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THE 7TH IEEE INTERNATIONAL CONFERENCE ON INDUSTRIAL CYBER-PHYSICAL SYSTEMS (ICPS 2024)
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Special Session on
"Fault Diagnosis and Attack Defense for ICPS"

With the rapid growth of the demands on the performance of machines and services, the applications of industrial cyber-physical systems (ICPSs), which integrate the communication, computation, and control technologies, have grown exponentially over the past few decades. The ICPSs build a closed-loop system between cyberspace and physical space through communication networks, enabling state perception, real-time analysis, scientific decision-making, and accurate execution in industrial processes. However, the increasing complexity of ICPSs can make the consequences of a system failure even more severe on the physical layer induced by physical faults. Additionally, the extensive employment of open communication networks makes ICPSs vulnerable to various malicious cyber-attacks on the cyber layer. In such background, novel fault diagnosis and attack defense approaches, schemes, frameworks, and solutions are required to be applicable to ICPSs. This Special Session (SS) welcomes original papers investigating in the areas of physical fault diagnosis and cyber-attack detection and defense for ICPSs from research groups worldwide. This SS also provides a forum to discuss the vital issues, challenges and possible future trends which are closely related to safety measures against physical faults and cyber-attacks. Topics of interest include, but are not limited to:

- Faults and attacks detection for ICPSs
- Secure state estimation
- Distributed detection, isolation, and estimation
- Secure data transmissions for communication network
- Data-driven methods for fault and attack diagnosis
- Integration of model-based and data-driven diagnosis methods
- Fault-tolerant/Attack-resilient control system design
- Integrated fault-tolerant and attack-resilient control system design
- Applications to industrial control systems and critical infrastructure

Organizers

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Dr. Yuchen Jiang is currently an Assistant Professor with School of Astronautics, Harbin Institute of Technology. He received the B.E. degree in Automation and the Ph.D. degree in Control Science and Engineering from the same university in 2016 and 2021, respectively. During 2019-2020, Dr. Jiang was a visiting PhD researcher with the Lehrstuhl für Steuerungs- und Regelungstechnik (Chair of Automatic Control Engineering), Technical University of Munich, Germany. His research interests include data-driven safety and security monitoring, fault diagnosis, artificial intelligence, and applications to complex systems such as industrial cyber-physical systems. He is an active member of IEEE and IES. His homepage is at http://homepage.hit.edu.cn/jiangyuchen

Dr. Jingwei Dong received the B.E. degree in automation and M.E. degree in control science and engineering from Harbin Institute of Technology, Harbin, China, in 2016 and 2018, respectively. He received the Ph.D. degree in systems and control from Delft University of Technology, Delft, the Netherlands, in 2023. He will join the Department of Information Technology at Uppsala University as a postdoc. His research interests include optimization-based fault detection and estimation, security of cyber-physical systems, fault-tolerant control, applications to energy systems.

Dr. Xin Peng (Member, IEEE) received the B.S. and M.S. degrees in control science and engineering from the East China University of Science and Technology, Shanghai, China, in 2009 and 2012, respectively, and the Ph.D. degree from the Key Laboratory of Smart Manufacturing in Energy Chemical Process, Ministry of Education, East China University of Science and Technology, in 2017. He is currently a Researcher and PhD Supervisor with the Key Laboratory of Smart Manufacturing in Energy Chemical Process, Ministry of Education, East China University of Science and Technology. He was selected for the Shanghai Pujiang Scholar Talent Program (Class A), Shanghai Youth Science and Technology Talent Sailing Program, and the "Postdoctoral International Exchange Program" dispatched by the Ministry of Human Resources and Social Security. From 2017 to 2019, he worked as a postdoctoral researcher with the University of Duisburg-Essen, Duisburg, Germany. He has published over 90 journal and conference papers. His current research interests include performance evaluation and smart modeling of chemical and biological processes, data mining, and feature extraction of process data.

Prof. Youmin Zhang (Fellow, IEEE) received the B.S., M.S., and Ph.D. degrees in automatic control from the Department of Automatic Control, Northwestern Polytechnical University, Xi'an, China, in 1983, 1986, and 1995, respectively. He is currently a Professor with the Department of Mechanical, Industrial and Aerospace Engineering, Concordia University, Montreal, QC, Canada. He has published eight books, over 600 journal and conference papers with high citations. His research interests are in the areas of monitoring, diagnosis and physical fault/cyber-attack tolerant/resilient control, guidance, navigation, and control of unmanned systems and smart grids, with applications to forest fires and smart cities in the framework of cyber – physical systems by combining with remote sensing techniques. Prof. Zhang has been the Editor-in-Chief, an Editorial (Advisory) Board Member of several journals, including as a member of Board of Governors and Representatives of Journal of Intelligent and Robotic Systems, an Associate Editor of IEEE Transactions on Industrial Electronics, IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Circuits and Systems-Part II: Express Briefs, and IET Cyber-Systems and Robotics, Unmanned Systems, and Security and Safety, and the Deputy Editor-in-Chief of Guidance, Navigation and Control. He has served as the (Honorary) General Chair and the Program Chair of several unmanned systems, renewable energy, and smart cities relevant conferences. He is a registered Professional Engineer in Ontario, Canada, a Fellow of the Canadian Society of Mechanical Engineering, and a member of Technical Committee for several scientific societies.

■ **Accepted papers will be published in an IEEE proceedings volume and will be also submitted for the International Publication in IEEE xplore。**

■ **Authors who face travel restrictions due to force majeure and can not attend in person, are kindly requested to contact the conference organizers committee after the acceptance of the paper, for consideration and approval of alternative ways to present their work.**

IES Technical Committee Sponsoring the Special Session

- IEEE IES TC on "Data-Driven Control and Monitoring"
- IEEE IES TC on "Industrial Cyber-Physical Systems"
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