2026 第九届 IEEE 国际无人系统大会
特邀专题简介表

特邀专题名称

数据驱动的无人系统自主感知与安全控制

组织者

1. 柏明明，助理研究员，浙江大学

2. 徐泽远，博士后，意大利帕维亚大学

3. 谢树宗，副教授，浙江科技大学

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个人简介

柏明明，浙江大学工业控制技术全国重点实验室助理研究员，南洋理工大学先进机器人技术创新中心(CARTIN)访问博士后，中国指控学会青工委委员，哈尔滨工程大学与加拿大 McGill 大学联合培养博士，研究兴趣包括多源信息融合、集群协同导航与网络分布式感知。近 5 年以第一/通信作者身份在 IEEE TAC/IEEE TSMC/IEEE TII/IEEE TAES 等国际顶级期刊和 ICRA/IROS/IFAC/ICASSP 等国际知名会议发表论文 18 篇，获授权专利 6 项，注册软件注册权 4 项。获中国卫星导航定位协会博士学位论文激励计划，作为负责人主持国家自然科学基金青年基金、中国博士后科学基金特别资助、中国博士后科学基金面上资助、浙江省基础公益研究计划、“智能多源自主导航”基础科学中心开放课题等项目，作为骨干参与国家重点研发任务，担任多个国际学术会议的 Workshop 与专题主席，以及多家著名期刊审稿人。

徐泽远，现为意大利帕维亚大学/南洋理工大学玛丽居里学者，2022 年于哈尔滨工业大学控制科学与工程学科获得博士学位，2022-2024 年任新加坡国立大学博士后。以一作在 IEEE TIE、TII、TCYB、TASE、MSSP 等期刊发表 SCI 论文 20 多篇，获国家发明专利 2 项。研究方向主要是半球谐振陀螺组合导航系统、联邦学习分布式控制。现为 Microsystems & Nanoengineering（中科院一区期刊）、AI for Science 等期刊青年编委；国际会议 ACC2024、ICoIAS’

2022-2025、 IEEE ISIE2026 等分会主席和编委；还担任 40 多个国际 SCI 期刊的审稿人。

谢树宗，工学博士，浙江科技大学特聘副教授，硕士生导师，入选浙江省科协青年人才托举工程。主要研究方向为有限时间自适应控制、预设性能控制及其在飞行器和风力发电系统中的应用。主持国家自然科学基金青年项目、浙江省自然科学基金探索项目、中国博士后科学基金面上项目、全国重点实验室开放课题等项目。迄今为止，已在 IEEE 汇刊、航空学报等国内外知名期刊和会议上发表学术论文 40 余篇（包括 ESI 高被引论文 5 篇、ESI 热点论文 1 篇），受理/授权国家发明专利 20 余项。获吴文俊人工智能科学技术奖自然科学奖二等奖、中国发明协会发明创业奖创新奖二等奖、日内瓦国际发明展金奖、世界青年科学家峰会优秀论文奖、SAMCON 和 ICICC 最佳论文奖、ICMIC 最佳张贴论文奖以及 RCAE 最佳专题组织奖。同时，担任中国指挥与控制学会具身智能专委会委员以及中国自动化学会自适应强化学习与动态规划专委会委员，并担任《Journal of Artificial Intelligence & Control Systems》和《科技通报》青年编委以及 IEEE TSMCS、TNNLS、TAES、航空学报、控制与决策等 30 余本国内外期刊审稿人。

黄家豪，华东理工大学工学博士，现任浙江科技大学讲师，主要研究方向为信息物理融合系统安全、分布式滤波及知识图谱。主持国家自然科学基金青年项目及浙江省自然科学基金青年项目各 1 项，参与国家重点研发计划、国家自然科学基金重大项目等多项国家级科研项目，在 IEEE 汇刊、Automatica 等国内外知名期刊和会议上发表学术论文 10 余篇，参编专著《自主智能系统控制》1 部（"数字浪潮：工业互联网先进技术"丛书）。此外，荣获 2025 年 Engineering 期刊优秀审稿人及 2021 年 Journal of the Franklin Institute 期刊优秀审稿人称号。

特邀专题简介

无人系统以其自主性和灵活性等优势，在军事和民用领域都发挥着举足轻重的作用。然而，在高动态、强干扰、密攻击的开放环境下开展导航、探测、跟踪和控制等复杂任务在当前仍是一项极具挑战性的难题。随着微小型传感器技术和人工智能技术的不断进步，海量数据得以涌现，为复杂环境下无人系统的发展带来了新的机遇。在这一背景下，本专题将探讨数据驱动方法在可靠感知与安全控制中的最新进展和重要突破，寻求能克服模型依赖、提高抗扰性能、增强时变响应、保证系统稳定的新理论新方法，以推动自主无人系统的安全、可靠与弹性发展。本专题会议拟邀请多篇原创的、新颖的高水平学术论文，主要包括（但不限于）以下研究主题：

- 复杂噪声条件下的多模态信息融合理论与导航、跟踪、建图等技术；
- 数据驱动的态势感知理解、时空数据分析以及目标检测分类等理论与技术；
- 数据驱动的故障诊断、攻击检测、威胁识别以及噪声建模等理论与技术；
- 数据驱动的容错控制、弹性控制以及无人系统自我修复等理论与技术。

IEEE ICUS 2026
Invited Session Summary

Title of Session

Data-Driven Autonomous Sensing and Safety Control for Unmanned Systems

Organizers

1. Dr. Mingming Bai
Zhejiang University, China
2. Dr. Zeyuan Xu
Università degli Studi di Pavia, Italy
3. Assoc. Prof. Shuzong Xie
Zhejiang University of Science and Technology, China
4. Dr. Jiahao Huang
Zhejiang University of Science and Technology, China

Biosketches of Organizers

Mingming Bai is a postdoctoral fellow at Centre for Advanced Robotics Technology Innovation (CARTIN), Nanyang Technological University, Singapore, and also an assistant Researcher at State Key Lab of Industrial Control Technology, Zhejiang University, China. He received his B.S. degree and Ph.D from China University of Geosciences (Wuhan) and Harbin Engineering University, respectively. During his Ph.D. he visited McGill University for one year. His research interests include multi-source information fusion, cooperative navigation, and network distributed sensing. He has published 18 papers in top journals such as IEEE TAC, IEEE TSMC, IEEE TII, IEEE TAES, and well-known international conferences including ICRA, IROS, IFAC,ICASSP, obtained 6 authorized patents, and 4 software copyrights. He is also the principal investigator of several projects such as the China Postdoctoral Science Fund No.5 Special Funding (Pre-Station), the China Postdoctoral Science Foundation No.74 General Fund, and the Zhejiang Provincial Natural Science Foundation (Youth Exploration Project). He has participated in key projects of NSFC and joint key projects as a core member and serves as a peer reviewer for several renowned journals.

Dr. Zeyuan Xu is currently a Marie Skłodowska-Curie Research Fellow jointly affiliated with the University of Pavia, Italy, and Nanyang Technological University, Singapore. He received his Ph.D. degree in Control Science and Engineering from Harbin Institute of Technology in 2022. From 2022 to 2024, he worked as a Postdoctoral Research Fellow at the National University of Singapore. Dr. Xu has published more than 20 SCI-indexed papers as the first author in leading journals, including IEEE TIE, TII, TCYB, TASE, and Mechanical Systems and Signal Processing (MSSP). He holds two national invention patents. His research interests primarily focus on hemispherical resonator gyroscope-based integrated navigation systems and federated learning-based distributed control. Dr. Xu serves as a Young Associate Editor for journals such as Microsystems & Nanoengineering (Q1 journal) and AI for Science. He has also served as a session chair and technical committee member for several international conferences, including ACC 2024, ICoIAS (2022–2025), and IEEE ISIE 2026. In addition, he acts as a reviewer for more than 40 international SCI-indexed journals.

Shuzong Xie, Ph.D. in Engineering, is a specially appointed Associate Professor and Master's Supervisor at Zhejiang University of Science and Technology, and a recipient of the Youth Talent Support Program of the Zhejiang Association for Science and Technology. His research focuses on finite-time adaptive control, prescribed performance control, and their applications in aerospace and wind power systems. He has led several competitive research projects, including those funded by the National Natural Science Foundation of China, the Zhejiang Provincial Natural Science Foundation, the China Postdoctoral Science Foundation, and national key laboratory open funds. He has published over 40 papers in leading journals and conferences such as IEEE Transactions and Acta Aeronautica et Astronautica Sinica, including 5 ESI Highly Cited Papers and 1 ESI Hot Paper, and holds more than 20 national invention patents. His awards include the Second Prize of the Wu Wenjun AI Science and Technology Award (Natural Science), the Second Prize of the China Invention Association Innovation Award, a Gold Medal at the Geneva International Exhibition of Inventions, and multiple best paper awards. He also serves on professional committees of the Chinese Association of Command and Control and the Chinese Association of Automation, acts as a young editorial board member for related journals, and reviews for over 30 international and domestic journals.

Jiahao Huang, Ph.D. in Engineering from East China University of Science and Technology, is currently a Lecturer at Zhejiang University of Science and Technology. His research interests focus on the security of cyber-physical systems, distributed filtering, and knowledge graphs. He has led one project each funded by the National Natural Science Foundation of China (Young Scientists Fund) and the Zhejiang Provincial Natural Science Foundation (Young Scientists Fund), and has participated in several national-level research projects, including the National Key R&D Program of China and major programs of the National Natural Science Foundation of China. He has published over 10 academic papers in leading journals and conferences such as IEEE Transactions and Automatica, and co-authored the monograph Autonomous Intelligent Systems Control (part of the "Digital Wave: Advanced Technologies of the Industrial Internet" series). In addition, he was recognized as an Outstanding Reviewer by Engineering in 2025 and by the Journal of the Franklin Institute in 2021.

Details of Session

Unmanned systems, with their advantages in autonomy and flexibility, play a pivotal role in both military and civilian domains. However, performing complex tasks such as navigation, detection, tracking, and control in highly dynamic, interference-rich, and attack-prone open environments remains a significant challenge today. With the continuous advancement of micro-sensor technologies and artificial intelligence, a surge of massive data has emerged, bringing new opportunities for the development of unmanned systems in complex environments. Against this backdrop, this special issue will explore the latest advancements and significant breakthroughs in data-driven methods for reliable sensing and safety control, seeking new theories and methods that can overcome model dependency, enhance anti-interference performance, improve time-varying response, and ensure system stability, thereby promoting the safe, reliable, and resilient development of autonomous unmanned systems. This special session invites a number of original, innovative, high-quality academic papers on topics including (but not limited to):

- Multimodal information fusion theories and technologies for navigation, tracking, and mapping under complex noise conditions;
- Data-driven situation awareness understanding, spatiotemporal data analysis, and theories and technologies for target detection and classification;
- Data-driven fault diagnosis, attack detection, threat identification, and noise modeling theories and technologies;
- Data-driven fault-tolerant control, resilient control, and theories and technologies for unmanned system self-repair.