

# 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

不完全信息下的分簇群智决策

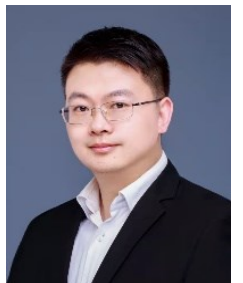
## 组织者

1. 温广辉，教授，东南大学
2. 陈杨杨，教授，东南大学
3. 房肖，助理研究员，东南大学
4. 栾萌，博士生，东南大学

## 个人简介



**温广辉**，东南大学首席教授，博士生导师，IET Fellow。2012 年获北京大学力学系统与控制专业博士学位，长期从事网络群体智能理论与技术、分布式控制与优化、弹性协同控制和分布式强化学习等领域的研究工作。在 Nature Reviews Electrical Engineering、Research、The Innovation 和 IEEE 汇刊发表学术论文 200 余篇，出版学术专著 4 部，获国际学术期刊最佳论文奖 1 次、国内外学术会议最佳论文奖 4 次。任中国指挥与控制学会副秘书长、中国指挥与控制学会青年工作委员会副主任；主持国家杰青项目(2023)、优青项目(2017)，国家自然科学基金联合重点项目、科技部重点研发计划项目课题等 30 余项科研项目。获中国青年科技奖，ARC Decra Fellow、中国指挥与控制学会青年科学家奖等荣誉称号。



**陈杨杨**，东南大学教授，博士生导师，IEEE 高级会员。2010 年获得东南大学工学博士学位，长期从事群体智能与优化、编队控制、自适应控制、强化学习和博弈对抗等领域的研究工作。在控制顶刊 TAC、导航顶刊 JGCD 和 IEEE 汇刊等发表学术论文 100 余篇，国内外学术会议最佳论文奖 3 次。现任控制顶会 CDC 和 ACC 副主编，江苏省自动化学会理事。主持国家自然科学基金、总装项目子课题、总装横向项目等十余项。



**房肖**，东南大学自动化学院博士后，助理研究员。2025 年获东南大学数学学院理学博士学位，主要从事分布式优化与博弈、多智能体系统协同控制与决策、多无人艇系统分布式优化与博弈决策等领域的研究工作。在 IEEE 汇刊和 Automatica 等国际期刊和会议发表学术论文 10 余篇，获 2022 年 CICC 科学技术进步奖一等奖（排 14/15）、全国复杂网络学术会议最佳学生论文奖 1 次、2023 年 Asian Journal and Control 最佳审稿人。任 IEEE TAC, IEEE TII, IEEE TCNS, ASJC, ICUS 等国际期刊和会议的审稿人。



**栾萌**，东南大学在读博士生。2019 年获燕山大学信息与计算科学专业学士学位，2022 年获东南大学数学专业硕士学位，目前在东南大学数学专业攻读博士学位。主要从事多智能体系统、分布式优化决策、资源分配、网络化博弈等领域的研究工作。在 IEEE 汇刊等国际期刊和会议发表学术论文 10 余篇。入选 2024 年度中国科协青年人才托举工程博士生专项计划。任 IEEE TAC, JAS, IEEE TII, IEEE TCNS, IEEE CDC, ICUS 等国际期刊和会议审稿人。

### 特邀专题简介

群智决策技术是确保无人集群系统在复杂多变环境中实现高效协作的关键因素。随着信息技术、传感技术和计算能力的迅速提升，群智决策技术在灾难救援、智能制造、自动化物流、军事作战等多个领域得到了广泛应用。对于大规模异构集群系统，群智决策面临着决策信息不完全、策略学习不及时、实时交互性弱、决策精度差等挑战，导致传统决策模型在实际应用中难以满足需求。此外，面向复杂耦合决策任务，集群的多级联盟构建方法和动态分簇准则仍需进一步研究，同时环境动态变化对集群决策的快速性和安全适应性实现提出了更高要求。因此，研究**不完全信息下的分簇群智决策**技术，不仅对提升集群决策能力和智能化水平具有重要的理论价值，还能为提升复杂集群任务能力提供有力的科学保障。

本特邀专题邀请以下与“**不完全信息下的分簇群智决策**”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，主题包括但不限于：

- 规模级异构集群的簇群形成机制
- 分布式优化与博弈决策方法
- 分层竞合博弈算法
- 融合信息层与物理层的群体智能算法
- 不完全信息下的可信在线决策
- 多阶段动态博弈时序决策技术
- 集群无人系统资源分配与任务规划

# IEEE ICUS 2025

## Invited Session Summary

### Title of Session

Clustered Collective Decision-Making under Incomplete Information

### Organizers

1. Prof. Guanghui Wen  
Southeast University, China
2. Prof. Yang-Yang Chen  
Southeast University, China
3. Dr. Xiao Fang  
Southeast University, China
4. Dr. Meng Luan  
Southeast University, China

### Biosketches of Organizers



**Guanghui Wen** is an Endowed Chair Professor at Southeast University, an IET Fellow. He received the Ph.D. degree in mechanical systems and control from Peking University, Beijing, China, in 2012. He has been engaged in long-term research in the fields of analysis and synthesis of complex networks, distributed control and optimization, resilient control, and distributed reinforcement learning. He has published over 200 academic papers in prestigious journals, including Nature Reviews Electrical Engineering, Research, The Innovation, and various IEEE Transactions. He has authored four academic monographs and received one Best Paper Award from an international academic journal and four Best Paper Awards from domestic and international conferences. Prof. Wen currently serves as the Deputy Secretary-General of the Chinese Institute of Command and Control and the Deputy Director of its Youth Working Committee. He has led over 30 major research projects, including projects funded by the National Science Fund for Distinguished Young Scholars of China (2023), the National Science Fund for Excellent Young Scholars of China (2017), the Key Joint Funds of the National Natural Science Foundation of China, and key projects of the Ministry of Science and Technology, China. His honors include the China Youth Science and Technology Award, ARC Decra Fellow, and the Young

Scientist Award from the Chinese Institute of Command and Control.



**Yang-Yang Chen** is a Professor and Doctoral Supervisor at Southeast University, Senior Member of IEEE. He received the Ph.D. degree in Engineering from Southeast University in 2010. His research focuses on swarm intelligence and optimization, formation control, adaptive control, reinforcement learning, game theory and adversarial dynamics. He has published over 100 academic papers in top control journals such as IEEE TAC, JGCD, and other IEEE Transactions, as well as in conference proceedings. He has received three Best Paper Awards at international academic conferences. He currently serves as an Associate Editor for the top control conferences IEEE CDC and ACC, and is a director of the Jiangsu Automation Society. He has led more than ten research projects, including those funded by the National Natural Science Foundation of China, the sub-projects of the General Armament Department, and various other horizontal projects.



**Xiao Fang** is a Post-doctoral Fellow and Assistant Researcher at the School of Automation, Southeast University. She received the Ph.D. degree in the school of mathematics from Southeast University, Nanjing, China, in 2025. She current research interests include distributed optimization and game theory, multi-agent system coordination and decision-making, and distributed optimization and game-theoretic decision-making for multi-unmanned vehicle systems. She has published over 10 academic papers in international journals and conferences such as IEEE Transactions and Automatica. She was the recipient of best paper awards at the 18th Chinese Conference on Complex Networks. She was awarded the First Prize in the 2022 CICC Science and Technology Progress Award (14th/15th place). She serves as a reviewer for international journals and conferences such as IEEE TAC, IEEE TII, IEEE TCNS, ASJC, and ICUS.



**Meng Luan** is a Ph.D. candidate in the Department of Mathematics at Southeast University. She received the B.S. degree in information and computing sciences from Yanshan University in 2019, and the M. S. degree in mathematics from Southeast University in 2022. Currently, she is pursuing the Ph.D. in

mathematics at Southeast University. Her research focuses on multi-agent systems, distributed optimization and decision-making, distributed resource allocation, and networked games. She has published more than 10 academic papers in international journals and conferences, including IEEE TAC and others. She was selected for the 2024 China Association for Science and Technology Youth Talent Promotion Program (Doctoral Candidate Special Plan). Additionally, she serves as a reviewer for several international journals and conferences, including IEEE TAC, JAS, IEEE TII, IEEE TCNS, IEEE CDC, and ICUS.

### **Details of Session**

Swarm intelligence decision-making technology is a key factor in ensuring the efficient collaboration of unmanned swarm systems in complex and dynamic environments. With the rapid advancements in information technology, sensing technology, and computing power, swarm intelligence decision-making has found wide applications in various fields such as disaster rescue, intelligent manufacturing, automated logistics, and military operations. However, for large-scale heterogeneous swarm systems, swarm intelligence decision-making faces challenges such as incomplete decision information, delayed strategy learning, weak real-time interaction, and poor decision accuracy. These challenges result in traditional decision-making models being inadequate for practical applications. Moreover, for complex coupled decision tasks, the methods for multi-level alliance construction and dynamic clustering criteria of the swarm still require further research. The dynamic changes in the environment also impose higher requirements for the speed and safety adaptability of swarm decision-making. Thus, researching clustering-based swarm intelligence decision-making technologies under conditions of incomplete information is not only of significant theoretical value in enhancing swarm decision-making capabilities and intelligence levels but also provides strong scientific support for improving the capabilities of complex swarm tasks.

This special invitation calls for original papers related to the theme of “Clustered Collective Decision-Making under Incomplete Information,” including but not limited to the following topics:

- Clustering mechanisms for large-scale heterogeneous swarms
- Distributed optimization and game decision-making methods
- Hierarchical competitive-cooperative game algorithms
- Swarm intelligence algorithms integrating cyber and physical layers

- Trustworthy online decision-making under incomplete information
- Multi-stage dynamic game and sequential decision-making technologies
- Resource allocation and task planning for swarm unmanned systems