-Only UWB Localization in Measurement of Cadastral Boundary Points**

Chengchao Jiang (Southeast University), Lingfei Mo (Southeast University)





## Poster Presentations

**Venue:** Huaxia Hall

**Time:** 11:30-13:30, October 22, 2021

**Chairs:** Weihua Li (South China University of Technology), Gongbo Zhou (China University of Mining and Technology)

**P-01: A Fault Detection Method for Analog Circuits Based on the Wavelet Features and One-Class KNN**

Fuyong Zhang (Zhongkexin Engineering Consulting Co. Ltd), Zhiwei Hong (Zhongkexin Engineering Consulting Co. Ltd), Tianyu Gao (Harbin Institute of Technology), Shuangyan Yin (Harbin Institute of Technology)

**P-02: Singular Spectrum Decomposition and Iteration Sparsity-Oriented Morphological Demodulation for Bearing Fault Diagnosis**

Rongkai Duan (Xi'an Jiaotong University), Lei Yang (Xi'an Jiaotong University), Tao Kang (Xi'an Jiaotong University), Yuhe Liao (Xi'an Jiaotong University)

**P-03: A Navigation and Positioning Method for Indoor Mobile Robots**

Xinyue Wang (Beijing University of Chemical Technology), Zhiqing Li (Beijing University of Chemical Technology), Shugen Ma (Beijing University of Chemical Technology), Yingzi Chen (Beijing University of Chemical Technology), Zhifeng Liu (Beijing University of Chemical Technology)

**P-04: SVOM EMC Test and Electric Field Measurement**

Yang Liu (Chinese Academy of Sciences), Zongde Li (Chinese Academy of Sciences), Yuanyuan Dai (Chinese Academy of Sciences), Xiaofeng Zhang (Chinese Academy of Sciences), Haichen Wu (Chinese Academy of Sciences), Dong Li (Chinese Academy of Sciences)

**P-05: The Supercapacitor Energy Storage System is Applied to Shanghai Medium-low Speed Maglev Train Test Line**

Haiquan Liang (Tongji University), Peizhong Li (Tongji University)

**P-06: A Diagnosis Method based on Maximum Information Coefficient and MKL for Open Circuit Fault in PMSM Inverter**

Chenyang Wan (Nanjing University of Science and Technology), Liuxuan Wei (Nanjing University of Science and Technology), Manyi Wang (Nanjing University of Science and Technology)

**P-07: A Health Evaluation Method based on Fuzzy Grey Clustering and Combination Weighting for Artillery Fire System**

Ruixiang Zhang (Nanjing University of Science and Technology), Manyi Wang (Nanjing University of Science and Technology), Pengju Zhao (Norendar International Ltd.), Xiaohai Liu (North Automatic Control Technology Institute Technology)

**P-08: A Comprehensive Review on Blade Damage Detection and Prediction**

Yemei Xia (Hunan University of Technology), Hao Sheng (Hunan University of Technology), Zhongsheng Chen (Hunan University of Technology)

**P-09: Intelligent Fault Diagnosis Based on Adversarial Domain Adaptive Network**

Huafeng Zhou (Air Force Engineering University), Peiyuan Cheng (Air Force Engineering

University), Siyu Shao (Air Force Engineering University), Yuwei Zhao (Air Force Engineering University), Zijian Ye (Air Force Engineering University)

**P-10: Device-free Localization and Tracking of Multiple Person in UWB Sensor Networks**

Jiale Wang (Nanjing University of Science and Technology), Jiaxing Yang (Nanjing University of Science and Technology), Manyi Wang (Nanjing University of Science and Technology)

**P-11: Remaining Useful Life Prediction of Aeroengine Based on Ghost Approach**

Zijian Ye (Air Force Engineering University), Qiang Zhang (Air Force Engineering University), Siyu Shao (Air Force Engineering University), Yuwei Zhao (Air Force Engineering University), Huafeng Zhou (Air Force Engineering University), Chen Chen (Xi'an Satellite Control Center)

**P-12: Signal and Interference Analysis of UPMC System with Timing Offset**

Jingjing Wang (Zhejiang Gongshang University), Jiangang Wen (Zhejiang Gongshang University), Yuanping Zou (Zhejiang Gongshang University), Anding Wang (Zhejiang Gongshang University), Jingyu Hua (Zhejiang Gongshang University)

**P-13: Research on the Noises Analysis of the MEMS Inertial Sensor Array**

Feng Li (Soochow University), Yanghao Chen (Soochow University), Yifan Sun (Soochow University), Xiang Xu (Soochow University)

**P-14: Design and Implementation of Towered Transient Electromagnetic System for Unexploded Ordnance Detection**

Tianyu Gao (Jilin University), Shuang Zhang (Jilin University), Shudong Chen (Jilin University)

**P-15: Transformer Fault Probability Calculation Based on Analytic Hierarchy Process**

Xiao Cheng (State Grid Corporation of China), Xinyi He (Xi'an Jiaotong University), Ming Dong (Xi'an Jiaotong University), Yuanfu Xu (State Grid TianJin Electric Power Company), Zhongchen Yuan (Tianjin Research Institute of Electric Science)

**P-16: Fast Surface Topography Reconstruction Method for Profilometer Measurement based on Neural Continuous Representation**

Jieji Ren (Shanghai Jiaotong University), Mingjun Ren (Shanghai Jiaotong University)

**P-17: Fault Diagnosis Based on Data-driven Dynamic Model**

Xuan Wang (Beijing University of Civil Engineering and Architecture), Yanxue Wang (Beijing University of Civil Engineering and Architecture), Hanfang Dai (Beijing University of Civil Engineering and Architecture)

**P-18: Study on Electrical Characteristics of 550 kV GIL Three-post Insulator after Mechanical Load Tests**

Ruodong Huang (China Southern Power Grid), Chao Gao (China Southern Power Grid), Fusheng Zhou (China Southern Power Grid), Guoli Wang (China Southern Power Grid), Yao Zheng (China Southern Power Grid), Weiguo Li (Maintenance and Test Center of EHV Power Transmission Company of China Southern Power Grid), Jinwei Chu (Maintenance and Test Center of EHV Power Transmission Company China Southern Power Grid), Wanying Liu (Maintenance and Test Center of EHV Power Transmission Company China Southern Power Grid), Changhong Zhang (Maintenance and Test Center of EHV Power Transmission Company China Southern Power Grid)

**P-19: Rolling Bearing Fault Classification Utilizing Adaptive Density Peaks Search Clustering Based on Wavelet Packet Transform**



Meng Li (Beijing University of Civil Engineering and Architecture), Yanxue Wang (Beijing University of Civil Engineering and Architecture)

**P-20: Fault Diagnosis of Rolling Bearing Based on CNN with Attention Mechanism and Dynamic Learning Rate**

Qingyu Zhang (Yanshan University), Hao Wu (Yanshan University), Jinxin Tao (Yanshan University), Wanmeng Ding (Yanshan University), Jinfeng Zhang (Yanshan University), Jimeng Li (Yanshan University)

**P-21: BEN: Brightness Enhancement Network for Low- Light Image Enhancement in Complex Environment**

Mingsong Chen (Guilin University of Electronic Technology), Zuwei Ouyang (Guilin University of Electronic Technology; Chinese Academy of Sciences), Qieshi Zhang (Chinese Academy of Sciences; The Chinese University of Hong Kong), Ziliang Ren (Chinese Academy of Sciences; The Chinese University of Hong Kong), Cheng Jun (Chinese Academy of Sciences; The Chinese University of Hong Kong), Shuai Yuan (Chinese Academy of Sciences; The Chinese University of Hong Kong)

**P-22: Interturn Short Circuit Fault Diagnosis of Brushless DC Motor Based on Image Feature Extraction and Transfer Learning**

Jiliang Wang (Anhui University), Hui Wang (Anhui University), Siliang Lu (Anhui University), Haidong Shao (Hunan University)

**P-23: Remaining Useful Life Prediction of Lithium-ion Battery Based on Cycle-consistency Learning**

Fujin Wang (Xi'an Jiaotong University), Zhibin Zhao (Xi'an Jiaotong University), Zhi Zhai (Xi'an Jiaotong University), Shibin Wang (Xi'an Jiaotong University), Baoqing Ding (Xi'an Jiaotong University), Xuefeng Chen (Xi'an Jiaotong University)

**P-24: Dispersion Compensation Strategy Based on Sparse Bayesian Learning in Terahertz Nondestructive Evaluation**

Yafei Xu (Xi'an Jiaotong University), Xingyu Wang (Xi'an Jiaotong University), Xiangdong Fang (Xi'an Jiaotong University), Liuyang Zhang (Xi'an Jiaotong University), Ruqiang Yan (Xi'an Jiaotong University), Xuefeng Chen (Xi'an Jiaotong University)

**P-25: Raindrop Recognition and Spectrum Analysis Algorithm Based on Stroboscopic Image Processing**

Jie Zhang (CSIC PRIDe (Nanjing) Atmospheric and Oceanic Information System Co., Ltd), Xiaohu Lu (CSIC PRIDe (Nanjing) Atmospheric and Oceanic Information System Co., Ltd), Xichen Sheng (CSIC PRIDe (Nanjing) Atmospheric and Oceanic Information System Co., Ltd), Shu Liu (CSIC PRIDe (Nanjing) Atmospheric and Oceanic Information System Co., Ltd), Chao Chen (CSIC PRIDe (Nanjing) Atmospheric and Oceanic Information System Co., Ltd), Xidong Xu (CSIC PRIDe (Nanjing) Atmospheric and Oceanic Information System Co., Ltd)

**P-26: Icing Dataset of Overhead Power Transmission Lines for China Southern Power Grid**

Jinqiang He (Electric Power Research Institute, China Southern Power Grid), Yongli Liao (Electric Power Research Institute, China Southern Power Grid), Ruihai Li (Electric Power Research Institute, China Southern Power Grid), Xinyuan Wang (Electric Power Research Institute, China

Southern Power Grid), Yi Wen (Electric Power Research Institute, Gui Zhou Power Grid of CSG), Jianrong Wu (Electric Power Research Institute, Gui Zhou Power Grid of CSG), Huan Huang (Electric Power Research Institute, Gui Zhou Power Grid of CSG)

**P-27: The Study of Partial Discharge Localization in Transformer Oil Based on Coupling Optical Fiber Ultrasonic Sensor**

Penghui Yang (Xi'an Jiaotong University), Yiyang Liu (Xi'an Jiaotong University), Penghao Yu (Jiaxing Electric Power Supply Company State Grid Zhejiang Electric Power Co., Ltd), Xuhong Wang (Xi'an Jiaotong University), Na Wang (Xi'an Jiaotong University)

**P-28: A Fault Diagnosis Method for Mechanical Rotating Components Based on Automatic Learning of Pseudo Labels**

Shuangyan Yin (Harbin Institute of Technology), Jingli Yang (Harbin Institute of Technology), Cheng Yang (China Institute of Marine Technology and Economy)

**P-29: Rolling Bearing Fault Diagnosis Based on Variational Mode Decomposition and Cyclostationary Analysis**

Pengpeng Han (Anhui University), Changbo He (Anhui University), Siliang Lu (Anhui University)

**P-30: State Evaluation Model of Distribution Transformer Based on Analytic Hierarchy Process**

Da Zhou (State Grid Jiangsu Electric Power Co., Ltd), Xin Zhang (State Grid Jiangsu Electric Power Co., Ltd), Yunfeng Zou (State Grid Jiangsu Electric Power Co., Ltd), Yuling Ni (State Grid Jiangsu Electric Power Co., Ltd), Deyu Wang (State Grid Jiangsu Electric Power Co., Ltd)

**P-31: Rotating Machinery Fault Diagnosis Based on Spatial-Temporal GCN**

Chenyang Li (Southeast University), Lingfei Mo (Southeast University), Ruqiang Yan (Southeast University)

**P-32: Study on Detection Characteristics of Partial Discharge Detection System Based on Microfiber Coupler Sensor**

Yang Zhou (Xi'an Jiaotong University), Yiyang Liu (Xi'an Jiaotong University), Na Wang (Xi'an Jiaotong University), Junhao Li (Xi'an Jiaotong University), Xutao Han (Xi'an Jiaotong University)

**P-33: A GAN-based Background Noise Removal Method on Infrared Image of Gas-Insulated Transmission Line**

Shan Gao (Jiangsu Electric Power Research Institute), Hongtao Li (Jiangsu Electric Power Research Institute), Ke Zhao (Jiangsu Electric Power Research Institute), Yujie Li (Jiangsu Electric Power Research Institute), Yongfei Liu (Jiangsu Electric Power Research Institute), Jingtian Ma (Jiangsu Electric Power Research Institute)

**P-34: Response of Coupling Optical Fiber Ultrasonic Sensor to Different Types of Partial Discharge of Transformer**

Na Wang (Xi'an Jiaotong University), Yiyang Liu (Xi'an Jiaotong University), Penghao Yu (Jiaxing Power Supply Company State Grid Zhejiang Electric Power Company), Xuhong Wang (Xi'an Jiaotong University), Penghui Yang (Xi'an Jiaotong University)

**P-35: Transmission Line Defect Detection Based on AG-RetinaNet**

Wei Du (Northwestern University), Min Zhang (Northwestern University), Xiaomei Shi (Northwestern University), Mingfeng Mao (Xi'an Jiaotong University), Yu Chen (Xi'an Jiaotong University), Jun Feng (Northwestern University)



**P-36: Non-destructive Testing of Internal Defects in Composite Post Insulators Using Microwave Technique**

Xiying Wang (Chongqing University), Zhidong Cheng (Chongqing University), Li Cheng (Chongqing University), Lijun Yang (Chongqing University), Ruijing Liao (Chongqing University), Sida Zhang (Chongqing University), Tingting Wang (China Southern Power Grid Co. Ltd)

**P-37: A Subspace Domain Adaptation Method: SSA-Theoretic Drift Correction for Gear Fault Diagnosis under Varying Working Conditions**

Chao Chen (Jiangsu University), Ruqiang Yan (Xi'an Jiaotong University), Fei Shen (Huawei Technologies Co., Ltd), Wei Fan (Jiangsu University)

**P-38: A Novel Fourth-Order Multi-Bit Quantization  $\Sigma\Delta$  Modulator**

Tiechao Yang (Beijing University of Chemical Technology), Yu Jin (Beijing University of Chemical Technology), Chi Xu (Chinese Academy of Science), Xuebin Wu (Sinopec Geophysical Corporation), Duli Yu (Beijing University of Chemical Technology)

**P-39: Structural Vibration of Low-Speed Maglev Switch Based on Measured Data**

Feng Ye (Tongji University), Mingbo Liu (Tongji University), Guofeng Zeng (Tongji University), Ziping Han (Tongji University), Andong Zheng (Tongji University)

**P-40: Fault Diagnosis of Aero-Engine under Variable Working Condition Based on Improved Viterbi Algorithm**

Haiyang Shi (Chongqing University), Yi Qin (Chongqing University), Yi Wang (Chongqing University)

**P-41: Decoupling Levitation Control of Maglev Train Based on Backstepping Control**

Yougang Sun (Tongji University), Lu Yang (The Hong Kong Polytechnic University), Junqi Xu (Tongji University), Sumei Wang (The Hong Kong Polytechnic University)

**P-42: Quality Prediction of Laer Induced Graphene using Convolutional Neural Network**

Feilong Jiang (Wuhan University), Zhe Zhao (Wuhan University), Zheng Huang (Wuhan University), Haidong Shao (Hunan University), Yaowu Hu (Wuhan University), Min Xia (Lancaster University)

**P-43: Deep Learning Based Infrared Image Recognize and Internal Overheating Fault Diagnosis of Gas Insulated Switchgear**

Ke Zhao (Jiangsu Electric Power Research Institute), Hongtao Li (Jiangsu Electric Power Research Institute), Shan Gao (Jiangsu Electric Power Research Institute), Yujie Li (Jiangsu Electric Power Research Institute), Yongfei Liu (Jiangsu Electric Power Research Institute), Jingtian Ma (Jiangsu Electric Power Research Institute)

**P-44: SOC Prediction Method of Wireless Sensor Nodes Batteries Based on Attention-LSTM**

Xiaodong Yan (China University of Mining and Technology), Gongbo Zhou (China University of Mining and Technology), Houlian Wang (Jiangsu University of Science and Technology)

**P-45: An Approach for Fetal QRS Complex Detection from Abdominal ECG Recordings**

Yuwei Zhang (Southeast University), Aihua Gu (Nanjing Medical University), Chenxi Yang (Southeast University), Jianqing Li (Southeast University), Chengyu Liu (Southeast University)



