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

无人集群对抗的关系挖掘与弹性决策

组织者

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个人简介

公鑫，东南大学网络空间安全学院副教授，博士生导师，江苏省双创人才，东南大学华英学者；现为中国指挥与控制学会高级会员和青工委委员，中国自动化学会高级会员，中国网络空间安全学会专委会委员。他长期从事分布式控制与优化、无人机集群实验、网络攻防和博弈论等领域的相关研究，了解国内外无人集群系统的主要研究热点和动态，曾主持国家自然科学基金项目、江苏省自然科学金基金项目、江苏省双创项目、人社部留学人员科技创新项目、网络安全国家重点实验室开放基金等项目，参与国家重点研发项目，搭建过无人机集群实验平台，积累了丰富的项目与工程经验。近年来，他围绕高效集群和安全集群两大主题，以第一/通讯作者在 Automatica、IEEE Transactions 系列等国际知名杂志发表和接收了 SCI 论文 30 余篇，兼任多个 SCI 期刊编委。

倪培远，本科毕业于湖南大学，博士就读于上海交通大学，专业为机械电子工程，研究方向为人工智能和无人系统。2022 年至 2025 年在新加坡国立大学高级机器人中心从事博士后工作三年，师从 Gregory Scott Chrikjian。在 ICRA,IROS,RAL 等机器人知名会议与期刊中发表多篇论文。2025 年入职南京电子工程研究所，担任高级工程师，从事情报分析与数据挖掘工作。

余涛，安徽大学教授，博导。长期从事人工智能、智能控制算法设计分析、及其在多机器人协同感知和分布式控制中的应用工作。主持国家自然科学基金面上项目、国家自然科学基金青年项目、国家电网项目、中国人民解放军***部队项目、安徽省市场监督管理局科技计划项目等课题多项。发表包括 Automatica、IEEE Transactions 系列等论文 40 余篇，出版专著 2 部，授权国家发明专利 20 余项，授权软件著作权 5 项。担任《 IET Cyber-Systems and Robotics》、《Intelligence & Robotics》、《自动化与信息工程》等期刊编委/青年编委。余涛曾获得 IEEE 系统仿真技术大会最佳论文奖、先进控制及人工智能国际会议最佳论文一等奖、安徽省教学成果一等奖/二等奖等，入选安徽省机器人学会优秀青年教师科技发展激励计划。指导学生获得“互联网+”大学生创新创业大赛全国铜奖/安徽省金奖、国际先进机器人及仿真技术大赛全国一等奖等多项学科/竞赛奖励。

黄腾龙，西北农林科技大学机械与电子工程学院副教授，陕西高校优秀青年人才支持计划，陕西省“校招共用”引才用才(原秦创原引用高层次创新创业人才项目)，哈尔滨工业大学控制科学与工程专业博士。主要从事智能车辆、移动机器人、机械臂与智能农机等领域的非线性控制、智能控制、运动规划和容错控制研究，发表多篇高水平论文，主持或参与国家级、省部级机器人相关项目多项。兼任多个 JCR 1 区期刊编委或青年编委，并受邀担任 IEEE TASE、TITS、TIV、TII、TTE、IEEE/ASME TMech 等国内外重要期刊及 IV、ITSC、IECON、中国自动化大会等会议的审稿人、组委会成员或 Workshop Chair。

特邀专题简介

随着无人系统、人工智能与自主控制技术的发展，无人集群正从单体自主运行走向多智能体协同与对抗应用。在复杂动态环境中，集群系统面临通信受限、信息不完备、环境扰动、平台失效以及智能对手策略变化等挑战，亟需建立面向协同与博弈过程的关系建模方法，并形成具备鲁棒性、适应性和可恢复能力的弹性决策机制。

本特邀专题围绕“无人集群的关联关系挖掘与弹性决策”展开，重点关注

多智能体之间的任务关系、通信关系、威胁关系、信任关系与策略交互关系建模，以及在不确定和对抗条件下的自主决策、分布式协同、鲁棒优化与安全控制方法。专题旨在促进博弈论、多智能体强化学习、图表示学习、分布鲁棒优化、模型预测控制和弹性控制等方法在无人集群系统中的交叉融合，提升无人集群在复杂任务和智能对抗场景下的协同效率与任务持续能力。

本特邀专题邀请以下相关方向的原创论文。

- 无人集群博弈关系建模与交互机制分析
- 基于图学习的多智能体协同与对抗表征
- 不完全信息条件下的意图识别与策略推理
- 面向动态不确定环境的弹性决策与鲁棒优化
- 异构无人集群任务规划与分布式控制
- 无人集群博弈决策系统的仿真、评估与应用
- 轨迹异常检测与事件发现
- 时空轨迹数据挖掘

IEEE ICUS 2026
Invited Session Summary

Title of Session

Relationship Modeling and Resilient Decision-Making for Unmanned Swarms

Organizers

1. Assoc. Prof. Xin Gong

Southeast University, China

2. Res. Prof. Peiyuan Ni

Nanjing Electronic Engineering Research Institute, China

3. Prof. Tao Yu

Anhui University, China

4. Assoc. Prof. Tenglong Huang

Northwest A&F University, China

Biosketches of Organizers

Xin Gong, Associate Professor and Doctoral Supervisor, School of Cyber Science and Engineering, Southeast University. He is a recipient of Jiangsu Provincial Innovation and Entrepreneurship Talent and the Huaying Scholar of Southeast University. He serves as Senior Member and Committee Member of the Youth Working Committee of Chinese Institute of Command and Control, Senior Member of Chinese Association of Automation, and Committee Member of the Specialized Committee of Chinese Society for Cyberspace Security. His research focuses on distributed control and optimization, UAV swarm experiments, network attack and defense, and game theory. He keeps track of the latest research trends of unmanned swarm systems worldwide. He has presided over numerous projects including the National Natural Science Foundation of China, Natural Science Foundation of Jiangsu Province, Jiangsu Innovation and Entrepreneurship Program, Science and Technology Innovation Program for Returned Scholars sponsored by the Ministry of Human Resources and Social Security, and Open Fund of State Key Laboratory of Cyberspace Security. He also participated in national key R&D programs and built an experimental platform for UAV swarms, gaining extensive experience in project management and engineering practice. In recent years, centering on efficient and secure swarm systems, he has published over 30 SCI papers as the first or corresponding author in top international journals such as Automatica and IEEE Transactions. He also acts as an editorial board member for several SCI journals.

Peiyuan Ni, He received his bachelor's degree from Hunan University and his doctoral degree in Mechatronic Engineering from Shanghai Jiao Tong University, with research interests in artificial intelligence and unmanned systems. From 2022 to 2025, he worked as a postdoctoral researcher for three years at the Advanced Robotics Centre, National University of Singapore, under the supervision of Prof. Gregory Scott Chrikjian. He has published multiple papers in renowned robotics conferences and journals including ICRA, IROS and RAL. In 2025, he joined Nanjing Electronic Engineering Research Institute as a Senior Engineer, engaging in intelligence analysis and data mining.

Tao Yu, Professor and Doctoral Supervisor, Anhui University. His long-term research covers artificial intelligence, design and analysis of intelligent control algorithms, as well as their applications in multi-robot cooperative perception and distributed control. He has led a host of research projects, including the General Program and Youth Program of the National Natural Science Foundation of China, projects from State Grid Corporation of China, military research projects, and science and technology programs of Anhui Administration for Market Regulation. He has published more than 40 papers in journals such as Automatica and IEEE Transactions, authored 2 monographs, obtained over 20 national invention patents and 5 software copyrights. He serves as editorial board member or youth editorial board member for journals including IET Cyber-Systems and Robotics, Intelligence & Robotics and Automation & Information Engineering. He has won the Best Paper Award at IEEE Conference on System Simulation Technology, First Prize for Best Paper at International Conference on Advanced Control and Artificial Intelligence, as well as the First and Second Prizes of Anhui Provincial Teaching Achievement Award. He was selected into the Outstanding Young Teacher Development Program of Anhui Robotics Society. Under his supervision, students have won multiple awards in discipline competitions, including National Bronze Award and Anhui Provincial Gold Award in the "Internet+" National College Students Innovation and Entrepreneurship Competition, and National First Prize in International Advanced Robotics and Simulation Technology Competition.

Tenglong Huang, Associate Professor, College of Mechanical and Electronic Engineering, Northwest A&F University. He is a recipient of the Outstanding Young Talent Support Program of Shaanxi Provincial Universities and the High-level Innovation and Entrepreneurship Talent Program of Shaanxi Province. He earned his Doctorate in Control Science and Engineering from Harbin Institute of Technology. His research mainly involves nonlinear control, intelligent control, motion planning and fault-tolerant control for intelligent vehicles, mobile robots, manipulators and intelligent agricultural machinery. He has published a number of high-level papers and presided over or participated in multiple national and provincial research projects related to robotics. He is an editorial board member or youth editorial board member of several JCR Q1 journals. Additionally, he has been invited to work as a reviewer, organizing committee member or Workshop Chair for prestigious journals including IEEE TASE, TITS, TIV, TII, TTE and IEEE/ASME TMech, as well as major conferences such as IV, ITSC, IECON and Chinese Automation Congress.

Details of Session

With the development of unmanned systems, artificial intelligence, and autonomous control, unmanned swarms are moving from single-agent autonomy toward multi-agent cooperation and confrontation. In complex dynamic environments, swarm systems face challenges such as communication constraints, incomplete information, environmental disturbances, platform failures, and changing opponent strategies. Therefore, effective relationship modeling and resilient decision-making are essential for improving robustness, adaptability, and mission sustainability.

This invited session focuses on “Relationship Modeling and Resilient Decision-Making for Game-Theoretic Unmanned Swarms”. It aims to explore task relations, communication relations, threat relations, trust relations, and strategic interaction relations among multiple agents, as well as autonomous decision-making, distributed cooperation, robust optimization, and safe control under uncertainty and adversarial conditions. The session welcomes interdisciplinary studies combining game theory, multi-agent reinforcement learning, graph representation learning, distributionally robust optimization, model predictive control, and resilient control for unmanned swarm systems.

Topics of interest include but are not limited to:

- Game-theoretic relationship modeling and interaction mechanism analysis for unmanned swarms

- Graph learning-based representation of multi-agent cooperation and confrontation
- Intention recognition and strategy reasoning under incomplete information
- Resilient decision-making and robust optimization in dynamic uncertain environments
- Mission planning and distributed control for heterogeneous unmanned swarms
- Simulation, evaluation, and application of game-theoretic decision-making systems for unmanned swarms
- Trajectory anomaly detection and event discovery
- Multi-agent trajectory relationship modeling