

# 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

集群无人系统博弈决策与安全控制

## 组织者

1. 周媛，博士后研究员，香港理工大学
2. 周佳玲，教授，北京理工大学
3. 赵宇，教授，西北工业大学

## 个人简介



**周媛**，香港理工大学，博士后研究员，于 2024 年西北工业大学获得博士学位。主要从事集群智能无人系统协同控制、优化与博弈等方面的研究及应用工作。在国际重要学术期刊和会议发表论文 10 余篇，其中 IEEE 系列汇刊及 Automatica 10 篇，含长文 2 篇，授权国家发明专利 2 项。



**周佳玲**，北京理工大学，教授，博士生导师，万人计划青年拔尖人才入选者，中国科协青托。从事多无人系统协同控制与决策、集群博弈等研究。发表 JGCD、IEEE 汇刊等学术论文 60 余篇，主持国家自然科学基金面上项目、军科委 XX 主题项目、军科委 XX 领域基金项目、国家重点研发计划课题等国家级项目/课题，获中国指挥与控制学会青年科技奖、中国指挥与控制学会科学技术进步一等奖、日内瓦国际发明展金奖、IEEE SMC 学会 Zadeh 最佳论文奖、IEEE ICUS 会议最佳论文奖等。担任《Asian Journal of Control》副主编，《系统工程与电子技术》青年编委，《IEEE Systems, Man, and Cybernetics Magazine》、《控制工程》等期刊客座编委。任 IEEE 工业电子学会工业信息学技术委员会副秘书长，中国指挥与控制学会集群智能与协同控制专委会、网络科学与工程专委会委员，中国自动化学会机器人智能专委会委员，IEEE Senior Member。



**赵宇**，西北工业大学，教授、博导，国家优青，博士毕业于北京大学，多次出访香港城市大学、加州大学河滨分校、皇家墨尔本理工大学等国内外知名高校。长期从事多智能体系统协同控制、优化相关研究工作，目前发表学术论文 100 余篇，其中 IEEE 会刊 40 余篇，IEEE TAC 和 Automatica 等顶刊长文 5 篇；主持国家级科研项目 3 项，省部级项目多项；2017 年被评为陕西省高层次人才，2019、2022 年获陕西省自然科学优秀学术论文奖 2 项，2021 年陕西省研究生教育一等奖，2022 年第 16 届 IFAC 复杂系统国际学术会议（IFAC-LSS-2022）大会主席。

### 特邀专题简介

随着人工智能技术的快速发展，集群无人系统于各个领域的应用愈发广泛，其博弈决策与安全控制成为重要研究的研究课题，通过智能体之间的信息共享和协同合作，解决在智能体之间可能出现的利益冲突和决策问题。在智能交通领域，通过无人集群的协同与博弈控制，对交通信号灯和交通流量进行协调和优化，减少交通拥堵和提高车辆及行人交通安全性。在物流配送领域，无人集群系统主要可以应用于物流配送的路径规划以及资源优化，通过协同控制方法，优化配送路径，提升物流配送效率；在军事作战范畴中，无人集群系统借助协同与博弈控制来实施军事决策并实现军事优化，单个智能体在确保自身安全和数据隐私的前提下，进一步增强自身的反应水平与作战本领。因此，集群无人系统博弈决策与安全控制的研究，对于推动无人系统的发展，提高其在各个领域的应用效果，具有重要的理论和实际意义，进一步为人类社会带来诸多便利和进步。

本特邀专题邀请以下与“集群无人系统博弈决策与安全控制”主题相关的包含创新思想、概念、新发现、改进以及新应用的原创论文。包括但不限于：

- 集群无人系统建模与协同控制
- 集群无人系统编队与路径规划
- 集群无人系统优化与博弈决策
- 集群无人系统协作与任务分配
- 集群无人系统隐私保护与安全控制

# IEEE ICUS 2025

## Invited Session Summary

### Title of Session

The Game, Decision-Making and Safety Control of Multiple Unmanned Systems

### Organizers

#### 1. Dr. Yuan Zhou

The Hong Kong Polytechnic University, Hong Kong

#### 2. Prof. Jialing Zhou

Beijing Institute of Technology, China

#### 3. Prof. Yu Zhao

Northwestern Polytechnical University, China

### Biosketches of Organizers



**Yuan Zhou**, a postdoctoral researcher at The Hong Kong Polytechnic University. She obtained her doctoral degree from Northwestern Polytechnical University in 2024. Her main research and application work focuses on the collaborative control, optimization and game of cluster intelligent unmanned systems. She has published more than 10 papers in important international academic journals and conferences, including 10 papers in IEEE series and *Automatica*, including 2 long papers, and has been authorized 2 national invention patents.



**Jialing Zhou**, Beijing Institute of Technology, professor, doctoral supervisor, Ten Thousand People Plan Young Top Talents, Young Talents of China Association for Science and Technology. She is engaged in the research of cooperative control and decision-making of multi-unmanned systems, cluster game, etc. She has published more than 60 academic papers in *JGCD* and *IEEE Transactions*. She has presided over national Natural Science Foundation of China general project, XX theme project of Military Science and Technology Commission, XX Field Fund project of Military Science and Technology Commission, national Key research and Development Program and other national projects/topics. She was awarded the Youth Science and Technology Award of the Chinese Command and Control Society, the First Prize of Science and Technology Progress of the Chinese

Command and Control Society, the Gold Award of the International Exhibition of Inventions in Geneva, the Zadeh Best Paper Award of the IEEE SMC Society, and the Best Paper Award of the IEEE ICUS Conference, etc. She is associate editor of Asian Journal of Control, Young Editorial Board member of Systems Engineering and Electronics, guest editorial board member of IEEE Systems, Man, and Cybernetics Magazine, Control Engineering and other journals. She is deputy Secretary General of the Technical Committee on Industrial Informatics of IEEE Industrial Electronics Society, Member of the Special Committee on Cluster Intelligence and Cooperative Control and Network Science and Engineering of Chinese Command and Control Society, member of the Special Committee on Robot Intelligence of Chinese Society of Automation, and IEEE Senior Member.



**Yu Zhao**, professor and doctoral supervisor, currently works at Northwestern Polytechnical University, is a National Excellent Youth Fund recipient. He graduated with a doctoral degree from Peking University and has visited well-known universities at home and abroad such as City University of Hong Kong, University of California, Riverside, and RMIT University for many times. He has long been engaged in research work related to the collaborative control and optimization of multi-agent systems. Currently, he has published more than 100 academic papers, including more than 40 papers in IEEE transactions, and 5 long papers in top journals such as IEEE TAC and Automatica. He has presided over 3 national scientific research projects and several provincial and ministerial-level projects. In 2017, he was rated as a high-level talent in Shaanxi Province. In 2019 and 2022, he won 2 Shaanxi Provincial Natural Science Excellent Academic Paper Awards. In 2021, he won the First Prize of Graduate Education in Shaanxi Province. In 2022, he was the conference chair of the 16th IFAC International Symposium on Complex Systems (IFAC-LSS-2022).

### **Details of Session**

With the rapid development of artificial intelligence technology, the application of swarm unmanned systems in various fields is becoming more and more widespread. Its game decision-making and safety control have become important research topics. Through information sharing and collaborative cooperation among agents, the possible interest conflicts and decision-making problems among agents can be solved. In the field of intelligent transportation, through the coordination and

game control of unmanned swarm, the traffic signals and traffic flow are coordinated and optimized to reduce traffic congestion and improve the traffic safety of vehicles and pedestrians. In the field of logistics and distribution, the unmanned swarm system can mainly be applied to the path planning and resource optimization of logistics distribution. Through the collaborative control method, the distribution path is optimized to improve the efficiency of logistics distribution. In the military operations field, the unmanned swarm system implements military decision-making and achieves military optimization by means of coordination and game control. On the premise of ensuring its own safety and data privacy, each unmanned unit further enhances its response level and combat ability. Therefore, the research on game decision-making and safety control of swarm unmanned systems is of great theoretical and practical significance for promoting the development of unmanned systems and improving their application effects in various fields, and further bringing many conveniences and progresses to human society.

This special issue invites original papers related to the theme of "Game Decision-Making and Safety Control of Swarm Unmanned Systems" with innovative ideas, concepts, new discoveries, improvements, and new applications. Including but not limited to:

- Modelling and collaborative control of swarm unmanned systems
- Formation and path planning of swarm unmanned systems
- Distributed optimization and game of swarm unmanned systems
- Task collaboration and task allocation of swarm unmanned systems
- Privacy protection and safety control of swarm unmanned systems