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

无人系统智能博弈

组织者

1.刘　瑜，研究员，清华大学

2.王　栋，教授，大连理工大学

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4.朱圆恒，副研究员，中科院自动化所

5.李　徵，助理教授，清华大学深圳国际研究生院

6.李劭辉，研究员，浙江大学

个人简介

刘瑜，清华大学电子工程系研究员，博导，国家杰青/优青，中国青年科技奖获得者，享受国务院政府特殊津贴。现任中国航空学会理事及青工委副主任、中国指挥与控制学会具身智能专委会副主任、中国人工智能学会智能融合专委会副秘书长/常委。长期致力于多模态数据智能融合、无人系统智能决策等方向的研究，在相关领域重要学术会议与期刊上发表高水平学术论文 90 余篇，获授权专利 60 余项，登记软件著作权 20 余项。主持国家重点研发计划项目课题、国家自然科学基金重大项目课题等 10 余项科研任务，主要成果已应用于多项实装系统中，获省部级科技一等奖 4 项，兼任 IEEE TNNLS、TMC、CJA、CJE 等国内外期刊编委。

王栋，大连理工大学信息与通信工程学院，教授、博导。主要从事计算机视觉和智能机器人领域研究，迄今在本领域顶级会议(CVPR/ICCV/ICRA)及期刊(TPAMI/IJCV)发表论文 60 余篇，谷歌学术引用 1.8 万余次。获得国际视觉目标跟踪竞赛 VOT 冠军(10 次)、CCF 自然科学二等奖(排名第 1)、教育部自然科学二等奖(排名第 2)、CVPR2020 最佳论文提名(通讯作者)等学术奖励。研究工作获得国家自然科学基金优秀青年科学基金、区域联合重点项目等资助。

张鼎文，西北工业大学自动化学院，教授，国家优秀青年科学基金获得者、科睿唯安“全球高被引科学家”。2015 年赴美国卡耐基梅隆大学进行为期 2 年的访问研究，致力于建立面向开放环境下、具备动态学习能力的新一代医学影像智能感控体系。迄今为止，作为第一作者/通讯作者在领域内国际重要期刊及会议发表学术论文 60 余篇，其中包含 TPAMI、IJCV、TMI、TIP、CVPR、ICCV、MICCAI、Science China: Information Science 等，其中部分研究成果被 IEEE TBME 遴选为 Featured Article，获得全国人工智能应用场景创新挑战赛（CICAS）总决赛一等奖等。曾入选中国博士后创新人才计划、AI 华人青年学者榜单，获吴文俊人工智能优秀青年奖、2021 IEEE TCSVT 最佳论文奖、中国图象图形学学会优秀博士论文奖、中国电子学会自然科学一等奖等奖励。担任中国图象图形学学会青年工作委员会副秘书长，IEEE TMM 与 TCSVT 副编辑。

朱圆恒，中国科学院自动化研究所副研究员。长期开展深度强化学习理论与方法的研究工作，并在多智能体系统、智能决策、大模型智能体和后训练等领域取得成果。目前已出版专著 2 本，发表论文 100 余篇，其中 IEEE 汇刊 30 余篇，ESI 高被引/期刊热点论文 9 篇。谷歌学术引用 4000 余次，包括 DeepMind 的 AlphaStar Nature 论文引用。获得北京市和天津市自然科学二等奖（排名第二），1 篇中文论文入选国内期刊年度论文奖，2 篇英文论文获得 IEEE 汇刊年度杰出论文奖（唯一）。获国家自然科学基金重大和重点项目、“新一代人工智能”重大专项、中科院战略先导等国家重大项目支持。入选中科院青促会，北京市科技新星计划以及全球前 2%顶尖科学家榜单。

李徵，清华大学深圳国际研究生院助理教授、博导。研究方向包括多智能体对抗博弈、具身智能等。主持国家自然科学基金青年项目、博士后特别资助项目等多项，参与多项国家级重大项目。曾获中国人工智能学会科技进步二等奖等科技奖励，入选“中国科协青年人才托举工程”。近五年在 IEEE TNNLS、IEEE TKDE、ACM TKDD、ICLR、ICML、KDD 等顶级国际期刊与会议发表论文 40 余篇，获授权专利 10 余项。

李劭辉，浙江大学信息与电子工程学院百人计划研究员、博导。研究方向包括多智能体对抗博弈、多媒体智能表示编码等。主持国家自然科学基金青年项目，参与多项国家级重大项目。曾获上海市科技进步一等奖、中国人工智能学会科技进步二等奖、中国电子学会科技进步二等奖等科技奖励，入选“博士后创新人才支持计划”。近五年在 IEEE TSP、IEEE TCSVT、ICLR、ICML 等顶级国际期刊与会议发表论文 40 余篇，获授权美国专利 2 项、中国专利 20 余项；参与《人工智能发展前沿》编写；任 IEEE ICME 2025、PRCV 2025 等国际国内会议领域主席。

特邀专题简介

无人系统智能博弈通常是指无人平台在动态不确定环境中，通过自主感知、决策优化与交互协作，实现多主体竞争与协同的智能决策过程，其核心涵盖环境感知认知、任务规划决策、博弈策略生成、群智协同控制等关键环节。随着大模型、人工智能与自主控制的快速发展，无人系统智能博弈理论与方法已广泛应用于低空协同管控、应急救援协同、智能物流调度、国防安全等多个领域，正在推动无人系统产业从单一任务执行向复杂场景多主体智能交互升级，成为支撑新质生产力发展的重要技术支撑。然而，复杂动态环境下无人系统智能博弈仍面临诸多挑战，主要涉及动态环境建模的准确性、博弈策略的实时性与鲁棒性、多主体交互的非平稳性、多智能体信用分配的合理性等。如何提升无人系统智能博弈的自主决策能力、协同交互效率与环境适应能力，成为当前无人系统领域科研人员的重点研究方向。随着人工智能技术与无人系统的深度融合，智能博弈已成为无人系统从单一自主执行向多主体协同对抗、动态决策演进的核心支撑，更是推动相关领域发展的关键技术方向。

本特邀专题邀请以下与“无人系统智能博弈”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。

- 无人集群对抗博弈与应用
- 面向博弈对抗的无人系统感知认知
- 面向博弈对抗的无人系统规划决策
- 无人系统博弈群智涌现
- 无人系统智能博弈仿真与实体验证

IEEE ICUS 2026
Invited Session Summary

Title of Session

Intelligent Game-Theoretic Decision-Making for Unmanned Systems

Organizers

1. Prof. Yu Liu
Tsinghua University, China
2. Prof. Dong Wang
Dalian University of Technology, China
3. Prof. Dingwen Zhang
Northwestern Polytechnical University, China
4. Dr. Yuanheng Zhu
Chinese Academy of Sciences, China
5. Asst. Prof. Zhi Li
Tsinghua Shenzhen International Graduate School, China
6. Dr. Shaohui Li
Zhejiang University, China

Biosketches of Organizers

Yu Liu is a Research Fellow and Ph.D. supervisor in the Department of Electronic Engineering at Tsinghua University. He is a recipient of the National Science Fund for Distinguished Young Scholars, the National Science Fund for Excellent Young Scholars, the China Youth Science and Technology Award, and the State Council Government Special Allowance. He currently serves as a Council Member of the Chinese Society of Aeronautics and Astronautics and Deputy Director of its Youth Working Committee, Deputy Director of the Embodied Intelligence Committee of the Chinese Institute of Command and Control, and Deputy Secretary-General / Standing Committee Member of the Intelligent Fusion Committee of the Chinese Association for Artificial Intelligence. He has long been engaged in research on multimodal data intelligent fusion and intelligent decision-making for unmanned systems. He has published more than 90 high-level papers in leading conferences and journals in related fields, been granted more than 60 patents, and registered more than 20 software copyrights. He has led more than 10 major research projects, including projects under the National Key R&D Program of China and major programs of the National Natural Science Foundation of China. His major achievements have been applied in multiple

deployed systems, and he has received four first-class provincial- or ministerial-level science and technology awards. He also serves on the editorial boards of domestic and international journals, including IEEE Transactions on Neural Networks and Learning Systems (TNNLS), IEEE Transactions on Mobile Computing (TMC), Chinese Journal of Aeronautics (CJA), and Chinese Journal of Electronics (CJE).

Dong Wang is a Professor and Ph.D. supervisor at the School of Information and Communication Engineering, Dalian University of Technology. His research mainly focuses on computer vision and intelligent robotics. To date, he has published more than 60 papers in top conferences such as CVPR, ICCV, and ICRA, as well as leading journals such as TPAMI and IJCV, with more than 18,000 citations on Google Scholar. He has received numerous academic honors, including ten championships in the Visual Object Tracking (VOT) Challenge, the Second Prize of the CCF Natural Science Award (ranked 1st), the Second Prize of the Ministry of Education Natural Science Award (ranked 2nd), and a CVPR 2020 Best Paper Nomination as corresponding author. His research has been supported by the Excellent Young Scientists Fund of the National Natural Science Foundation of China and regional joint key projects.

Dingwen Zhang is a Professor at the School of Automation, Northwestern Polytechnical University. He is a recipient of the Excellent Young Scientists Fund and has been recognized by Clarivate as a Highly Cited Researcher. In 2015, he visited Carnegie Mellon University in the United States for a two-year research stay. He has been committed to establishing a new-generation intelligent perception and control system for medical imaging in open environments with dynamic learning capability. To date, as first author or corresponding author, he has published more than 60 papers in major international journals and conferences in the field, including TPAMI, IJCV, TMI, TIP, CVPR, ICCV, MICCAI, and Science China: Information Sciences. Some of his work has been selected as Featured Articles by IEEE TBME. He has won the First Prize in the Finals of the National Artificial Intelligence Application Scenario Innovation Challenge (CICAS) and the Second Prize in the A1+ Pharmaceutical and Medical Innovation Track of the “Xingzhi Cup” National AI Innovation and Application Competition. He was previously selected for the Chinese Postdoctoral Innovative Talent Support Program and the AI Chinese Young Scholars List, and has received honors including the Wu Wenjun AI Outstanding Young Scholar Award, the 2021 IEEE TCSVT Best Paper Award, the Excellent Doctoral Dissertation Award of the

China Society of Image and Graphics, and the First Prize of the Natural Science Award of the Chinese Institute of Electronics. He currently serves as Deputy Secretary-General of the Youth Working Committee of the China Society of Image and Graphics and as an Associate Editor of IEEE Transactions on Multimedia (TMM) and IEEE Transactions on Circuits and Systems for Video Technology (TCSVT).

Yuanheng Zhu is an Associate Research Professor at the Institute of Automation, Chinese Academy of Sciences. He has long been engaged in research on the theories and methods of deep reinforcement learning, and has achieved important results in multi-agent systems, intelligent decision-making, LLM agents, and post-training. To date, he has published two monographs and more than 100 papers, including over 30 papers in IEEE Transactions journals, as well as 9 ESI highly cited papers / hot papers. He has received more than 4,000 citations on Google Scholar, including citations from DeepMind's AlphaStar paper in Nature. He won the Second Prize of the Beijing Natural Science Award and the Second Prize of the Tianjin Natural Science Award (both ranked 2nd), one of his Chinese papers was selected for a domestic journal annual paper award, and two of his English papers received IEEE Transactions Outstanding Paper Awards as sole recipient. His work has been supported by major national projects, including major and key programs of the National Natural Science Foundation of China, the "New Generation Artificial Intelligence" Major Project, and the Strategic Priority Research Program of the Chinese Academy of Sciences. He has also been selected for the Youth Innovation Promotion Association of the Chinese Academy of Sciences, the Beijing Nova Program, and the World's Top 2% Scientists list.

Zhi Li is an Assistant Professor and Ph.D. supervisor at the Tsinghua Shenzhen International Graduate School, Tsinghua University. His research interests include multi-agent adversarial games and embodied intelligence. He has led multiple projects, including the Young Scientists Fund of the National Natural Science Foundation of China and the Special Postdoctoral Support Program, and has participated in several major national projects. He has received science and technology awards including the Second Prize of the Science and Technology Progress Award of the Chinese Association for Artificial Intelligence, and was selected for the Young Talent Support Project of the China Association for Science and Technology. Over the past five years, he has published more than 40 papers in top international journals and conferences, including IEEE

TNNLS, IEEE TKDE, ACM TKDD, ICLR, ICML, and KDD, and has been granted more than 10 patents. He also contributed to the book Frontiers of Artificial Intelligence Development.

Shaohui Li is a Research Fellow under the Hundred Talents Program and a Ph.D. supervisor at the College of Information Science and Electronic Engineering, Zhejiang University. His research interests include multi-agent adversarial games and multimedia intelligent representation and coding. He has led projects such as the Young Scientists Fund of the National Natural Science Foundation of China and has participated in multiple major national projects. He has received several science and technology awards, including the First Prize of the Shanghai Science and Technology Progress Award, the Second Prize of the Science and Technology Progress Award of the Chinese Association for Artificial Intelligence, and the Second Prize of the Science and Technology Progress Award of the Chinese Institute of Electronics, and was selected for the Postdoctoral Innovative Talent Support Program. Over the past five years, he has published more than 40 papers in top international journals and conferences, including IEEE TSP, IEEE TCSVT, ICLR, and ICML, and has been granted 2 U.S. patents and more than 20 Chinese patents. He also contributed to the book Frontiers of Artificial Intelligence Development and serves as an Area Chair for international and domestic conferences such as IEEE ICME 2025 and PRCV 2025.

Details of Session

Intelligent game for unmanned systems usually refers to the intelligent decision-making process in which unmanned platforms, in dynamic and uncertain environments, realize multi-agent competition and cooperation through autonomous perception, decision optimization, and interactive collaboration. Its core covers key links such as environmental perception and cognition, task planning and decision-making, game strategy generation, and swarm-intelligence-based cooperative control. With the rapid development of large models, artificial intelligence, and autonomous control, the theories and methods of intelligent game for unmanned systems have been widely applied in many fields, including low-altitude collaborative management and control, emergency rescue coordination, intelligent logistics scheduling, and national defense and security. They are driving the unmanned systems industry to upgrade from single-task execution to multi-agent intelligent interaction in complex scenarios, and have become an important technical support for the development of new quality productive forces. However, intelligent game for unmanned systems in complex dynamic environments still faces many

challenges, mainly involving the accuracy of dynamic environment modeling, the real-time performance and robustness of game strategies, the non-stationarity of multi-agent interaction, and the rationality of credit assignment in multi-agent systems. How to improve the autonomous decision-making capability, collaborative interaction efficiency, and environmental adaptability of intelligent game for unmanned systems has become a key research direction for researchers in the field of unmanned systems. With the deep integration of artificial intelligence technology and unmanned systems, intelligent game has become the core support for the evolution of unmanned systems from single autonomous execution to multi-agent cooperative confrontation and dynamic decision-making, and is also a key technical direction driving the development of related fields.

This special issue invites original papers related to the theme of "Intelligent Game for Unmanned Systems", including innovative ideas, concepts, new findings, improvements, and new applications.

- Adversarial game and applications of unmanned swarms
- Perception and cognition of unmanned systems for game confrontation
- Planning and decision-making of unmanned systems for game confrontation
- Swarm-intelligence emergence in unmanned-system games
- Simulation and physical verification of intelligent game for unmanned systems