ICPS 2023
May 8-11,2023 | Wuhan, China

The 6th IEEE International Conference on Industrial Cyber–Physical Systems

May 8-11, 2023 | Wuhan, China

Program

Host by
IEEE Industrial Electronics Society

Organized by
China University of Geosciences

Co-Organizers
Hubei Key Laboratory of Advanced Control
and Intelligent Automation for Complex Systems
Engineering Research Center of Intelligent Technology for
Geo-Exploration, Ministry of Education
Advanced Control and Intelligent Automation for Complex Systems
Overseas Expertise Introduction Center for Discipline Innovation
Hubei Province Association for Automation
Hubei Province Association for Artificial Intelligence

Contents

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Yong He (CN)   Mo-Yuen Chow (US)

Conference Secretary

Zhengtao Liu (CN)   Feng Wang (CN)

Important Information

- Time: May 8–11, 2023
- Venue: Wuhan East Lake International Conference Center (ELICC)
- Agenda: May 9–11, 2023, Academic lectures and discussion
- Official Languages: English

Registration
- Registration Time: May 8, 8:00–22:00
- Registration Desk: Wuhan East Lake International Conference Center

Contacting the Organizing Committee
- Contacting Person: Feng Wang
                              Zhentao Liu
- E-mail: ICPS2023@cug.edu.cn

Website of ICPS2023: http://icps2023.cug.edu.cn/

Website of IEEE IES Conferences Community: https://confcomm.ieee-ies.org/home/welcome

Instruction for Oral and Poster Presentations

Oral Presentation

- Oral Presentation Time: 20 minutes (15 minutes oral presentation + 5 minutes discussion);
- Each speaker is required to meet his/her session chairs in the corresponding session rooms 10 minutes before the session starts and copy the slides to the computer;
- Each session room is equipped with a projector and a PC (with Microsoft Windows and Microsoft Power-Point). Please make sure that your files are compatible and readable with our operation system by using commonly used fonts and symbols.

Poster Presentation

- ALL Extended Abstracts accepted by the conference will be presented in form of posters.
- The conference will provide the proposed design template of LaTeX and Word (choose by yourself) as well as the poster design prospectus. Please make and post your paper according to the prospectus. The conference will provide an exhibition board (width 1m, height 2.5m) for each poster paper. The poster print size is 1.2m(H)×0.9m(W) (Please make by yourself). The boards will be arranged in order of the paper in the final program. Tape and other materials will be provided on site, and volunteer-assistants will give necessary help. Posters are required to be condensed and attractive. The characters should be large enough so that they are visible from 1 meter apart.
- During your poster session, the author should stay by your poster paper to explain and discuss your paper with visiting colleagues. The authors, who do not poster their papers at their poster sessions and/or do not stay by their papers, will be considered as "No Show".

Transportation and Venue Location
Transportations

1. Wuhan Tianhe International Airport → Wuhan East Lake International Conference Center

Route 1: Subway (★Recommended)
Route:
Take Subway Line 2 (Toward Fozuling) → Get on the subway at Wuhan Tianhe International Airport Station → Get off the subway at Hongtu Boulevard → Transfer to Subway Line 8 (Toward Junyun Village) → Get off the subway at Hubei Provincial Museum & Hubei Daily (Exit A) → Walk 1.1 kilometers or take a taxi to Wuhan East Lake International Conference Center.
Fare: 8 RMB

Route 2: Subway & Bus
Route:
Take Subway Line 2 (Toward Fozuling) → Get on the subway at Wuhan Tianhe International Airport Station → Get off at Hongshan Square (Exit B5) → Walk to Hongshan Road Hongshan Square Bus Stop → Take the 701 bus (Toward Huanhu Road Donghu) → Get off the bus at Huanhu Road Donghu → Walk 307 meters to Wuhan East Lake International Conference Center.
Fare: 9 RMB

Route3：Airport Bus Line 2 & Bus
Route:
From Wuhan Tianhe International Airport, walk 439 meters to Wuhan Tianhe International Airport Bus Stop → Take Airport Bus Line 2 → Get off the bus at Wuhuo Road Yuemachang → Transfer to the 701 bus at the same stop → Get off the bus at Huanhu Road Donghu → Walk 307 meters to Wuhan East Lake International Conference Center.
Fare: 9 RMB

Route4：Taxi
Route: Drive along the Airport Expressway, the Second Ring Road, Wuhan Avenue and Donghu Road, the journey is about 40 kilometers and takes about 50 minutes.
Fare: About 120 RMB

2. Wuhan Railway Station → Wuhan East Lake International Conference Center

Route 1: Subway (★Recommended)
Take Subway Line 4 (Toward Bailin), Get on the Subway at Wuhan Railway Station Subway Station → Get off the subway at Yuejiazui → Transfer to Subway Line 8 (Toward Junyun Village) at the same station → Get off the subway at Hubei Provincial Museum & Hubei Daily (Exit A) → Walk 1.1 kilometers or take a taxi to Wuhan East Lake International Conference Center.
Fare: 4 RMB

Route 2: Subway & Bus
Take Subway Line 4 (Toward Bailin), Get on the Subway at Wuhan Railway Station Subway Station → Get off the subway at Dongting (Exit A) → Walk to Huangli Road Shengbao Xiaoqu Bus Stop → Take the 678 bus (Toward Zhongshan Road Fenghuangshan) → Get off the bus at Donghu Road Provincial Museum → Walk 924 meters or take a taxi to Wuhan East Lake International Conference Center.
Fare: 4 RMB

Route 3: Bus
Bus stop location:
Near the east exit of Wuhan Railway Station.
Route:
Walk to Wuhan Railway Station Bus Stop → Take the 504 bus (Toward East Square of Wuchang Railway Station) → Get off the bus at Xudong Street Railway Wangjiadun Stop → Transfer the 402 (or 709) bus at the same stop → Get off the bus at Donghu Road Provincial Museum → Walk 924 meters or take a taxi to Wuhan

East Lake International Conference Center.
Fare: 4 RMB

Route 4: Taxi
Route: Drive along Happy Avenue, Second Ring Road, Donghu Road, the journey is about 13 kilometers, and it takes about 25 minutes.
Fare: About 30 RMB

3. Hankou Railway Station → Wuhan East Lake International Conference Center

Route 1: Subway (★Recommended)
Route:
Take Subway Line 2 (Toward Fozuling), Get on the Subway at Hankou Railway Station Subway Station → Get off the subway at Fanhu → Transfer to Subway Line 3 (Toward Hongtu Boulevard) at the same station → Get off the subway at Zhaojiatiao → Transfer to Subway Line 8 (Toward Junyun Village) at the same station → Get off the subway at Hubei Provincial Museum & Hubei Daily (Exit A) → Walk 1.1 kilometers or take a taxi to Wuhan East Lake International Conference Center.
Fare: 5 RMB

Route 2: Subway & Bus
Route:
Take Subway Line 2 (Toward Fozuling), Get on the Subway at Hankou Railway Station Subway Station → Get off the subway at Hongshan Square (Exit B5) → Walk to Hongshan Road Hongshan Square Bus Stop → Take the 701 bus (Toward Huanhu Road Donghu) → Get off the bus at Huanhu Road Donghu → Walk 307 meters to Wuhan East Lake International Conference Center.
Fare: 6 RMB

Route 3: Bus
Bus stop location:
Near the Exit A of Hankou Railway Station Subway Station.
Route:
Walk to Hankou Railway Station Bus Stop → Take the 411 bus (Toward Hongmiao Bus Station) → Get off the bus at Donghu Road Provincial Museum → Walk 924 meters or take a taxi to Wuhan East Lake International Conference Center.
Fare: 1 RMB

Route 4: Taxi
Route: Drive along the Second Ring Road, Huangpu Street, Wuhan Yangtze River Second Bridge, Wuhan Avenue and Xudong Street, the journey is about 16 kilometers and takes about 30 minutes.
Fare: About 50 RMB

4. Wuchang Railway Station → Wuhan East Lake International Conference Center

Route 1: Subway (★Recommended)
Route:
Take Subway Line 4 (Toward Wuhan Railway Station), Get on the Subway at Wuchang Railway Station Subway Station → Get off the subway at Yuejiazui → Transfer to Subway Line 8 (Toward Junyun Village) at the same station → Get off the subway at Hubei Provincial Museum & Hubei Daily (Exit A) → Walk 1.1 kilometers or take a taxi to Wuhan East Lake International Conference Center.
Fare: 4 RMB

Route 2: Subway & Bus
Route:
Take Subway Line 4 (Toward Wuhan Railway Station), Get on the Subway at Wuchang Railway Station Subway Station → Get off the subway at Hongshan Square (Exit B5) → Walk to Hongshan Road Hongshan Square Bus Stop → Take the 701 bus (Toward Huanhu Road Donghu) → Get off the bus at Huanhu Road Donghu → Walk 307 meters to Wuhan East Lake International Conference Center.
Fare: 3 RMB

Route 3: Bus

Bus stop location:
Near the south side of Wuchang Railway Station West Square
Route:
Walk to Zhongshan Road Wuchang Railway Station Bus Stop → Take the 564 bus (Toward Shibeiling West Road Xiongchu Avenue direction) or the 636 bus (Toward Zhongnan Road, Zhongnan 2nd Road) → Transfer to the 701 bus at the same stop → Get off the bus at Huanhu Road Donghu → Walk 307 meters to Wuhan East Lake International Conference Center.
Fare: 3 RMB

Route 4：Taxi

Route: Drive along Wuluo Road, Zhongnan Road, Zhongbei Road and Huangli Road, the journey is about 10 kilometers and takes about 30 minutes.
Fare: About 30 RMB
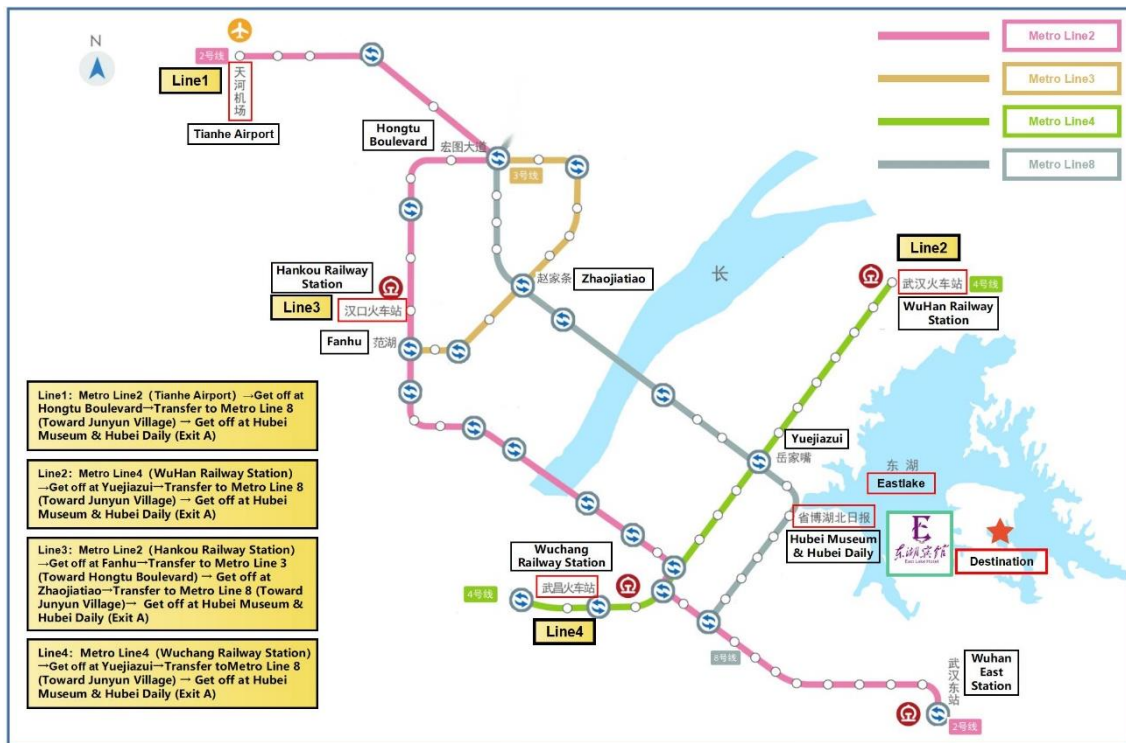
Subway Route Maps of Wuhan East Lake International Conference Center

Conference Center Floor Plan

Wuhan East Lake International Conference Center / East Lake Hotel

Floor Plan of the First floor of Conference Center

Keynotes

Keynote 1

Xiaohong Guan

Xi'an Jiaotong University

Cyber-Physical Energy Systems for the Energy Revolution

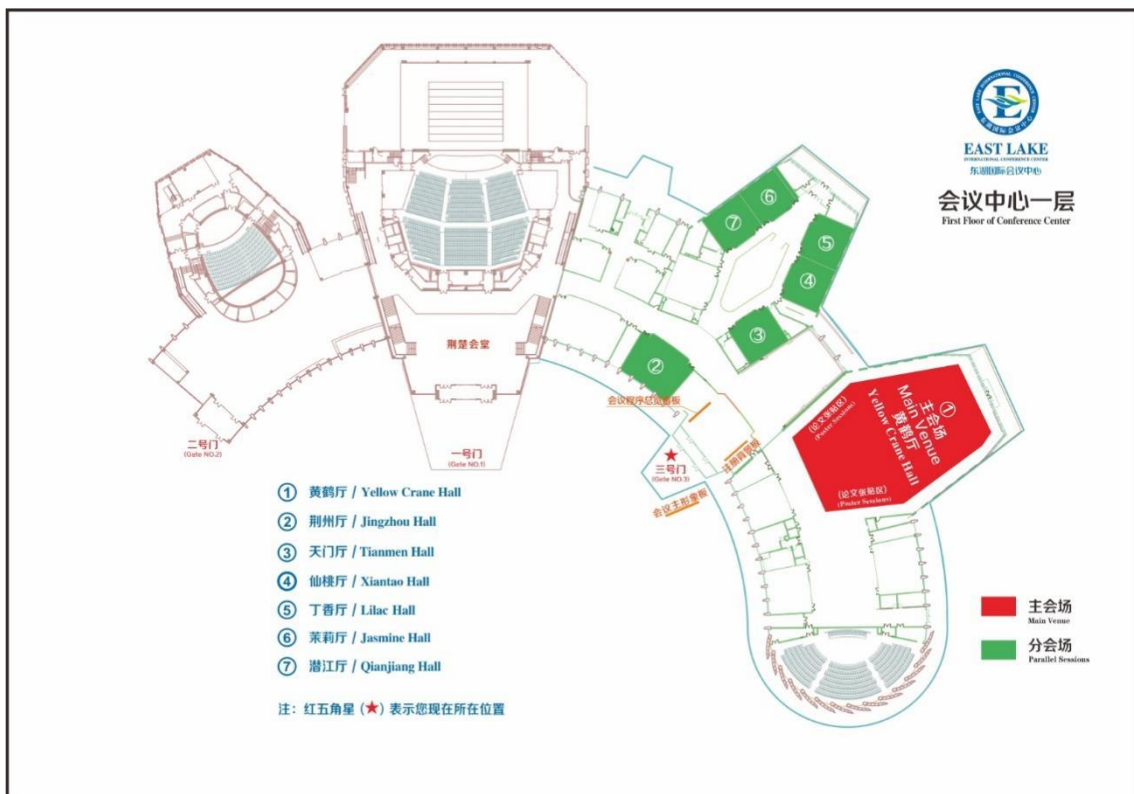Chair: Xin Chen (China University of Geosciences)

Abstract: Networking, intelligence and integration of cyber and physical systems are the trend of information science and technology development. Cyber-physical systems are the foundation of the energy revolution and technology revolution with tremendous challenges on cyber-physical modeling, intelligence design, system optimization and control. Cyber-physical energy systems with hydrogen storage offers a possible solution for energy supply and consumption without carbon emission and pollution, and would lead to the energy revolution towards resolving the global warming issue. It is shown that with the nontraditional energy storage technology the hydrogen enabled zero-carbon intelligent energy system provides an ideal infrastructure for energy supply and consumption without carbon emission and pollution, and would lead to the energy revolution towards resolving the global warming issue.

Xiaohong Guan received his B.S. and M.S. degrees in Control Engineering from Tsinghua University, Beijing, China, in 1982 and 1985, respectively, and his Ph.D. degree in Electrical and Systems Engineering from the University of Connecticut in 1993. He was a senior consulting engineer with Pacific Gas and Electric from 1993 to 1995. He visited the Division of Engineering and Applied Science, Harvard University 1999-2000. Since 1995 he has been with the Systems Engineering Institute at Xi'an Jiaotong University, Xi'an, China, and was appointed as the Cheung Kong Professor of Systems Engineering in 1999, and Dean of Faculty of Electronic and Information Engineering since 2008. From 2001 he has also been with the Center for Intelligent and Networked Systems, Tsinghua University, Beijing, China, and severed the Head of Department of Automation, Tsinghua University, 2003-2008.

Professor Guan is a member of Chinese Academy of Science and IEEE Fellow. His research interests include economics and security of networked systems, optimization based planning and scheduling of electrical power and energy systems, manufacturing systems, etc., and cyber-physical systems, etc.

Keynote 2

Peng Shi

University of Adelaide, Australia

Cyber-Physical Systems: Analysis and Design

Chair: Jundong Wu (China University of Geosciences)

Abstract: Cyber-physical systems (CPS), such as smart grids and intelligent transportation systems, are complex systems where software and hardware components are seamlessly integrated toward performing well-defined tasks. However, this integration increases the vulnerability of CPS with higher possibility of cyber-attack that could cause severe consequences to economics, society, and human beings. Hence, cyber-security is critical and important in CPS. In this talk, the security of CPS is discussed from the perspectives of attackers. We will introduce the background of CPS and security issues, and some existing work on cyber-attacks. We then present our recent work on the design of stealthy hybrid attacks to CPS, which enables attackers to launch hybrid cyber-attacks more effectively to maximize system performance degradation with less chance to be detected.

Peng Shi received the PhD degree in Electrical Engineering from the University of Newcastle, Australia, the PhD degree in Mathematics from the University of South Australia, the Doctor of Science degree from the University of Glamorgan, UK, and the Doctor of Engineering degree from the University of Adelaide, Australia. He is now a Professor at the School of Electrical and Electronic Engineering, and the Director of Advanced Unmanned Systems Laboratory, at the University of Adelaide, Australia. His research interests include systems and control theory and applications to autonomous and robotic systems, cyber-physical systems, and multi-agent systems. He received the MA Sargent Medal Award from Engineers Australia in 2022 to recognize his longstanding eminence in science and practice of electrical engineering, the Life-time achiever Leader-Board acknowledgement from THE AUSTRALIAN from 2019-2022, and the Highly Cited Researcher recognition from Thomson Reuters from 2014-2022. Currently he serves as the Editor-in-Chief of IEEE Transactions on Cybernetics, a Senior Editor of IEEE Access, and an editorial member for a number of journals, including Automatica and IEEE Transactions on (Artificial Intelligence, and Circuits and Systems). His professional services also include as the President of the International Academy for Systems and Cybernetic Sciences, the Vice President of IEEE SMC Society, and IEEE SMC Distinguished Lecturer. He is a Fellow of IEEE, IET, IEAust and CAA, a Member of the Academy of Europe, and an Honorary Member of the Romanian Academy of Scientists.

Keynote 3

Shinji Hara

Tokyo Institute of Technology

Glocal (Global/Local) Control for Hierarchical Cyber Physical Systems: Theoretical Foundation towards Practical Applications

Chair: Jinhua She (Tokyo University of Technology)

Abstract: There are a lot of world-wide crucial issues to be solved such as energy, environments, and transportations. Current and future directions of science and technology in almost all fields including control should be contributed for realizing desirable societies, say smart cities. This means that our target systems in control are large-scale cyber physical systems with hierarchical structure. One of the ideas to properly handle such systems is "Glocal (Global/Local) Control," which means that the global objective is achieved mainly by local actions of measurement and control cooperatively. This is a new control framework for realizing smart cities. The key for developing a fundamental theory is hierarchically networked dynamical systems with multiple resolutions in time and space, and one of the most important issues is how to compromise the global and local control objectives.

The main purpose of this talk is to show that new ideas, by exploiting the special structure of the target networked systems, with utilization of powerful existing theory in classical, modern, and robust control enable us to develop scalable methods for control analysis and design. The effectiveness of the proposed methods is verified through practical applications including glocal control for a type of electric vehicles with multiple controllable wheels. After explanations of the background, the idea, and the concept of glocal control, the first part is focused on the analysis, where stability and robust stability conditions are provided for hierarchically decentralized control systems. The second part is devoted to hierarchical optimal control based on the standard LQ optimal control, which gives a systematic way of compromising the global and local objectives. In the third part, a fairly general framework for compromising the global and local achievable performances based on a novel setting in the standard robust control. The effectiveness of all the proposed methods is verified through practical applications including glocal control for a type of electric vehicle with multiple motor driven wheels. Some remarks on the future research directions are addressed at the end of the talk.

Shinji Hara received the B.S., M.S., and Ph.D. in engineering from Tokyo Institute of Technology, Japan, in 1974, 1976, and 1981, respectively. In 1984, he joined Tokyo Institute of Technology as an Associate Professor and served as a Full Professor for ten years. From 2002 to 2017 he was a Full Professor in the Department of Information Physics and Computing at the University of Tokyo. He is Professor Emeritus of Tokyo Institute of Technology and the University of Tokyo. His current research interests are in robust control, decentralized cooperative control for large-scale networked dynamical systems, system biology, and glocal control.

Dr. Hara has received many awards in control including the George S. Axelby Outstanding Paper Award from the IEEE Control System Society in 2006. He was the President of SICE (Society of Instrument and Control Engineers, Japan) in 2009, a Vice President of the IEEE Control Systems Society in 2009 to 2010, and an IFAC Council member from 2011 to 2017. He is a Fellow of IFAC, IEEE, and SICE.

Industry Forum

IEEE ICPS 2023 will host an Industry Forum session during the conference. Industry Forum is an IES program for Industry to engage with research in a productive manner. Industry speakers are invited to discuss industry, technology directions, and, most importantly, challenges for the companies. These presentations inform the attendees on the vision and application of technologies in business and what challenges companies are encountering. The forum also offers the opportunity for researchers to study their challenges and know the contacts in the companies should they have a solution that the company might utilize. We want all conference attendees to engage in the Industry Forum and listen to the presentations of our industry speakers so all communities can benefit. For additional Industry Forums organized in IES events visit https://www.ieee-ies.org/industry-forum

Organizers:

Victor Huang
Onlye Solutions
IEEE Life Fellow

Allen C. Chen
Innovatech
Solutions IEEE
Life Senior
Member

Michael Condry
ClinicAI
IEEE Life Fellow

Yebin Wang
Sr Principal Research
Scientist
Mitsubishi Electric
Research Laboratories

Zhibo Pang
Sr Principal Scientist
ABB/KTH

Industry Forum 1

Sensor Networks toward Autonomy and Sustainability

Chairs: Zhibo Pang, Allen Chen, and Victor Huang

Panelists:

- **Panpan Hu** (VanJee Wuhan Research Institute)
- **Ying Shi** (Zhejiang Supcon Technology Co., Ltd)
- **Tao Ren** (WISDRI Engineering & Research Incorporation Ltd.)

10:45 – 11:10 a.m.

Title: Research and Development of Lidar and Its Applications

Abstract: In recent years, with the continuous development of Lidar technology and products, its application value has been more emphasized in the fields of mobile robots, intelligent traffic perception, and automatic drives. This report summarizes and introduces the technical principle, development history, technical form, and product category of Lidar, and analyzes the specific requirements and current technical level of Lidar according to different application fields. In addition, in the form of cases, the report also focuses on the introduction of global awareness of intelligent transportation solutions based on Lidar.

Panpan Hu is a Senior Engineer, the Chief Engineer of Laser technology of Vanjee Technology, and the President of Vanjee Wuhan Research Institute. He received his Ph.D. degree in Optical Engineering from Huazhong University of Science and Technology, Wuhan, China. He is also an expert in the Science and Technology Expert Database of Ministry of Communications, a member of the second Session of the Electronic Optical System Sub-Technical Committee of the National Optical and Photonics Standardization Technical Committee (TC103SC6), a member of the National Optical Radiation Safety and Laser Equipment Standardization Committee (TC284), an expert in the "Zhongguancun Standard" think tank, an expert in the expert database of Hubei Science and Technology Department, and an artificial intelligence expert of Wuhan Economy and Information Technology Bureau. He was elected into the ninth batch of Wuhan City "3551" Optical Valley Talent Program. His work was selected for the 2019 Major Scientific and Technological Innovation Database of Transportation of Ministry of Communications. In 2020, he won the sixth Beijing Invention Patent Award. He is currently involved in the preparation of one international standard and one national standard. In the past five years, he has authorized more than 50 invention patents and published 4 papers.

11:10 – 11:35 a.m.

Title: Practice Study on Industrial Internet in Process Industry

Abstract: Industrial Internet is aimed at the digitalization, networking, and intelligence needs of the manufacturing industry, building a data platform based on massive data collection, aggregation, and analysis. At the same time, Industrial Internet supports the ubiquitous connection of manufacturing resources, elastic supply, and efficient configuration in enterprise operations. This report focuses on the practical application of Industrial Internet platforms combined with continuous production and high-security integration in process industries, achieving the ultimate goal of improving safety, quality, efficiency, and environmental protection in process intelligent factories.

Ying Shi is the President Assistant of Zhejiang Supcon Technology Co., Ltd. and the President of the New Business Incubation Department. As a technical leader, he has received the second prize of Zhejiang Provincial Science and Technology Progress Award, the second prize of Hangzhou Science and Technology Progress Award, and has been selected as a "131" young talent in Hangzhou. He has been granted 9 invention patents and participated in 2 key research and development projects of the Ministry of Science and Technology.

11:35 a.m. – 12:00 noon.

Title: WISDRI's iBF Solution Promotes BLAST Furnace's Digital Transformation

Abstract: Steel enterprises play a vital role in China's economy, but are also one of the main sources of carbon emissions. Blast furnaces, featuring high yield and high volume, reduction of carbon emissions of blast furnaces is a key branch of carbon neutrality. On the other hand, blast furnaces are labeled with the "black box" characteristics of high temperature, high pressure, sealing, and continuous production, and internal information is extremely scarce, making it difficult to implement synchronous monitoring. While maintaining stable and high production, how to reduce energy consumption has always been a global challenge. At present, the informatization, intelligence, and unmanned operation of blast furnaces are recognized as the key to solving the above problems.

Based on the demand for transparency in blast furnace production and the intelligent perception core, an intelligent blast furnace solution has been gradually constructed by WISDRI Corporation Ltd., Which actualized in six steps: less production personnel, intelligent management, transparency inside the furnace, prompt warning, comprehensive evaluation, and standardized guidance. Specific measures such as real-time monitoring of key areas through intelligent monitoring instruments, analysis on the mechanism and big data information of blast furnace status, and accurate analysis and judgment of blast furnace status based on expert rules. Helping blast furnace production to operate reasonably, scientifically, and effectively, ultimately achieve indicators optimization and management improvement, and accomplish the goals of blast furnace safety, efficiency, longevity, and green.

These achievements have made us the leader and the carbon neutrality practitioner of the ironmaking industry.

Tao Ren is a Senior Engineer, and the Deputy Chief Engineer of the Intelligent Manufacturing Division of WISDRI Engineering and Research Inc. Ltd. He graduated in Control Theory and Control Engineering from HUST. His main research directions include industrial informatization and industrial intelligence.

Industry Forum 2

Trends and Advances in Industrial Automation and Autonomous Vehicles

Chairs: Yebin Wang, Victor Huang, and Michael W. Condry

Panelists:

- **Pengwei Tian** (Alibaba Cloud)
- **Pei Huang** (e-works Ltd)
- **Honglin Li** (Dongfeng Motors)

10:45 – 11:10 a.m.

Title: Data Intelligence for Industrial Manufacturing: Practice Sharing

Abstract: Data technology with artificial intelligence on top has been upgrading industrial manufacturing in the recent 10+ years, in both production and overall delivery process. The presentation will focus on the practice of research, development, and application of data intelligence solutions in industrial manufacturing, around multiple crucial topics like quality, production, energy, etc. with concrete technical use cases and lessons learned. The presentation aims to deliver some understanding and patterns from a practice point of view regarding how data intelligence benefits industrial manufacturing upgrading with added value.

Pengwei Tian is the Senior Technical Expert and responsible for R&D of discrete manufacturing at Alibaba Cloud. Prior to his current post, he was Head of Research Group Data Analytics and AI at Siemens Technology China. Dr. Tian Peng Wei received his Ph.D. degree from Tsinghua University and has 10+ years of R&D experience in data and AI technology for industries, with solutions widely applied cross industrial verticals incl. manufacturing, energy & power, smart city, etc.

11:10 – 11:35 a.m.

Title: Trends and Practice of Digital Transformation in Chinese Manufacturing Sector

Abstract: In this talk, I will introduce digital transformation models for manufacturing, data-driven X IIoT platform, big data analysis, and AI applications. Digital twin applications and going beyond: particularly on the digital transformation strategy toward building a digital ecosystem.

Pei Huang is the CEO and editor-in-chief of e-works, Ltd. Dr. Huang is a member of the Chinese National Intelligent Manufacturing Expert Committee. He has 32 years experience of doing research, consulting, and training in the intelligent manufacturing area, and has been actively engaged in international cooperation in the intelligent manufacturing area. Dr. Huang started up e-works in 2002, which grows into a leading platform that links manufacturing enterprises, solution providers, and academia. Dr. Huang obtained his Ph.D. degree in mechanical engineering from Huazhong University of Science and Technology, Wuhan, China, in 1997. He got a senior management certificate from Rensselaer Polytechnic Institute, Troy, NY, in 2001.

11:35 a.m. – 12:00 noon.

Title: Exploration of the Connected Collaborative Perception and Decision-Making Based on C-V2X in Dongfeng Motors

Abstract: Intelligent connected vehicles refer to a new generation of intelligent vehicles equipped with advanced onboard sensing, decision-making planning and control, execution, and other devices, and integrating modern communication and network technology, enabling vehicles to have a complex environmental perception, intelligent decision-making and control functions, and can comprehensively achieve safety, energy conservation, environmental protection, and comfortable driving. From the perspective of perception and decision-making planning control carriers, intelligent connected vehicles can be divided into autonomous intelligent vehicles and connected vehicles. Among them, the perception and decision-making planning control carrier of autonomous intelligent vehicles is vehicles, while the perception or decision-making planning control carrier of connected vehicles is composed of vehicles and roadside equipment. The onboard perception unit of autonomous intelligent vehicles has many recognition limitations in blind spots, lane recognition under adverse weather conditions, beyond the line of sight perception, traffic signal recognition, and traffic guidance, which pose certain traffic safety hazards to intelligent driving vehicles. However, roadside intelligent terminals can compensate for the perception and planning control limitations of autonomous intelligent vehicles, forming a combination of autonomous and networked vehicle road coordination solutions, Thus improving traffic safety and improving traffic efficiency.

This presentation introduces Dongfeng Motor's practice in the field of vehicle road collaboration, including system architecture design for different application scenarios, achieving target-level integration between vehicle and road ends in the designed system architecture, and mainly solving difficulties such as target spatiotemporal synchronization and fusion spatial compensation. After completing the generation of collaborative perception targets, we attempt to reconstruct traffic environment information and achieve vehicle decision planning and control in various scenarios through reinforcement learning to complete vehicle traffic tasks.

Honglin Li is the Chairman of the Intelligent Connected Vehicles Professional Technical Committee of DFM, the chief engineer of intelligent technology, and the pilot of the AI platform of DFM Technology Centre. With 20 years of working experience in the automotive industry, he has successively engaged in vehicle architecture design and intelligent driving system integration, and led the development of intelligent driving systems for multiple vehicles. Currently, he is engaged in research and engineering applications of V2X, and artificial intelligence, and serves as: an expert in the coordination of international standards and regulations of UN WP.29 GRVA; part-time doctoral supervisor for the professional degree of Wuhan University of Technology; managing director of IEEE PES Electric Vehicle Charging and Discharging Technology Subcommittee; committee member of Chinese Association for Artificial Intelligence.

Tutorials

IEEE ICPS 2023 will host two tutorials during the conference, addressing 1) Advanced Technologies for Industrial Systems: Cyber-Security Protection, Intelligent Control, and Data Analytics, and 2) Advanced Technologies for Industrial Systems: Intelligent Alarm Monitoring and Applications. Tutorials in IES conferences can provide an opportunity for attendees to learn about a specific topic or technology in a structured and focused manner. They can help to supplement the knowledge gained from attending talks and sessions, and provide attendees with a deeper understanding of a particular area.

Organizers:

Wenkai Hu

China University of Geosciences

China

Jiandong Wang

Shandong University of Science and Technology

China

Chuan-Ke Zhang

China University of Geosciences

China

Tutorial 1

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May 8, 14:00-15:30
Jingzhou Hall

Advanced Technologies for Industrial Systems: Cyber-Security Protection, Intelligent Control, and Data Analytics

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Presenters:

- **Chunjie Zhou** (Huazhong University of Science and Technology)
- **Chunjie Yang** (Zhejiang University)
- **Fan Yang** (Tsinghua University)

This tutorial is designed to provide attendees with a comprehensive overview of the latest advancements in the fields of cyber-security protection, intelligent control, and data analytics in industrial systems. The tutorial is comprised of three talks. The first one will focus on the importance of cyber-security for industrial systems in the age of the industrial internet and explore advanced techniques against cyber-attacks. The second one will delve into the key technologies and applications of high-performance intelligent operation control of large blast furnace ironmaking systems. The third one will illustrate the importance of data analytics in identifying the root cause of system failures and optimizing system performance, and explore real-world case studies about the application of these techniques in industrial systems. The tutorial will be led by leading experts in this field, who will provide attendees with valuable insights and practical knowledge that can be applied to industrial systems.

14:00 – 14:30 p.m.

Title: Cyber Security Protection Technology for Control Systems in the Context of Industrial Internet

Abstract: Industrial control systems are typical examples of complex cyber-physical systems that play a vital role in the national economy and people's daily lives. As critical national infrastructure, they have widespread applications across various industries. With the increasing adoption of industrial internet technologies and the deep integration of informatization and industrialization, the issue of information security in industrial control systems has become increasingly prominent. However, the operational modes, working characteristics, and structural features of industrial control systems make their information security issues different from those of traditional IT systems. This report first introduces industrial internet technologies and analyzes the information security protection framework of the industrial internet. Then, based on the characteristics of industrial control systems, it provides a detailed analysis of the unique information security issues and challenges of control systems in the industrial internet environment. Finally, the report discusses possible solutions to information security protection in this context and introduces the key technologies involved.

Chunjie Zhou is a distinguished professor, doctoral supervisor, and Special Class I professor of the Huazhong Scholars Program at Huazhong University of Science and Technology. He has received the Baosteel Outstanding Teacher Award and serves as a member of the Teaching Steering Committee for Automation in Higher Education Institutions under the Ministry of Education. He is also the Associate Dean of the School of Artificial Intelligence and Automation at Huazhong University of Science and Technology and the Chairman of the Wuhan Automation Association. His research focuses on the security of the industrial internet and industrial cyber-physical systems. As a principal investigator, he has led projects funded by the National Natural Science Foundation, national key research and development plans, and other national programs. He has published over 40 academic papers in significant domestic and international journals and conferences and has been invited to contribute articles to prestigious journals like Proceedings of the IEEE. He has also published more than 20 papers in top-tier international journals such as IEEE Transactions. He has participated in the development of over 10 national standards related to the security of industrial control systems and held more than 20 authorized national invention patents.

14:30 – 15:00 p.m.

Title: Key technology and application of high-performance intelligent operation control of large blast furnace ironmaking system

Abstract: High-performance operation control of large blast furnace iron-making system is a major demand for "safe, high-quality, efficient and low-carbon" operation of the iron and steel industry. This report addresses the challenges of high-performance operation control brought by the high smelting temperature, high spatial and temporal dynamics, and high complexity of the large blast furnace ironmaking system, describes the key technologies of intelligent sensing, intelligent diagnosis and safe operation, and intelligent optimized cooperative control of the system, introduces the system development and implementation results, and discusses the future research direction and challenges.

Chunjie Yang is a distinguished professor of Zhejiang University, doctoral supervisor, deputy director of the National Engineering Research Center for Industrial Automation, an expert enjoying the special government allowance of the State Council, and a winner of the first prize of the National Science and Technology Progress Award. He is a standing member of Technical Committee on Process Control, member of Metallurgical Automation Branch of Chinese Society of Metals. He is mainly engaged in research on Industrial Internet, digital twins, optimal control and fault diagnosis of ironmaking system, etc. He has presided over a number of important scientific research work such as the Industrial Internet Innovation and Development Project of the Ministry of Industry and Information Technology of the People's Republic of China and the key projects of the National Natural Science Foundation of China. He authorized over 50 invention patents, published over 100 academic papers, won one first prize and two second prizes of the National Science and Technology Progress Award, and six provincial and ministerial level science and technology awards.

15:00 – 15:30 p.m.

Title: Causality and Root Cause Analysis Based on Data Analytics

Abstract: This presentation will introduce advanced alarm strategy and abnormal situation monitoring based on process data analytics and, in particular, correlation/causality analysis based on mining of process and alarm data in combination with process connectivity knowledge, with applications to root cause analysis of propagated or even plant-wide abnormalities. The methods of Granger causality and transfer entropy will be demonstrated.

Fan Yang received the B.Eng. degree in Automation and the Ph.D. degree in Control Science and Engineering from Tsinghua University, Beijing, China, in 2002 and 2008, respectively. After working as a Postdoctoral Fellow with Tsinghua University and the University of Alberta, he joined the Department of Automation, Tsinghua University in 2011, where he is currently a Professor. His research interests include topology modeling of large-scale processes, abnormal events monitoring, process hazard analysis, and smart alarm management. He was a recipient of the Young Research Paper Award from the IEEE Control Systems Society Beijing Chapter in 2006, the Science and Technology Progress Award from the Chinese Association of Automation in 2018, the Zhang Zhongjun Excellent Paper Award in 2019, and the Teaching Achievement Awards from Tsinghua University in 2012, 2014, 2016, and 2019 and from the Chinese Association of Automation in 2016.

Tutorial 2

Advanced Technologies for Industrial Systems: Intelligent Alarm Monitoring and Applications

Presenters:

- **Chunli Wang** (SINOPEC Research Institute of Safety Engineering Co., Ltd)
- **Jiandong Wang** (Shandong University of Science and Technology)
- **Jun Shang** (Tongji University)

Alarm systems are critical assets for the operational safety and efficiency of modern complex industrial facilities. However, the presence of nuisance alarms and alarm floods severely impair the performance of alarm systems, compromise the safety of system operations, and may even cause catastrophic consequences. Extensive studies have been conducted by both academic scholars and industrial practitioners to develop new techniques for industrial alarm monitoring. Advanced tools such as machine learning, data mining, deep learning, and causality inference have been applied successfully to alarm system design and alarm data analysis and have been proven excellent in reducing nuisance alarms and handling alarm floods based on experimental results and practical applications. The objective of this workshop is to introduce recent advances in industrial alarm monitoring, present new ideas through presentations and discussions, as well as attract more academic researchers and industrial practitioners into working and shaping this fascinating research area. Interesting topics in this workshop include alarm system design, reduction of nuisance alarms, alarm flood analysis, etc. In addition, speakers from the industry will discuss practical issues and solutions in real alarm management and also present implementations of advanced alarm management techniques.

15:40 – 16:10 p.m.

Title: Introduction to Alarm Management Standards, Technologies, and Applications in the Petrochemical Industry

Abstract: This report will mainly introduce domestic and international alarm management standards and discuss in detail the history of alarm management standards in the petrochemical industry. It will also systematically introduce alarm system performance evaluation and optimization technologies, advanced alarm management technologies, and the application of these alarm management and technologies in actual chemical industries.

Chunli Wang is an Expert and a Professorial Senior Engineer at the SINOPEC Research Institute of Safety Engineering Co., Ltd. He has been consistently engaged in the research and development of intelligent monitoring and early warning technology for abnormal conditions, process control and optimization technology, and process safety management in the petrochemical industry, and participated in writing the first national standard for alarm management in China, namely, "Process Industry Alarm System Management."

16:10 – 16:40 p.m.

Title: Optimal Design of Multivariate Alarm Systems Based on Normal Operating Zones

Abstract: This talk will focus on the optimal design of multivariate alarm systems with multiple-correlated process variables. The geometric space formulated by allowable variational ranges of process variables is called the normal operating zone (NOZ). If an operating point is inside the NOZ, then the operating condition is regarded as being normal; otherwise, an alarm arises to indicate the deviation of an operating point from the NOZ. The NOZ model is built, and dynamic alarm thresholds are designed to implement such a multivariate alarm system. Numerical and

industrial examples will be provided to illustrate the design methods.

Jiandong Wang is a Professor in the College of Electrical Engineering and Automation at the Shandong University of Science and Technology, Qingdao, Shandong Province, China. He received the B.E. in Automatic Control from Beijing University of Chemical Technology, Beijing, China, in 1997, and the M.Sc. and Ph.D. in Electrical and Computer Engineering from the University of Alberta, Canada, in 2003 and 2007, respectively. From 1997 to 2001, he was a Control Engineer with the Beijing Tsinghua Energy Simulation Company, Beijing, China. From December 2006 to October 2016, he was an Assistant/Associate/Full Professor with the College of Engineering, Peking University, China. His research interests include process control, industrial alarm systems, optimal scheduling, and their applications to industrial problems. Dr. Wang has served as an Associate Editor/Guest Editor for Journal of Franklin Institute, Systems and Control Letters, and Control Engineering Practice.

16:40 – 17:10 p.m.

Title: Feature Vectors in the Early Classification of Alarm Floods

Abstract: Early classification of ongoing alarm floods in industrial monitoring systems is crucial for safe and efficient operations. It provides online decision support for plant operators to take timely action without waiting for the end of an alarm flood. This presentation discusses feature vectors in the problem of early classification of alarm floods. We will analyze the properties of different feature vectors in different approaches. We will also discuss the advantages and disadvantages of different feature vectors in the sense of classification accuracy, computational complexity, and generalization ability.

Jun Shang received the B.Eng. degree in control science and engineering from Harbin Institute of Technology, Harbin, China, in 2013, and the Ph.D. degree in control science and engineering from Tsinghua University, Beijing, China, in 2018. From September 2018 to January 2023, he was a Postdoctoral Fellow with the Department of Electrical and Computer Engineering, University of Alberta, Edmonton, Canada. He is currently a Professor with the Department of Control Science and Engineering, Tongji University, Shanghai, China. His research interests include cyber-physical security, alarm management, fault diagnosis, and networked control.

Program at a Glance

IEEE 6th International Conference on Industrial Cyber-Physical Systems (ICPS)
Wuhan, China
May 8-11, 2023

May 8 (Monday)	May 9 (Tuesday)		May 10 (Wednesday)		May 11 (Thursday)	
Registration: Wuhan East Lake International Conference Center Time: May 8, 8:00-22:00 Tutorial 1: May 8, 14:00-15:30 Tutorial 1 by Chunjie Zhou, Chunjie Yang, Fan Yang. Tutorial 2: May 8, 15:40-17:10 Tutorial 2 by Chunli Wang, Jiandong Wang, Jun Shang. Venue: Jingzhou Hall	08:30-08:50 08:50-09:10 09:10-10:10 10:10-10:30 10:30-12:00	Opening Ceremony Group Photo Keynotes 1 Keynotes 1 by Xiaohong Guan Tea Break Industry Forum 1 Industry Forum 1 by Panpan Hu, Ying Shi, Tao Ren.	09:00-10:00 10:00-10:30 10:30-12:00	Keynotes 2 Keynotes 2 by Peng Shi Tea Break Industry Forum 2 Industry Forum 2 by Pengwei Tian, Pei Huang, Honglin Li.	08:30-09:30 09:30-09:50 09:50-10:50 10:50-11:20	Keynotes 3 Keynotes 3 by Shinji Hara Tea Break Poster Sessions ThA01 Closing Ceremony
	12:00-13:30 Lunch No.2 Tingtao Floor, Oriole Hall		12:00-13:30 Lunch No.2 Tingtao Floor, Oriole Hall		11:30-13:30 Lunch No.2 Tingtao Floor, Oriole Hall	
	13:30-15:30 15:30-15:50 15:50-18:10	Oral Sessions TuA01-05 Break Oral Sessions TuB01-05	13:30-15:30 15:30-15:50 15:50-17:50	Oral Sessions WeA01-05 Break Oral Sessions WeB01-05		
			18:00-20:00 Conference Banquet No.2 Tingtao Floor, Haiguang Hall, Lingbo Hall, Bailu Hall			

Timetable of Technical Program

Monday, May 8, 2023, Wuhan East Lake International Conference Center (ELICC)				
08:00-22:00	Registration			
14:00-15:30	**Tutorial 1:** *Advanced Technologies for Industrial Systems: Cyber-Security Protection, Intelligent Control, and Data Analytics*, Presenters: **Chunjie Zhou, Chunjie Yang, Fan Yang**, Venue: Jingzhou Hall			
15:40-17:10	**Tutorial 2:** *Advanced Technologies for Industrial Systems: Intelligent Alarm Monitoring and Applications*, Presenters: **Chunli Wang, Jiandong Wang, Jun Shang**, Venue: Jingzhou Hall			
Tuesday, May 9, 2023, Wuhan East Lake International Conference Center (ELICC)				
08:30-08:50	Opening Ceremony			
08:50-09:10	Group Photo			
09:10-10:10	**Keynotes 1**: *Cyber-Physical Energy Systems for the Energy Revolution*, Prof. **Xiaohong Guan**, Venue: Yellow Crane Hall, Chair: Xin Chen			
10:10-10:30	Tea Break			
10:30-12:00	**Industry Forum 1**: *Sensor Networks toward Autonomy and Sustainability*, Lecturers: **Panpan Hu, Ying Shi, Tao Ren**, Chairs: Zhibo Pang, Allen Chen, and Victor Huang, Venue: Yellow Crane Hall			
12:00-13:30	**Lunch**, Venue: No.2 Tingtao Floor, Oriole Hall			

Time/Room	Qianjiang Hall	Jasmine Hall	Lilac Hall	Tianmen Hall	Xiantao Hall
	TuA01	**TuA02**	**TuA03**	**TuA04**	**TuA05**
13:30-15:30	Engineering (1)	Engineering (2)	Data-driven fabrication and control for autonomous robots	Advanced Control in Aerospace Cyber-Physical and Autonomous Systems	Best Paper Award Finalist
15:30-15:50	Break				
	TuB01	**TuB02**	**TuB03**	**TuB04**	**TuB05**
15:50-18:10	Theory and Technologies (1)	Active Disturbance Rejection and Intelligent Control for Industrial Systems	Distributed Cooperative Control of Multi-agent Systems and Its Applications	Theories, Technologies and Applications of Intelligent and Connected Vehicles	Digital Twin for Industrial IoT

Wednesday, May 10, 2023, Wuhan East Lake International Conference Center (ELICC)					
09:00-10:00	**Keynotes 2**: *Cyber-physical systems: Analysis and Design*, Prof. **Peng Shi**, Venue: Yellow Crane Hall, Chair: Jundong Wu				
10:00-10:30	Tea Break				
10:30-12:00	**Industry Forum 2**: *Trends and Advances in Industrial Automation and Autonomous Vehicles*, Lecturers: **Pengwei Tian, Pei Huang, Honglin Li**, Chairs: Yebin Wang, Victor Huang, and Michael W. Condry, Venue: Yellow Crane Hall				
12:00-13:30	**Lunch**, Venue: No.2 Tingtao Floor, Oriole Hall				

Time/Room	Qianjiang Hall	Jasmine Hall	Lilac Hall	Tianmen Hall	Xiantao Hall
	WeA01	**WeA02**	**WeA03**	**WeA04**	**WeA05**
13:30-15:30	Theory and Technologies (2)	Representation Learning Theories, Methods, and Algorithms with Application to Health Management of Complex Equipment	Recent Advances on Networked Control Systems: Analysis and Synthesis	Fault and Attack Detection for Interconnected Systems	Cybersecurity of the Future DER-based Power Grid
15:30-15:50	Break				
	WeB01	**WeB02**	**WeB03**	**WeB04**	**WeB05**
15:50-17:50	Applications (1)	Applications (2)	Data Oriented Prognostics and Health Management for Industrial Systems (1)	Data Oriented Prognostics and Health Management for Industrial Systems (2)	Application of Artificial Intelligence in Iron and Steel Metallurgy Process
18:00-20:00	**Conference Banquet, Venue: No.2 Tingtao Floor, Haiguang Hall, Lingbo Hall, Bailu Hall**				

Thursday, May 11, 2023, Wuhan East Lake International Conference Center (ELICC)		
08:30-09:30	**Keynotes 3**: *Glocal (Global/Local) Control for Hierarchical Cyber Physical Systems: Theoretical Foundation towards Practical Applications*, Prof. **Shinji Hara**, Venue: Yellow Crane Hall, Chair: Jinhua She	
09:30-09:50	Tea Break	
09:50-10:50	**Poster Session ThA01, Venue: Yellow Crane Hall**	
10:50-11:20	**Closing Ceremony**, Venue: Yellow Crane Hall	
11:30-13:40	**Lunch**, Venue: Yellow Crane Hall	

	Technical Tracks		Special Sessions		Best Paper

Technical Program

Tuesday, May 9, 2023

Keynote 1	9:10-10:10	Yellow Crane Hall
Keynote 1		

Chair: Xin Chen   China Univ. of GeoSci.

Cyber-physical Energy Systems for the Energy Revolution

Xiaohong Guan   Xi'an Jiaotong Univ.

Industry Forum 1	10:30-12:00	Yellow Crane Hall
Industry Forum 1		

Chair: Zhibo Pang   ABB/KTH

Chair: Allen Chen   Innovatech

Chair: Victor Huang   Onlye Solutions

Industry Forum 1   10:30-12:00

Sensor Networks toward Autonomy and Sustainability

Panpan Hu   VanJee Tech.

Ying Shi   Zhejiang Supcon Co., Ltd

Tao Ren   WISDRI Engineering & Research Incorporation Ltd.

TuA 01	13:30-15:30	Qianjiang Hall
Engineering		

Chair: Dawei Shi   Beijing Univ. of Tech.

Co-Chair: Wenxin Lei   Univ. of Electronic Sci. & Tech. of China

●TuA01-1   13:30-13:50

A Practical Vision-Aided Multi-Robot Autonomous Navigation using Convolutional Neural Network

Alexandre Rocchi   Dalhousie Univ.

Zike Wang   Dalhousie Univ.

Yajun Pan   Dalhousie Univ.

●TuA01-2   13:50-14:10

Online Learning-based Trust Prediction for Reliable and Energy-efficient Transmission

Xiaolin Wang   East China Univ. of Sci. & Tech.

Jinglong Zhang   East China Univ. of Sci. & Tech.

Xuanzhao Lu   East China Univ. of Sci. & Tech.

Xiaojing Wen   East China Univ. of Sci. & Tech.

Fangfei Li   East China Univ. of Sci. & Tech.

●TuA01-3   14:10-14:30

An Input Module of Deep Learning for the Analysis of Time Series with Unequal Length

Hewei Gao   Harbin Inst. of Tech.

Xin Huo   Harbin Inst. of Tech.

Chao Zhu   Shanghai Rising Digital Co, Ltd.

●TuA01-4   14:30-14:50

Life Cycle Economic Policy for Multi-Level Imperfect Maintenance and Repairman Assignment

Shunkang Zhao   Chongqing Univ.

Xiaohui Chen   Chongqing Univ.

Youjun An   Chongqing Univ.

Ziye Zhao   Chongqing Univ.

●TuA01-5   14:50-15:10

Edge-enabled Zero Trust Architecture for ICPS with Spatial and Temporal Granularity

Wenxin Lei   Univ. of Electronic Sci. & Tech. of China

Zhibo Pang   ABB Corporate Research Center

Hong Wen   Univ. of Electronic Sci. & Tech. of China

Wenjing Hou   Univ. of Electronic Sci. & Tech. of China

Xiaoling Zhang   Northeastern Univ.

●TuA01-6   15:10-15:30

Improving the Traceability of Wood-based Sheet Leftovers using Computer Vision

Nuno Guedes   Laboratory Collaborative Mountains of Research

Iaggo Capitanio   SusTEC - Associate Laboratory for Sustainability & Tech. in Mountains Regions

Higor Vendramini Rosse   Laboratory Collaborative Mountains of Research

João Paulo Coelho   SusTEC - Associate Laboratory for Sustainability & Tech. in Mountains Regions

José Barbosa   Collaborative Laboratory Mountains of Research

Nélio Pires   Carpintaria Mofreita Lda.

João Magalhães   NKA - New Knowledge Advice Lda.

TuA 02	13:30-15:30	Jasmine Hall
Engineering		

Chair: Yuzhe Li   Northeastern Univ.

Co-Chair: Ancai Zhang   Linyi Univ.

●TuA02-1   13:30-13:50

Sound Field Control by Using Equivalent Input Disturbance Method

Toshiki Watanabe   Tokyo Univ. of Tech.

Jinhua She	Tokyo Univ. of Tech.
Zewen Wang	China Univ. of GeoSci.

●TuA02-2   13:50-14:10

A StyleGAN3-Based Data Augmentation Method for Ceramic Defect Detection

Huimin Ou	China Univ. of GeoSci.
Jianqi An	China Univ. of GeoSci.
Xing-ao Wang	China Univ. of GeoSci.
Jianru Xiong	China Univ. of GeoSci.
Xin Chen	China Univ. of GeoSci.
Qingyi Wang	China Univ. of GeoSci.

●TuA02-3   14:10-14:30

Challenges and Opportunities of DevOps in Cyber-Physical Production Systems Engineering

István Koren	RWTH Aachen Univ.
Felix Rinker	Inst. of Information Systems Engineering, TU Wien
Kristof Meixner	Inst. of Information Systems Engineering, TU Wien
Jasminka Matevska	City Univ. of Applied Sciences
Jörg Walter	OFFIS-Inst. for Information Tech.

●TuA02-4   14:30-14:50

Vibration Monitoring Signal Denoising of Industrial Machine Transmission System

Ran Hua	Nantong Power Supply Branch of State Grid Jiangsu Electric Power Co., Ltd.
Jianxin Shao	Nantong Power Supply Branch of State Grid Jiangsu Electric Power Co., Ltd.
Cencheng Pan	Nantong Power Supply Branch of State Grid Jiangsu Electric Power Co., Ltd.
Songyao Xing	Nantong Power Supply Branch of State Grid Jiangsu Electric Power Co., Ltd.
Weichao Huang	Nantong Power Supply Branch of State Grid Jiangsu Electric Power Co., Ltd.

●TuA02-5   14:50-15:10

Extraction of Current Characteristic Value of High-Voltage Bircuit Breaker Switching Coil based on Empirical Wavelet Transform

Xuefeng Ding	Nantong Power Supply Branch of State Grid Jiangsu Electric Power Co., Ltd.
Mingyu Gu	Nantong Power Supply Branch of State Grid Jiangsu Electric Power Co., Ltd.
Gufeng Xia	Nantong Power Supply Branch of State Grid Jiangsu Electric Power Co., Ltd.
Hongcheng Jiang	Nantong Power Supply Branch of State Grid Jiangsu Electric Power Co., Ltd.

Jun Zhao	Nantong Power Supply Branch of State Grid Jiangsu Electric Power Co., Ltd.

●TuA02-6   15:10-15:30

Towards an Interdisciplinary Technical Debt Interaction and Visualization Tool

Fandi Bi	Technical Univ. of Munich
Birgit Vogel-Heuser	Technical Univ. of Munich
Edgar Benet Sapera	Technical Univ. of Munich

TuA 03	13:30-15:30	Lilac Hall
Data-driven fabrication and control for autonomous robots		

Chair: Renjie Ma	Harbin Inst. of Tech.
Co-Chair: Zhijian Hu	Nanyang Technological Univ.

●TuA03-1   13:30-13:50

Cooperative Adaptive Cruise Control for Vehicles under False Data Injection Attacks

Zhongwei Feng	Northeast Agricultural Univ.
Keyun Qin	Northeast Agricultural Univ.
Xiaohang Jiao	Northeast Agricultural Univ.
Feifei Du	Northeast Agricultural Univ.
Dongshen Li	Northeast Agricultural Univ.

●TuA03-2   13:50-14:10

Image-based Calligraphy Information Extraction and Manipulator Copying

Xinyuan Cao	Shanghai Jiao Tong Univ.
Shaoyuan Li	Shanghai Jiao Tong Univ.

●TuA03-3   14:10-14:30

Additive Manufactured Active Thermal-Stream-Control Shell Infilled with the Gyroid Surface

Lin Yu	Beijing Inst. of Astronautical System Engineering
Yi Qin	Beijing Inst. of Astronautical System Engineering
Zenghao Lin	Harbin Inst. of Tech.
Huichun Tian	Harbin Inst. of Tech.
Xi Sheng	Beijing Inst. of Astronautical System Engineering
Yuxi Zhang	Beijing Inst. of Astronautical System Engineering
Jianxin Qiao	Harbin Inst. of Tech.

●TuA03-4   14:30-14:50

A Lite Fireworks Algorithm with Fractal Dimension Constraint for Feature Selection

Min Zeng	Guangdong Univ. of Sci. & Tech.
Haimiao Mo	Hefei Univ. of Tech.
Zhiming Liang	Fifth Affiliated Hospital of Guangzhou Medical Univ.

Hua Wang	Guangdong Univ. of Sci. & Tech.
●TuA03-5	14:50-15:10

Backstepping-based Anti-disturbance Flight Control for Attitude and Altitude Unmanned Helicopters with State Constraints

Yankai Li	Xi'an Univ. of Tech.
Yulong Huang	Xi'an Univ. of Tech.
Han Liu	Xi'an Univ. of Tech.
Jiajie Li	Xi'an Univ. of Tech.
●TuA03-6	15:10-15:30

Research on Testing and Evaluation of USV Formation Control based on Nonlinear Dynamic Inversion

Shun Li	Jiangsu Univ. of Sci. & Tech.
Wentao Xue	Jiangsu Univ. of Sci. & Tech.
Hui Ye	Jiangsu Univ. of Sci. & Tech.
Hao Zhang	Jiangsu Univ. of Sci. & Tech.

TuA 04	13:30-15:30	Tianmen Hall
Advanced Control in Aerospace Cyber-Physical and Autonomous Systems		

Chair: Kenan Yong	Nanjing Univ. of Aeronautics and Astronautics
Co-Chair: Zeyang Yin	Central South Univ.
●TuA04-1	13:30-13:50

Fault-Tolerant Attitude Tracking Control for Satellite based on Event-Triggered Training

Baomin Li	Nanjing Univ. of Aeronautics and Astronautics
Kenan Yong	Nanjing Univ. of Aeronautics and Astronautics
Shuyi Shao	Nanjing Univ. of Aeronautics and Astronautics
●TuA04-2	13:50-14:10

Event-triggered-based Control for Dynamic Positioning Vessels Subject to External Disturbances

Haibin Wang	Harbin Univ. of Sci. & Tech.
Bo You	Harbin Univ. of Sci. & Tech.
Ziyang Xiao	Harbin Research Inst. of Electrical Instruments Co., Ltd.
Weisong Cai	Harbin Research Inst. of Electrical Instruments Co., Ltd.
Jingjing Li	Harbin Research Inst. of Electrical Instruments Co., Ltd.
●TuA04-3	14:10-14:30

Anti-Saturation Attitude Tracking Control for Spacecraft with Flexible Performance

Yiqi Xu	Beihang Univ.

Bin Song	Aerospace System Engineering, Shanghai
Qinglei Hu	Beihang Univ.
●TuA04-4	14:30-14:50

Switching Control of 2-D Kuramoto-Sivashinsky Equation under Averaged Measurements

Jing Zhang	Univ. of Sci. & Tech. Beijing
Wen Kang	Beijing Inst. of Tech.
●TuA04-5	14:50-15:10

Boundary Protection Control of a Hybrid Vertical Take-Off and Landing UAV

Tongqing Chen	Hohai Univ.
Dawei Wu	Hohai Univ.
Shenjie Xv	Hohai Univ.
Bolin Wang	Hohai Univ.
Xiaoqi Huang	Hohai Univ.
●TuA04-6	15:10-15:30

Spacecraft Attitude Control based on Iterative Sequential Action Control

Guanhua Huang	Central South Univ.
Caisheng Wei	Central South Univ.
Zeyang Yin	Central South Univ.

TuA 05	13:30-15:30	Xiantao Hall
Best paper award finalist		

Chair: Yong He	China Univ. of GeoSci.
Co-Chair: Chunhui Zhao	Zhejiang Univ.
●TuA05-1	13:30-13:50

Multimode DALSTM Model for Anomaly Detection of Nuclear Reactor Core

Yingnan Wang	Zhejiang Univ.
Xin Wang	China Nuclear Power Engineering Co. Ltd., Shenzhen
Yinglong Wan	Zhejiang Univ.
Xianmin Li	China Nuclear Power Engineering Co. Ltd., Shenzhen
Chunhui Zhao	Zhejiang Univ.
Zhihong Lv	China Nuclear Power Engineering Co. Ltd., Shenzhen
●TuA05-2	13:50-14:10

Electric Vehicle Charging Load Time-Series Prediction based on Broad Learning System

Wang Sike	State Grid Hubei Electric Power Co., Ltd.
Yu Liansong	State Grid Electric Power Research Inst. Wuhan Nanrui Co.,Ltd.
Pang Bo	State Grid Hubei Electric Power Co., Ltd.
Zhu Xiaohu	State Grid Electric Power Research Inst.

Wuhan Nanrui Co.,Ltd.

Cao Peng	State Grid Hubei Electric Power Co., Ltd.
Shen Yang	State Grid Electric Power Research Inst.
	Wuhan Nanrui Co.,Ltd.

●TuA05-3 14:10-14:30

Obstacle Detection of Unmanned Surface Vessel based on Faster RCNN

Jiahe Cai	China Univ. of GeoSci.
Sheng Du	China Univ. of GeoSci.
Chengda Lu	China Univ. of GeoSci.
Bo Xiao	Guangzhou Marine Geological Survey
Min Wu	China Univ. of GeoSci.

●TuA05-4 14:30-14:50

Similarity Analysis of Industrial Alarm Floods Based on Word Embedding and Move–Split–Merge Distance

Xiangxiang Zhang	China Univ. of GeoSci.
Wenkai Hu	China Univ. of GeoSci.
Ahmad W. Al-Dabbagh	Univ. of British Columbia
Weihua Cao	China Univ. of GeoSci.

●TuA05-5 14:50-15:10

Stealthy Data Integrity Attacks Against Grid-tied Photovoltaic Systems

Sha Peng	Zhejiang Univ.
Mengxiang Liu	Imperial College London
Ke Zuo	Zhejiang Univ.
Wei Tan	Shanghai Hanxiang Intelligent Technology Co.,Ltd.
Ruilong Deng	Zhejiang Univ.

●TuA05-6 15:10-15:30

Allocating Defense Resources for Spatial Cyber-physical Power Systems based on Deep Reinforcement Learning

Zhengcheng Dong	Wuhan Univ.
Mian Tang	Army Engineering Univ. of PLA
Meng Tian	Wuhan Univ.

TuB 01 15:50-18:10 Qianjiang Hall
Theory and Technologies

Chair: Min Ding	China Univ. of GeoSci.
Co-Chair: Tengfei Li	Foshan Univ.

●TuB01-1 15:50-16:10

Deep Reinforcement Learning based Demand Response for Domestic Variable Volume Water Heater

Lei Chen	Xiangtan Univ.
Yongxin Su	Xiangtan Univ.
Tao Zhang	Xiangtan Univ.

●TuB01-2 16:10-16:30

Quantized Finite-Time H∞ Control of Fuzzy Distributed Parameter CPSs

Tengfei Li	Foshan Univ.
Ju H. Park	Yeungnam Univ.

●TuB01-3 16:30-16:50

Intelligent Vehicle Trajectory Tracking Control based on H∞ Proportional-differential Controller

Gongwei Pan	Wuhan Univ. of Tech.
Zhiyong Feng	Wuhan Univ. of Tech.
Huiru Guo	Wuhan Univ. of Tech.

●TuB01-4 16:50-17.10

Research on Dynamic Labels in Network Pruning

Lijun Zhang	China Univ. of GeoSci.
Yaomin Luo	China Univ. of GeoSci.
Shiqi Xie	China Univ. of GeoSci.
Xiucheng Wu	China Univ. of GeoSci.

●TuB01-5 17:10-17:30

Interference Suppression of Circulating Current Fluctuation Based on Equivalent Input Disturbance in Parallel Inverter

Zili Tao	China Univ. of GeoSci.
Min Ding	China Univ. of GeoSci.
Bo Hu	STATE GRID Corporation of China, Beijing
Meng Ye	China Univ. of GeoSci.

●TuB01-6 17:30-17:50

Observer-Based Robust Adaptive Control for the Synchronization of Uncertain Multiple Robot Manipulators

Abdul Rehan Khan Mohammed	Univ. of Warwick
Jiayi Zhang	Univ. of Warwick
Benjamin Silverstone	Univ. of Warwick
Ahmad Bilal	Univ. of Warwick

●TuB01-7 17:50-18:10

Encoding Techniques on Multivariate Time Series Signals for Failure Prevention of Industrial Assets with Unsupervised Deep Anomaly Detection

Fatih S. Bayram	Heilbronn Univ. of Applied Sciences
Md Nur Amin	Heilbronn Univ. of Applied Sciences
Aleksandra Melke	Operational Excellence Adolf Würth GmbH & Co. KG
Roland Schneider	Operational Technology Adolf Würth GmbH & Co. KG
Roman Radtke	Heilbronn Univ. of Applied Sciences
Alexander Jesser	Heilbronn Univ. of Applied Sciences

TuB 02 15:50-18:10 Jasmine Hall
Active Disturbance Rejection and Intelligent Control for Industrial Systems

Chair: Youwu Du	Jiangsu Univ. of Tech.

Co-Chair: Zixin Huang   Wuhan Inst. of Tech.

●TuB02-1   15:50-16:10

A Consecutive Control Strategy based on Quadratic Differentiable Trajectory for Planar Multi-link Underactuated Manipulator with Passive last joint

Huang Zixin   Wuhan Inst. of Tech.

Hou Mengyu   Wuhan Inst. of Tech.

Wei Ziang   Wuhan Inst. of Tech.

Wang Wei   Zhongnan Univ. of Economics and Law

Hua Yong   Wuhan Inst. of Tech.

Wang Lejun   Chongqing Univ. of Posts & Telecommunications

●TuB02-2   16:10-16:30

Trajectory Planning and Tracking Control Strategy for Space Underactuated Manipulator via Particle Swarm Optimization

Houneng Wang   Wuhan Inst. of Tech.

Yong Hua   Wuhan Inst. of Tech.

Zixin Huang   Wuhan Inst. of Tech.

Ziang Wei   Wuhan Inst. of Tech.

Chengsong Yu   Wuhan Inst. of Tech.

Lejun Wang   Chongqing Univ. of Posts and Telecommunications

●TuB02-3   16:30-16:50

Horizontal Path-following Control based on ESO for Parafoil Systems with Error Constraint

Erlin Zhu   Jiangsu Univ. of Tech.

Youwu Du   Jiangsu Univ. of Tech.

Haitao Gao   Anhui Sci. & Tech. Univ.

Wei Song   Jiangsu Univ. of Tech.

●TuB02-4   16:50-17:10

An Model-predictive-enabled Equibalent-input-disturbance Approach for Disturbance Rejection

Yujian Zhou   China Univ. of GeoSci.

Jinhua She   Tokyo Univ. of Tech.

Feng Wang   China Univ. of GeoSci.

Makoto Iwasaki   Nagoya Inst. of Tech.

●TuB02-5   17:10-17:30

The Topology Optimization of Compliant Mechanism with 0/1 solutions based on SIMP and SSV Constraint

Xiangyang Zhou   Wuhan Textile Univ.

Shilin Wu   Wuhan Textile Univ.

●TuB02-6   17:30-17:50

Robust Tracking Control of LCL-Type Inverter based on Fixed-Time Extended Observer Method

Mengling Ma   Linyi Univ.

Ancai Zhang   Linyi Univ.

Fengzeng Zhu   Linyi Univ.

Haonan Zhang   Linyi Univ.

●TuB02-7   17:50-18:10

An Investigation of Multi-Pattern Load Altering Attack Detection

Yunpeng Wang   China Univ. of Mining & Tech.

Chunyu Chen   China Univ. of Mining & Tech.

Kaifeng Zhang   Southeast Univ.

TuB 03	15:50-18:10	Lilac Hall
Distributed Cooperative Control of Multi-agent Systems and Its Applications		

Chair: Xiaowei Jiang   China Univ. of GeoSci.

Co-Chair: Xiangyong Chen   Linyi Univ.

●TuB03-1   15:50-16:10

A Data Enhancement Strategy for Multi-Agent Cooperative Hunting based on Deep Reinforcement Learning

Zhenkun Gao   Jilin Univ.

Xiaoyan Dai   Jilin Univ.

Meibao Yao   Jilin Univ.

Xueming Xiao   Changchun Univ. of Sci. & Tech.

●TuB03-2   16:10-16:30

Impulsive Formation Control of Nonlinear Leader-Following Multi-agent Systems with Input Saturation

Ni Zhang   China Univ. of GeoSci.

Xiaowei Jiang   China Univ. of GeoSci.

Xianhe Zhang   Hubei Normal Univ.

Le You   China Univ. of GeoSci.

●TuB03-3   16:30-16:50

Optimal State Synchronization for Discrete-Time Nonlinear Multi-Agent Systems under Switching Communication Graph

Wenpeng He   China Univ. of GeoSci.

Xin Chen   China Univ. of GeoSci.

Sun Yipu   China Univ. of GeoSci.

Akinori Sekiguchi   Tokyo Univ. of Tech.

Jinhua She   Tokyo Univ. of Tech.

●TuB03-4   16:50-17:10

Stabilization of Stochastic Linear Systems via Path-dependent Feedback Control

Ruizhe Yu   China Univ. of GeoSci.

Xiaofeng Zong   China Univ. of GeoSci.

●TuB03-5   17:10-17:30

Bounded Tracking of Uncertain Multiagent Systems with Time-Delays and Multiplicative Noises

Guoliu Chen   China Univ. of GeoSci.

Xiaofeng Zong	China Univ. of GeoSci.

●TuB03-6   17:30-17:50

A Novel Adaptive DC Voltage Droop Control for MMC-MTDC Considering Local Electric Variables

Ji Sun	Linyi Univ.
Jianhua Liu	Linyi Univ.
Jianlong Qiu	Linyi Univ.
Xiangyong Chen	Linyi Univ.

●TuB03-7   17:50-18:10

Mobile Charging Platform Improves Distribution System Resilience and Electric Vehicles Charging Service

Jian Zhong	Xi'an Jiaotong Univ.
Yuqi Qian	Xi'an Jiaotong Univ.
Xiaoyang Wang	Xi'an Jiaotong Univ.
Yuhong Zhao	Xi'an Jiaotong Univ.
Pengfei Wu	Xi'an Jiaotong Univ.
Chen Chen	Xi'an Jiaotong Univ.
Meng Cai	Xi'an Jiaotong Univ.

TuB 04	15:50-18:10	Tianmen Hall

Theories, Technologies and Applications of Intelligent and Connected Vehicles

Chair: Zhiyang Ju	Beijing Inst. of Tech.
Co-Chair: Jicheng Chen	Beihang Univ.

●TuB04-1   15:50-16:10

Optimal Attitude Consensus Control of Multiple Rigid-Body Systems with Digraphs

Zhuo Zhang	Northwestern Polytechnical Univ.
Rongxin Cui	Northwestern Polytechnical Univ.
Shouxu Zhang	Northwestern Polytechnical Univ.
Huiping Li	Northwestern Polytechnical Univ.
Weisheng Yan	Northwestern Polytechnical Univ.

●TuB04-2   16:10-16:30

Output Feedback Sliding Mode Control for Nonlinear Vehicle Platoon Tracking with Multiplication Measurement Errors

Shihui Yang	Chang'an Univ.
Zongtao Zhang	Shaanxi Transportation Holding Group Co.,Ltd.
Lei Zuo	Chang'an Univ.

●TuB04-3   16:30-16:50

Distributed Output-feedback Secure Platoon Control for Connected Vehicle Systems with Sensor-actuator Attacks

Lin He	Heilongjiang Univ.
Xin Wang	Heilongjiang Univ.
Xin Li	Northeast Forestry Univ.
Xian Zhang	Heilongjiang Univ.

●TuB04-4   16:50-17:10

Trajectory Prediction Method using Deep Learning for Intelligent and Connected Vehicles

Tianqi Qie	Beijing Inst. of Tech.
Weida Wang	Beijing Inst. of Tech.
Chao Yang	Beijing Inst. of Tech.
Ying Li	Beijing Inst. of Tech.
Yuhang Zhang	Beijing Inst. of Tech.
Wenjie Liu	Beijing Inst. of Tech.

●TuB04-5   17:10-17:30

Interaction-awareness based Intention Inference of Lag Vehicle in Lane Changing Decision-Making Process

Guofu Yan	Beijing Inst. of Tech.
Huilong Yu	Beijing Inst. of Tech.
Chaopeng Zhang	Beijing Inst. of Tech.
Junqiang Xi	Beijing Inst. of Tech.

●TuB04-6   17:30-17:50

Scene-insensitive Driving Style Recognition using CAN Signal based on Factor Analysis

Chaopeng Zhang	Beijing Inst. of Tech.
Wenshuo Wang	McGill Univ.
Jian Zhang	China FAW Group Co., Ltd.,Changchun
Zhiyang Ju	Beijing Inst. of Tech.
Zhaokun Chen	Beijing Inst. of Tech.
Junqiang Xi	Beijing Inst. of Tech.

●TuB04-7   17:50-18:10

Resilient Predictive Control of Constrained Connected and Automated Vehicles under Malicious Attacks

Henglai Wei	Nangyang Technological Univ.
Yan Wang	Nangyang Technological Univ.
Jicheng Chen	Beihang Univ.
Hui Zhang	Beihang Univ.

TuB 05	15:50-18:10	Xiantao Hall

Digital Twin for Industrial IoT

Chair: Zhen Cai	Wuhan City Polytechnic
Co-Chair: Dan Zhang	Zhejiang Univ. of Tech.

●TuB05-1   15:50-16:10

Observer-based trajectory inclination control with weight-on-bit uncertainty in directional drilling systems

Zhen Cai	Wuhan City Polytechnic Univ.
Shigang Wang	Wuhan City Polytechnic Univ.
Gang Hao	Wuhan City Polytechnic Univ.

●TuB05-2   16:10-16:30

Data Modeling Method and Application Practice on Identifiable Digital Object

Bin Xie	China Academy of Information & Communications Tech., Beijing
Juan Tian	China Academy of Information & Communications Tech., Beijing
Cheng Chi	China Academy of Information & Communications Tech., Beijing
Yang Liu	China Academy of Information & Communications Tech., Beijing

●TuB05-3   16:30-16:50

Digital Twin Development: Mathematical Modeling

Dennis Krummacker	German Research Center for Artificial Intelligence
Mike Reichardt	German Research Center for Artificial Intelligence
Christoph Fischer	German Research Center for Artificial Intelligence
Hans D. Schotten	German Research Center for Artificial Intelligence

●TuB05-4   16:50-17:10

Semantic Interoperability of Digital Twins: Ontology-based Capability Checking in AAS Modeling Framework

Yining Huang	Paris-Saclay Univ.
Saadia Dhouib	Paris-Saclay Univ.
Luis Palacios Medinacelli	Paris-Saclay Univ.
Jacques Malenfant	Sorbonne Univ.

●TuB05-5   17:10-17:30

Effective Throughput Optimization of SAG Milling Process based on BPNN and Genetic Algorithm

Zhenhong Liao	China Univ. of GeoSci.
Ce Xu	Changsha Research Inst. of Mining and Metallurgy CO., Ltd.
Wen Chen	Changsha Research Inst. of Mining and Metallurgy CO., Ltd.
Qifu Chen	China Univ. of GeoSci.
Feng Wang	China Univ. of GeoSci.
Jinhua She	Tokyo Univ. of Tech.

●TuB05-6   17:30-17:50

Design and Development of Big Data System for Blast Furnace Ironmaking

Qifu Chen	China Univ. of GeoSci.
Jinhua She	Tokyo Univ. of Tech.
Min Wu	China Univ. of GeoSci.
Zhuofu Zhang	China Univ. of GeoSci.
Zhenhong Liao	China Univ. of GeoSci.

●TuB05-7   17:50-18:10

Integrating Worker Assistance Systems and Enterprise

Resource Planning in Industry 4.0

Marc Brünninghaus	Fraunhofer Inst. of Optronics, System Technologies and Image Exploitation
Magnus Redeker	Fraunhofer Inst. of Optronics, System Technologies & Image Exploitation

Wednesday, May 10, 2023

Keynote 2	9:00-10:00	Yellow Crane Hall

Keynote 2

Chair: Jundong Wu   China Univ. of GeoSci.

Cyber-physical systems: Analysis and Design

Peng Shi   Univ. of Adelaide, Australia

Industry Forum 2	10:30-12:00	Yellow Crane Hall

Industry Forum 2

Chair: Yebin Wang   Mitsubishi Electric Research Lab.

Chair: Victor Huang   Onlye Solutions

Chair: Michael Condry   ClinicAI

Industry Forum 2   10:30-12:00

Trends and Advances in Industrial Automation and Autonomous Vehicles

Pengwei Tian   Alibaba Cloud

Pei Huang   e-works Ltd

Honglin Li   Dongfeng Motors

WeA 01	13:30-15:30	Qianjiang Hall

Theory and Technologies

Chair: Hongmei Shao   China Univ. of GeoSci.

Co-Chair: Shanying Zhu   Shanghai Jiao Tong Univ.

●WeA01-1   13:30-13:50

Real-time Solar Array Data Acquisition and Fault Detection using Neural Networks

Sunil Rao   Arizona State Univ.

Deep Pujara   Arizona State Univ.

Andreas Spanias   Arizona State Univ.

Cihan Tepedelenlioglu   Arizona State Univ.

Devarajan Srinivasan   Poundra, LLC

●WeA01-2   13:50-14:10

Emotion Recognition via Environmental Context and Human Body

Chengshan Jiang   China Univ. of GeoSci.

Zhentao Liu   China Univ. of GeoSci.

●WeA01-3   14:10-14:30

Simulation and Prediction of Bubble Size and Motion Characteristics of Underwater Horizontal Flow

Zhong Yu   Wuhan Univ. of Tech.

Zhiyong Feng   Wuhan Univ. of Tech.

Xiaohe Deng   Wuhan Univ. of Tech.

Sanbao Hu   Wuhan Univ. of Tech.

●WeA01-4   14:30-14:50

The Influence of Industrial Robot Application on the Employment of the Manufacturing Industry in China

Hongmei Shao   China Univ. of GeoSci.

Hongliang Hu   COFCO Coca Cola Beverage
                                       (Xinjiang) Co. Ltd.

Xingni Liu   China Univ. of GeoSci.

Ling Zhang   China Univ. of GeoSci.

●WeA01-5   14:50-15:10

Equivalent Input Disturbance-based Model Predictive Control of Shaking Table System

Qi Lei   Central South Univ.

Cheng Wang   Central South Univ.

●WeA01-6   15:10-15:30

Asset Adminstration Shell-based Flexible Manufacturing System

Zhi Fan   Fraunhofer Inst. for Manufacturing
                              Engineering & Automation IPA

Dachuan Shi   Fraunhofer Inst. for Manufacturing
                              Engineering & Automation IPA

Olga Meyer   Fraunhofer Inst. for Manufacturing
                              Engineering & Automation IPA

Joachim   Fraunhofer Inst. for Manufacturing

Seidelmann   Engineering & Automation IPA

Hao Wang   Shanghai Jiao Tong Univ.

WeA 02	13:30-15:30	Jasmine Hall

Representation Learning Theories, Methods, and Algorithms with Application to Health Management of Complex Equipment

Chair: Wanke Yu   China Univ. of GeoSci.

Co-Chair: Shumei Zhang   Tianjin Univ.

●WeA02-1   13:30-13:50

Health Condition Monitoring of Satellite Momentum Wheel Bearing based on Canonical Variable Analysis and Sliding Interval Variance

Sirui Du   Tianjin Univ.

Shumei Zhang   Tianjin Univ.

Yang Zhao   Beijing Inst. of Spacecraft
                                    System Engineering

●WeA02-2   13:50-14:10

Prediction and Scheduling for Blast Furnace Gas Generation based on Time Series Feature Extraction

Huihang Li   China Univ. of GeoSci.

Jie Hu   China Univ. of GeoSci.

Qingfeng Yang   China Univ. of GeoSci.

Luefeng Chen   China Univ. of GeoSci.

Min Wu   China Univ. of GeoSci.

●WeA02-3   14:10-14:30

Reinforcement Learning with Reward Shaping and Hybrid Exploration in Sparse Reward Scenes

Yulong Yang   China Univ. of GeoSci.
Weihua Cao   China Univ. of GeoSci.
Linwei Guo   China Univ. of GeoSci.
Chao Gan   China Univ. of GeoSci.
Min Wu   China Univ. of GeoSci.

●WeA02-4   14:30-14:50

Tomato Disease Degree Recognition based on RGB and Lab Color Space Conversion Method

Haojie He   Central South Univ. of Forestry & Tech.
Chongyang   Central South Univ. of Forestry & Tech.
Ning
Muou Liu   Central South Univ. of Forestry & Tech.
Junjie Zhu   Central South Univ. of Forestry & Tech.

●WeA02-5   14:50-15:10

Adaptive Neural Network Asymptotic Tracking Control for Autonomous Surface Vehicles

Yongchao Liu   Qingdao Univ.
Qingzhi Wang   Qingdao Univ.
Baozeng Fu   Qingdao Univ.

●WeA02-6   15:10-15:30

Fixed-time Leader-follower Consensus of Multi-agent Systems with Nonzero Leader's Control Input

Donglin Wang   Linyi Univ.
Yue Wu   Linyi Univ.
Xiangyong Chen   Linyi Univ.
Feng Zhao   Linyi Univ.

WeA 03	13:30-15:30	Lilac Hall
Recent Advances on Networked Control Systems: Analysis and Synthesis		

Chair: Wenjuan Lin   Qingdao Univ.
Co-Chair: Xing-Chen   China Univ. of GeoSci..
Shangguan

●WeA03-1   13:30-13:50

Event-Based Model Predictive Control: From Both Resource Conservation and Anti-Attack Points of View

Fan Wei   China Univ. of GeoSci.
Chaoling Zhang   China Univ. of GeoSci.
Xiongbo Wan   China Univ. of GeoSci.

●WeA03-2   13:50-14:10

H∞ control against mixed DoS attacks for cyber-physical systems

Huiting Wang   China Univ. of GeoSci.
Chuanke Zhang   China Univ. of GeoSci.

Yong He   China Univ. of GeoSci.

●WeA03-3   14:10-14:30

Robot-Assisted Trajectory Planning Method for NDT

Pengfei Wang   Anhui Univ.
Xiang Dong   Anhui Univ.
Yang Yang   Inst. of Plasma Physics, Chinese
                                     Academy of Sciences
Yong Cheng   Inst. of Plasma Physics, Chinese
                                     Academy of Sciences

●WeA03-4   14:30-14:50

Quasi-synchronization of Chaotic Systems with Parameters Mismatch via Intermittent Sampled-data Control

Ying Yang   Yunnan Univ.
Yali Zhi   Anhui Univ.
Zhiming Zhang   Fuyang Normal Univ.
Qingzhi Wang   Qingdao Univ.

●WeA03-5   14:50-15:10

Mode Estimation and Event-Triggered Filter of Switched Positive Systems with Switching Faults

Yahao Yang   Hainan Univ.
Junfeng Zhang   Hainan Univ.
Shitao Zhang   Hangzhou Dianzi Univ.
Huizhou Liu   Hainan Univ.

●WeA03-6   15:10-15:30

Reachable Set Control for Cyber-Physical Systems with False Data Injection Attacks

Xiuyang Fan   Qingdao Univ.
Wenjuan Lin   Qingdao Univ.

WeA 04	13:30-15:30	Tianmen Hall
Fault and Attack Detection for Interconnected Systems		

Chair: Yuchen Jiang   Harbin Inst. of Tech.
Co-Chair: Kuan Li   Shanghai Aerospace Control
                                            Tech. Inst.

●WeA04-1   13:30-13:50

Distributed Fault Diagnosis Approach for Large-Scale Interconnected Systems with Communication Link Failures

Hao Wang   Harbin Inst. of Tech.
Hao Luo   Harbin Inst. of Tech.
Yuchen Jiang   Harbin Inst. of Tech.
Mingyi Huo   Harbin Inst. of Tech.

●WeA04-2   13:50-14:10

Fuzzy Hierarchical Analysis based on the Identification of Power Grid Communication Channel Quality Detection

He Han   Wuhan Univ.
Fengqiu Xu   Wuhan Univ.
Xianze Xu   Wuhan Univ.

●WeA04-3   14:10-14:30

Design and Control of Optical Path Switching device in Image-spectrum Coordination Detection System

Xiangyan Liu   Wuhan Textile Univ.

Xiangyang Zhou   Wuhan Textile Univ.

Qiaoling Ji   Wuhan Textile Univ.

Feng Wang   Wuhan Textile Univ.

●WeA04-4   14:30-14:50

Control of Chaos in Permanent-Magnet Synchronous Motor Based on Equivalent-Input-Disturbance Approach

Xiang Yin   North China Univ. of Tech.

Yuntao Shi   North China Univ. of Tech.

Daqian Liu   North China Univ. of Tech.

Gang Li   North China Univ. of Tech.

●WeA04-5   14:50-15:10

Advanced Persistent Threats Detection based on Deep Learning Approach

Hope Nkiruka Eke   Robert Gordon Univ.

Andrei Petrovski   National Subsea Centre, Aberdeen

●WeA04-6   15:10-15:30

Ensemble Common Features Technique for Lightweight Intrusion Detection in Industrial Control System

Uneneibotejit   Robert Gordon Univ.

Otokwala

Andrei Petrovski   Robert Gordon Univ.

WeA 05	13:30-15:30	Xiantao Hall
Cybersecurity of the Future DER-based Power Grid		

Chair: Zhenyong Zhang   Guizhou Univ.

Co-Chair: Chensheng Liu   East China Univ. of Sci. & Tech.

●WeA05-1   13:30-13:50

Adaptive Physical Access Detection against Ambient Temperature Variation

An Zhou   Guangdong Power Grid Co., Ltd.

Kexin Jiao   Xi'an Jiaotong Univ.

Famao Mei   Guangdong Power Grid Co., Ltd.

Zhenwei Gu   Guangdong Power Grid Co., Ltd.

Hao Huang   Guangdong Power Grid Co., Ltd.

Yuanyi Bao   Xi'an Jiaotong Univ.

Yang Liu   Xi'an Jiaotong Univ.

●WeA05-2   13:50-14:10

Cluster Consensus Control for General Linear Systems with Arbitrary Convergence Time

Lu Ren   Anhui Univ.

Xiaofeng Li   Anhui Univ.

Mengwei Sun   Anhui Univ.

Dong Zhao   Anhui Univ.

●WeA05-3   14:10-14:30

Load Redistribution Attack in Optimal Power Flow with Phase Shifting Transformers

Hongcheng Zhu   East China Univ. of Sci. & Tech.

Chensheng Liu   East China Univ. of Sci. & Tech.

Min Zhou   East China Univ. of Sci. & Tech.

Yang Tang   East China Univ. of Sci. & Tech.

Wenli Du   East China Univ. of Sci. & Tech.

●WeA05-4   14:30-14:50

Impact Analysis of Moving Target Defense on the Small Signal Stability in Power Systems

Bingdong Wang   Guizhou Univ.

Junjie Song   Guizhou Univ.

Liang Wan   Guizhou Univ.

Youliang Tian   Guizhou Univ.

Xin Wang   Qilu Univ. of Tech.

Zhenyong Zhang   Guizhou Univ.

●WeA05-5   14:50-15:10

Deep Learning-based Hybrid Detection Model for False Data Injection Attacks in Smart Grid

Huan Yang   Ningxia Univ.

Ruijia Cao   Ningxia Univ.

Huan Pan   Ningxia Univ.

Jiayi Jin   Ningxia Univ.

●WeA05-6   15:10-15:30

Evaluation and Comparison of Three Fuel Optimal Impulsive Control Strategies for Satellite Formation Reconfiguration

Lu Bai   Sun Yat-Sen Univ.

Chengxi Zhang   Jiangnan Univ.

Jihe Wang   Sun Yat-Sen Univ.

WeB 01	15:50-17:50	Qianjiang Hall
Applications		

Chair: Xin Chen   China Univ. of GeoSci.

Co-Chair: Danyun Li   China Univ. of GeoSci.

●WeB01-1   15:50-16:10

Differential Privacy Framework using Secure Computing on Untrusted Servers

Jing Jia   Keio Univ.

Hiroaki Nish   Keio Univ.

●WeB01-2   16:10-16:30

Prediction Model of Photovoltaic Power Generation based on VMD-EMD-BiLSTM

Shaolong Zheng   China Univ. of GeoSci.

Danyun Li   China Univ. of GeoSci.

●WeB01-3   16:30-16:50

A Trajectory Tracking Method using Dynamic Sliding Mode Control with Parameter Optimization for Autonomous Underwater Vehicles

Weiliang Li	China Univ. of GeoSci.
Xuzhi Lai	China Univ. of GeoSci.
Sheng Du	China Univ. of GeoSci.
Chengda Lu	China Univ. of GeoSci.
Yawu Wang	China Univ. of GeoSci.
Zonghuan Chen	Guangzhou Marine Geological Survey
Min Wu	China Univ. of GeoSci.

●WeB01-4   16:50-17:10

An Improved 3D Reconstruction Method for Weak Texture Objects Combined with Calibration and ICP Registration

Lang Qin	China Univ. of GeoSci.
Xin Chen	China Univ. of GeoSci.
Xuan Gong	China Univ. of GeoSci.

●WeB01-5   17:10-17:30

Interpretable Analysis of Feature Importance and Implicit Correlation based on Semg Grayscale Images

Xiaohu Ao	China Univ. of GeoSci.
Feng Wang	China Univ. of GeoSci.
Juan Zhao	China Univ. of GeoSci.
Jinhua She	Tokyo Univ. of Tech.

●WeB01-6   17:30-17:50

Bayesian Optimized Autoencoder for Predictive Maintenance of Smart Packaging Machines

Murshedul Arifeen	Robert Gordon Univ.
Andrei Petrovski	Robert Gordon Univ.

WeB 02	15:50-17:50	Jasmine Hall
Applications		

Chair: Jiandong Wang	Shandong Univ. of Sci. & Tech.
Co-Chair: Shanying Zhu	Shanghai Jiao Tong Univ.

●WeB02-1   15:50-16:10

Photovoltaic Abnormal Data Cleaning based on Fuzzy Clustering-Quartile Algorithm

Yidong Li	China Univ. of GeoSci.
Danyun Li	China Univ. of GeoSci.

●WeB02-2   16:10-16:30

Energy Consumption Rectification to Remove Effects of Different Outdoor Temperatures in Degree-days

Shouchen Sun	Shandong Univ. of Sci. and Tech.
Jiandong Wang	Shandong Univ. of Sci. and Tech.
Qingdian Sun	Shandong Univ. of Sci. and Tech.
Changsheng Zhao	Shandong Univ. of Sci. and Tech.

●WeB02-3   16:30-16:50

SGDA: A Saliency-Guided Domain Adaptation Network for Nighttime Semantic Segmentation

Yijia Duan	Shanghai Jiao Tong Univ.
Jingzheng Tu	Shanghai Jiao Tong Univ.
Cailian Chen	Shanghai Jiao Tong Univ.

●WeB02-4   16:50-17:10

Orientation-based Feature Aggregation for Multi-Target Multi-Camera Tracking

Yansong Gao	Shanghai Jiao Tong Univ.
Jingzheng Tu	Shanghai Jiao Tong Univ.
Cailian Chen	Shanghai Jiao Tong Univ.
Qimin Xu	Shanghai Jiao Tong Univ.
Shanying Zhu	Shanghai Jiao Tong Univ.

●WeB02-5   17:10-17:30

Data Quality Guarantee Mechanism Based on Sunk Cost Effect

Yonghua Xu	Hunan Univ. of Tech.
Jiaqi Liu	Central South Univ.
Yuying Yang	Central South Univ.

●WeB02-6   17:30-17:50

Literature Survey on Manufacturing Shop Floor Performance Measurements: Frameworks, Models, and Categorizations

Abdul Rehan Khan Mohammed	Univ. of Warwick
Jiayi Zhang	Univ. of Warwick
Benjamin Silverstone	Univ. of Warwick
Ahmad Bilal	Univ. of Warwick

WeB 03	15:50-17:50	Lilac Hall
Data Oriented Prognostics and Health Management for Industrial Systems		

Chair: Renjie Ma	Univ. of Sci. & Tech. Beijing
Co-Chair: Yang Li	Shanghai Univ.

●WeB03-1   15:50-16:10

Exergy-related Operating Performance Assessment for Hot Rolling Process Based on Multiple imputation and Multi-class Support Vector Data Description

Chuanfang Zhang	Univ. of Sci. & Tech. Beijing
Kaixiang Peng	Univ. of Sci. & Tech. Beijing
Jie Dong	Univ. of Sci. & Tech. Beijing
Renjie Ma	Univ. of Sci. & Tech. Beijing
Yangfan Wang	Univ. of Sci. & Tech. Beijing
Dongjie Hua	Univ. of Sci. & Tech. Beijing

●WeB03-2   16:10-16:30

A Survey of Few-shot Learning-based Compound Fault Diagnosis Methods for Industrial Processes

Renjie Ma	Univ. of Sci. & Tech. Beijing

Fuzhong Shi	Univ. of Sci. & Tech. Beijing
Zijing Wu	Univ. of Sci. & Tech. Beijing
Kaixiang Peng	Univ. of Sci. & Tech. Beijing

●WeB03-3   16:30-16:50

An Efficient Condition Monitoring and Fault Diagnosis Method for Bearings under Multiple Working Conditions

Qiong Zeng	Hunan Univ.
Qing Zhu	Hunan Univ.
Yun Feng	Hunan Univ.
Yaonan Wang	Hunan Univ.

●WeB03-4   16:50-17:10

Sliding Window-based Real-time Remaining Useful Life Prediction for Milling Tool

Chen Tong	Hunan Univ.
Qing Zhu	Hunan Univ.
Yun Feng	Hunan Univ.
Yaonan Wang	Hunan Univ.

●WeB03-5   17:10-17:30

A Short-term Wind Power Forecasting Method Based on NWP Wind Speed Fluctuation Division and Clustering

Quanhui Li	China Univ. of GeoSci.
Ji Lv	China Univ. of GeoSci.
Min Ding	China Univ. of GeoSci.
Danyun Li	China Univ. of GeoSci.
Zhijian Fang	China Univ. of GeoSci.

●WeB03-6   17:30-17:50

Incipient Gradual Fault Detection via Transformed Component and Dissimilarity Analysis

Lingxia Mu	Xi'an Univ. of Tech.
Wenzhe Sun	Xi'an Univ. of Tech.
Youmin Zhang	Concordia Univ.
Nan Feng	Xi'an Univ. of Tech.

WeB 04   15:50-17:50   Tianmen Hall

Data Oriented Prognostics and Health Management for Industrial Systems

Chair: Xiuli Wang	Zhejiang Univ. of Tech.
Co-Chair: Yang Li	Shanghai Univ.

●WeB04-1   15:50-16:10

Deep Learning Traffic Prediction to Optimize Routing Paths and Reduce Latency in SDN

Rui Xiong	China Academy of Launch Vehicle Tech.
Qianchen Yuan	China Academy of Launch Vehicle Tech.
Hao Zhang	China Academy of Launch Vehicle Tech.
Xiaoming Wang	China Academy of Launch Vehicle Tech.

Kun Ma	National Inst. of Metrology

●WeB04-2   16:10-16:30

Extended Fast Relevance Vector Regression based Pollutant Concentrations Prediction for Biomass Cogeneration Systems

Zhifei Sun	Zhejiang Univ. of Tech.
Xiuli Wang	Zhejiang Univ. of Tech.
Defeng He	Zhejiang Univ. of Tech.

●WeB04-3   16:30-16:50

Short-term Load Forecasting for Holidays based on Similar Days Selecting and XGBoost Model

Anping Huang	Dongguan Power Supply Bureau Guangdong Power Grid Co., Ltd.
Juan Zhou	Dongguan Power Supply Bureau Guangdong Power Grid Co., Ltd.
Tao Cheng	Dongguan Power Supply Bureau Guangdong Power Grid Co., Ltd.
Xiangzhen He	Power Dispatching Control Center Guangdong Power Grid Co., Ltd
Ji Lv	China Univ. of GeoSci.
Min Ding	China Univ. of GeoSci.

●WeB04-4   16:50-17:10

Incipient Fault Diagnosis of IGBT Drive Circuit based on EWT-ResNet

Wu Hao	Tongji Univ.
Qiancun Yuan	Tongji Univ.

●WeB04-5   17:10-17:30

YOLO V5-MAX: A Multi-object Detection Algorithm in Complex Scenes

Xingkun Li	Tsinghua Univ.
Guangyu Tian	Tsinghua Univ.
Zhenghong Lu	Tsinghua Univ.
Guojun Zhang	Tsinghua Univ.

●WeB04-6   17:30-17:50

Vehicle Anomaly Detection by Attention-Enhanced Temporal Convolutional Network

Zhitao He	Zhejiang Univ. of Tech.
Yongyi Chen	Zhejiang Univ. of Tech.
Dan Zhang	Zhejiang Univ. of Tech.
Mohammed Abdulaal	King Abdulaziz Univ.

WeB 05   15:50-17:50   Xiantao Hall

Application of Artificial Intelligence in Iron and Steel Metallurgy Process

Chair: Xinmin Zhang	Zhejiang Univ.
Co-Chair: Luefeng Chen	China Univ. of GeoSci.

●WeB05-1   15:50-16:10

Short-Term Prediction of Coke Pushing Current Peak based on Improved ARIMA Model

Haiyang Wei	China Univ. of GeoSci.
Luefeng Chen	China Univ. of GeoSci.
Jie Hu	China Univ. of GeoSci.
Yi Ren	China Univ. of GeoSci.
Min Wu	China Univ. of GeoSci.
Witold Pedrycz	Univ. of Alberta
Kaoru Hirota	Tokyo Inst. of Tech.

●WeB05-2   16:10-16:30

Grid Voltage Feedforward Control of GFI for Improving Dynamical Performance

Zaixun Ling	State Grid Hubei Electric Power Research Inst.
Li You	State Grid Hubei Electric Power Research Inst.
Bin Zhou	State Grid Hubei Electric Power Co., Ltd.
Yibo Cui	State Grid Hubei Electric Power Research Inst.
Zhiqiang Zhou	State Grid Hubei Electric Power Co., Ltd.
Dingbang Huang	China Univ. of GeoSci.

●WeB05-3   16:30-16:50

A Decomposition-based Encoder-Decoder Framework for Multi-step Prediction of Burn-Through Point in Sintering Process

Yuhan Xie	Zhejiang Univ.
Bocun He	Zhejiang Univ.
Xinmin Zhang	Zhejiang Univ.
Zhihuan Song	Zhejiang Univ.

●WeB05-4   16:50-17:10

Prediction of Silicon Content in Molten Iron of Blast Furnace Based on Multi-dimensional Sequential Characteristic Reconstruction

Zhuofu Zhang	China Univ. of GeoSci.
Weihua Cao	China Univ. of GeoSci.
Jie Hu	China Univ. of GeoSci.
Qifu Chen	China Univ. of GeoSci.
Min Wu	China Univ. of GeoSci.

●WeB05-5   17:10-17:30

Blast Furnace Gas Utilization Rate Prediction Model based on Northern Goshawk Optimization and Long Short-Term Memory in Massive Data Set

Yue Zhou	China Univ. of GeoSci.
Weihua Cao	China Univ. of GeoSci.
Zhuofu Zhang	China Univ. of GeoSci.

Yan Yuan	China Univ. of GeoSci.

●WeB05-6   17:30-17:50

Analysis of Transient Voltage Problems based on Cluster Analysis of Multi-level Transmission Section Limit Coupling

Haotian Xu	China Electric Power Research Inst.
Shicong Ma	China Electric Power Research Inst.
Tiezhu Wang	China Electric Power Research Inst.
Shixiong Fan	China Electric Power Research Inst.

Thursday, May 11, 2023

Keynote 3	8:30-9:30	Yellow Crane Hall
Keynote 3		

Chair: Jinhua She   Tokyo Univ. of Tech.

Glocal (Global/Local) Control for Hierarchical Cyber Physical Systems: Theoretical Foundation towards Practical Applications

Shinji Hara   Tokyo Inst. of Tech.

Poster Sessions ThA01
May 11, 9:50-10:50
Yellow Crane Hall

●ThA01-1

Stochastic Leader-Following Consensus of Discrete-Time Nonlinear Multi-Agent Systems with Multiplicative Noises

Runhan Zhang   Huazhong Univ. of Sci. & Tech.
Yuanyuan Zhang   Huazhong Univ. of Sci. & Tech.
Xiaofeng Zong   China Univ. of GeoSci.

●ThA01-2

*Predictive Speed and Current Control for N*3-Phase PMSM with Parameter Online Correction*

Jing He   Hunan Univ. of Tech.
Runzhong Tang   Hunan Univ. of Tech.
Changfan Zhang   Hunan Univ. of Tech.
Gongping Wu   Changsha Univ. of Sci. & Tech.
Lin Jia   Hunan Univ. of Tech.
Zongyu Li   Hunan Univ. of Tech.

●ThA01-3

Output Stability for Wind Power Generation System Based on Equivalent-Input-Disturbance Approach

Shaoran Wang   China Univ. of GeoSci.
Jinhua She   Tokyo Univ. of Tech.
Feng Wang   China Univ. of GeoSci.
Juan Zhao   China Univ. of GeoSci.

●ThA01-4

Personnel Management System of Steelmaking Plant Based on CPS System

Zhang Zhen   WISDRI Incorporation Limited
Ma Jianjun   LEADOR Incorporation Limited

●ThA01-5

Adaptive Weight Feature Pyramid for Multi-Scale Pedestrian Detection in Real-Time

Haozheng Qian   Anhui Normal Univ.
Mingxing Fang   Anhui Normal Univ.
Youwu Du   Jiangsu Univ. of Tech.

Xiao Liang   Anhui Normal Univ.
Xinke Liu   Anhui Normal Univ.
Xinyv Rui   Anhui Normal Univ.

●ThA01-6

Experimental Design of Lower-limb Movement Recognition Based on Support Vector Machine

Wangyang Ge   China Univ. of GeoSci.
Jinhua She   Tokyo Univ. of Tech.
Juan Zhao   China Univ. of GeoSci.
Feng Wang   China Univ. of GeoSci.

●ThA01-7

A Robust Design for Modified Equivalent-Input-Disturbance Approach

Zewen Wang   China Univ. of GeoSci.
Daiki Sato   Tokyo Inst. of Tech.
Jinhua She   Tokyo Univ. of Tech.

●ThA01-8

sEMG-based Gesture Recognition by Deep Learning and Data Enhancement

Hao Wu   China Univ. of GeoSci.
Feng Wang   China Univ. of GeoSci.
Juan Zhao   China Univ. of GeoSci.
Jinhua She   Tokyo Univ. of Tech.

●ThA01-9

Disturbance Rejection Using Nonlinear Equivalent-Input-Disturbance Approach

Hantao Wang   China Univ. of GeoSci.
Jinhua She   Tokyo Univ. of Tech.
Feng Wang   China Univ. of GeoSci.
Juan Zhao   China Univ. of GeoSci.

●ThA01-10

Adaptive Spatial Repetitive Control for Position-dependent Periodic Signals

Dongxu Gao   Hunan Univ. of Sci. & Tech.
Lan Zhou   Hunan Univ. of Sci. & Tech.
Jinhua She   Tokyo Univ. of Tech.

●ThA01-11

Stable Physical Human-Robot Interaction Control for a Wrist Tremor Suppression Exoskeleton

Mingyuan Xie   China Univ. of GeoSci.
Zhen-Tao Liu   China Univ. of GeoSci.
Jinhua She   Tokyo Univ. of Tech.

●ThA01-12

High-precision frequency measurement approach of

diminishing multi-source errors for UAV-based aeromagnetic survey

Minkang Wang	China Univ. of GeoSci.
Jian Ge	China Univ. of GeoSci.
Minggui Wang	Hubei Earthquake Agency

●ThA01-13

Feedback linearization method for unknown dynamics based on nonzero-sum games

Yipu Sun	China Univ. of GeoSci.
Xin Chen	China Univ. of GeoSci.
Wenpeng He	China Univ. of GeoSci.
Edwardo F. Fukushima	Tokyo Univ. of Tech.
Jinhua She	Tokyo Univ. of Tech.

●ThA01-14

Homothetic Tube-based Model Predictive Control of Cyber-physical Systems with Guaranteed Transient Performance

Kunwu Zhang	Univ. of Victoria
Yang Shi	Univ. of Victoria

●ThA01-15

Cooperative braking of urban rail vehicles with Koopman model predictive control

Boyu Shu	Central South Univ.
Zhiwu Huang	Central South Univ.
Wanwan Ren	Central South Univ.
Xiaoyong Zhang	Central South Univ.
Hui Peng	Central South Univ.
Jun Peng	Central South Univ.

●ThA01-16

State of Charge Estimation Based on Hierarchical Optimization of Model Parameters for Lithium-ion

Hongjiang He	Central South Univ.
Zhiwu Huang	Central South Univ.
Hui Peng	Central South Univ.
Heng Li	Central South Univ.
Jun Peng	Central South Univ.

●ThA01-17

An optimized prediction horizon energy management method for electric vehicles

Zini Wang	Central South Univ.
Zhiwu Huang	Central South Univ.
Fu Jiang	Central South Univ.
Weirong Liu	Central South Univ.
Jun Peng	Central South Univ.

●ThA01-18

Cooperative Control with Adaptive Set Point Adjustment

of High-Speed Trains

Wanwan Ren	Central South Univ.
Jun Peng	Central South Univ.
Boyu Shu	Central South Univ.
Heng Li	Central South Univ.
Yingze Yang	Central South Univ.
Zhiwu Huang	Central South Univ.

●ThA01-19

Improved Sliding Mode Control Torsional Vibration Suppression Method for Permanent Magnet Synchronous Transmission System of Electric Vehicles

Ning Jia	Hunan Univ. of Tech.
Kaihui Zhao	Hunan Univ. of Tech.
Yuyin Lv	Hunan Univ. of Tech.
Mengjie Qiao	Hunan Univ. of Tech.
Xin You	Hunan Univ. of Tech.
Xiangfei Li	Hunan Univ. of Tech.

●ThA01-20

Modeling lithium-ion Battery in Grid Energy Storage Systems: A Big Data and Artificial Intelligence Approach

Yong Miao	Shanghai Electric Power Transmission & Distribution Group
Xinyuan He	Univ. of Bath
Chenghong Gu	Univ. of Bath

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