

2025 第八届 IEEE 国际无人系统大会 特邀专题简介表

特邀专题名称

无人系统数据融合与智能控制

组织者

1. 吕跃祖，副研究员，北京理工大学
2. 王琦少，副教授，北京航空航天大学
3. 彭秀辉，副教授，南京航空航天大学
4. 段培虎，准聘教授，北京理工大学

个人简介



吕跃祖，北京理工大学副研究员，博士生导师，中国科协青托，北京市科技新星。分别于 2013、2018 年在北京大学获学士与博士学位。曾访问香港城市大学、德州农工大学卡塔尔分校、澳大利亚皇家墨尔本理工大学。在多智能体系统完全分布式自适应控制、分布式抗饱和协同控制、分布式观测器设计与安全协同控制等方面做出一系列研究成果，发表 SCI 论文 80 余篇（含控制领域顶刊 IEEE TAC 和 Automatica 长文 8 篇，短文 7 篇，其他 IEEE 汇刊 40 余篇），谷歌引用 2400 余次，出版中英文专著 4 部。主持国家自然科学基金面上项目、JKW 1××工程项目等国家级项目 10 余项。曾获中国指挥与控制学会科技进步一等奖，IEEE SMC 学会 Zadeh 最佳会议论文奖，IEEE 国际无人系统大会最佳论文奖，亚太神经网络学会（APNNS）青年研究者奖，日内瓦国际发明展金奖等。任 IEEE SMC Magazine 编委、IJDY 青年编委，任 IEEE IES 工业信息学技术委员会秘书长、中国指挥与控制学会青工委委员、网络科学与工程专委会委员和集群智能与协同控制专委会委员、中国指挥与控制学会高级会员、IEEE Senior Member。



王琦少，北京航空航天大学副教授。本科毕业于北京航空航天大学，博士毕业于北京大学力学系统与控制专业。主要从事多无人系统协同控制方面的科研工作，研究方向为：无人机集群协同编队控制、异质动力学网络的分布式最优控制、无人系统跨域智能协作控制等。近年来在控制领域国际重要学术期刊发表 SCI 论文 30 余篇；授权国家专利 4 项；主持国家自然科学基金项目 3 项，中国博士后科学基金项目 2 项；入选全国博士后创新人才支持计划、北京市青年人才托举工程、小米青年学者，获评中国指挥与控制学会优秀博士学位论文、北京航空航天大学优秀博士后、IEEE 国际无人系统大会最佳论文奖；现任 *International Journal of Dynamics and Control* 期刊 (SCI) 青年编委、IEEE IES 技术委员会 (中国) 常务理事、中国指挥与控制学会集群智能与协同控制专业委员会委员、中国指挥与控制学会青年工作委员会委员。



彭秀辉，南京航空航天大学副教授，自动化学院自动控制系副主任。2019 年博士毕业于北京大学力学 (力学系统与控制) 专业，主要从事空天飞行器智能决策与控制方法及应用的研究。入选第八届中国科协“青年人才托举工程”，2021 年澳门青年学者计划，2020 年江苏省“双创博士”等。主持承担了 173 基础加强计划技术领域基金项目、国家自然科学基金青年项目、国防科技重点实验室项目、江苏省自然科学基金青年项目、博士后特别资助项目、博士后面项目、航空基金项目等 10 余项，作为骨干成员参与了国家自然科学基金重点项目、面上项目等多项，相关成果发表学术论文 30 余篇。担任中国指挥与控制学会青年工作委员会委员、江苏省自动化学会青年工作委员会委员、《电光与控制》青年编委、《指挥控制与仿真》青年编委等。



段培虎，北京理工大学准聘教授，国家级青年人才项目获得者。2015 年本科毕业于华中科技大学机械设计专业，2020 年博士毕业于北京大学力学系统与控制专业。2019 年至 2025 年，先后在香港城市大学、香港科技大学、香港大学和瑞典 KTH 皇家理工学院从事研究助理和博士后研究工作。在多智能体分布式估计和控制、数据驱动估计和控制、传感器网络资源调度等方面做

出一系列研究成果，发表高水平学术论文 30 余篇（含控制领域顶刊 IEEE TAC 和 Automatica 论文 10 篇）。主持和主要参与国家级项目 6 项。获 2022 年 IEEE ICUS 最佳论文奖、2022 年 AJC 杰出审稿人奖。担任 IEEE TAC 等国际 20 余个期刊审稿人。

特邀专题简介

随着无人技术的持续突破与发展，无人系统在国防、交通、能源、农业等各个领域取得了广泛应用。数据融合与智能控制是无人系统实现环境感知、决策优化与自主控制的核心技术，备受国内外学术界和工业界的高度关注。近年来，该领域不断涌现出新的理论、方法与应用，为无人系统技术的持续进步注入了强劲动力。本专题旨在汇聚来自学术界和工业界的技术专家，围绕无人系统中的数据融合与智能控制技术展开交流，分享最新研究成果与实践经验，探讨领域内的关键科学问题与技术难点，为推动无人系统的进一步发展提供理论支持与技术创新。本专题涵盖但不限于以下研究方向：

- 多传感器数据融合与信息处理
- 无人系统分布式数据融合方法
- 数据驱动的智能控制方法
- 无人系统的鲁棒控制与容错控制
- 无人系统的协同控制与任务分配
- 基于深度学习的无人系统感知与控制
- 基于强化学习的无人系统智能控制
- 动态复杂环境下的决策与控制优化

IEEE ICUS 2025

Invited Session Summary

Title of Session

Data Fusion and Intelligent Control for Unmanned Systems

Organizers

1. Prof. Yuezu Lv

Beijing Institute of Technology, China

2. Prof. Qishao Wang

Beihang University, China

3. Prof. Xiuhui Peng

Nanjing University of Aeronautics and Astronautics, China

4. Prof. Peihu Duan

Beijing Institute of Technology, China

Biosketches of Organizers



Yuezu Lv received the B.S. degree in engineering mechanism and Ph.D. degree in mechanical systems and control from the College of Engineering, Peking University, Beijing, China, in 2013 and 2018, respectively. He is currently an Associate Researcher with Advanced Research Institute of Multidisciplinary Sciences, Beijing Institute of Technology, Beijing, China. His research interests include cooperative control of multi-agent systems, adaptive control, robust control of uncertain systems, and distributed resilient control. He was a finalist for Zhang Si-Ying (CCDC) Outstanding Youth Paper Award in 2015. He received the 2021 APNNS Young Researcher Award by Asia Pacific Neural Network Society, the Lotfi A. Zadeh Best Conference Paper Award at IEEE ICCSS 2022, and the Best Paper Award at IEEE ICUS 2023. He was selected for the fifth Young Elite Scientists Sponsorship Program by CAST in 2020. He is an IEEE Senior member.



Qishao Wang received the B.S. degree in Automation from Beihang University, Beijing, China, in 2014, and Ph. D. degree in engineering from Peking University, Beijing in 2019. He is currently an Associate Professor with Department of Dynamics and Control, Beihang University, Beijing, China. From 2019 to 2021, He worked as a post-doctor in Department of Dynamics and

Control, Beihang University, Beijing, China. His research interests include cooperative control of multi-agent systems, adaptive control, and distributed optimization. He received Excellent Doctoral Dissertation Award of Chinese Institute of Command and Control. He was selected for the Postdoctoral Innovative Talent Support Program in 2019. He received Best Paper Award at IEEE ICUS 2022.



Xiuhui Peng received the Ph.D. degree in mechanics and engineering science from Peking University, Beijing, China, in 2019. He is currently an associate professor with the College of Automation Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing, China. He was a Post-Doctoral Fellow with the State Key Laboratory of Internet of Things for Smart City, University of Macau, Macau, China. He was selected for the Eighth Young Elite Scientists Sponsorship Program by CAST in 2022, and a recipient of the 2021 Macao Young Scholars Scheme. His research interests include cooperative mission planning, cooperative control, unmanned systems control, and nonlinear control of mechanical systems.



Peihu Duan received the B.S. degree in Mechanical Engineering from Huazhong University of Science and Technology, Wuhan, China, in 2015. He received the Ph.D. degree in Mechanical Systems and Control from Peking University, Beijing, China, in 2020. Currently, he is an assistant professor at Beijing Institute of Technology. From 2019 to 2025, he conducted research as a research assistant and postdoctoral fellow at City University of Hong Kong, Hong Kong University of Science and Technology, the University of Hong Kong, and KTH Royal Institute of Technology. He is a recipient of a national young talent project. His research focuses on distributed estimation and control for multi-agent systems, data-driven estimation and control, and resource scheduling in sensor networks.

Details of Session

With the continuous breakthroughs and advancements in unmanned technology, unmanned systems have found widespread applications in various fields, including national defense, transportation, energy, and agriculture. Data fusion and intelligent control are core technologies enabling unmanned systems to achieve environmental perception, decision optimization, and autonomous control. These technologies have

garnered significant attention from academia and industry worldwide. In recent years, this field has witnessed the emergence of new theories, methods, and applications, injecting strong momentum into the technological progress of unmanned systems. This special issue aims to bring together technical experts from academia and industry to exchange ideas on data fusion and intelligent control for unmanned systems, share the latest research achievements and practical experiences, and explore key scientific challenges and technical issues in the field. The goal is to provide theoretical support and foster technological innovation for the further development of unmanned systems.

This special issue covers, but is not limited to, the following research directions:

- Multi-sensor data fusion and information processing
- Distributed data fusion methods for unmanned systems
- Data-driven intelligent control methods
- Robust control and fault-tolerant control for unmanned systems
- Collaborative control and task allocation for unmanned systems
- Deep learning-based perception and control for unmanned systems
- Reinforcement learning-based intelligent control for unmanned systems
- Decision-making and control optimization in dynamic and complex environments