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
自主无人系统智能感知与决策

组织者

1. 李修贤，教授，同济大学

2. 操锟，教授，同济大学

3. 赵世钰，特聘研究员，西湖大学

4. 罗彪，教授，中南大学

个人简介

李修贤，同济大学教授，博导，自主智能无人系统全国重点实验室，电子与信息工程学院，上海自主智能无人系统科学中心，国家级青年人才。主要研究兴趣是网络化分布式控制和优化、博弈、及无人机、无人车与机械臂等无人系统。发表 SCI 期刊论文 50 余篇，获上海市人工智能学会青年优秀论文奖、会议 CCSICC 2023 最佳论文奖、上海市自动化学会自然科学奖二等奖等奖项。主持国家自然科学基金青年与面上项目、国家科技部重大项目课题等科研项目。中国自动化学会青年工作委员会委员，中国指挥与控制学会青年工作委员会委员，中国自动化学会 TCCT 委员，CAA、CICC 和 IEEE 高级会员。

操锟，博士，2023 年入选国家高层次青年人才，上海市领军人才（海外）。2016 年本科毕业于天津大学，2021 年博士毕业于新加坡南洋理工大学。之后，他在新加坡南洋理工大学担任博士后，并被遴选为 Wallenberg-NTU 荣誉博后，任职于新加坡南洋理工大学和瑞典皇家理工学院。2024 年加入同济大学电子与信息工程学院、上海自主智能无人系统科学中心。主要研究方向包括群体智能（例如基于模型或学习的多机器人导航）以及单机智能（例如机器人本体设计、建模和控制），发表论文 20 余篇，包括顶级期刊 TAC、Automatica 和 TRO 等，获 IROS Best Entertainment and Amusement Paper Award 和 ICCA Best Paper Award。
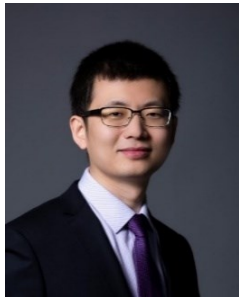
赵世钰，本硕毕业于北京航空航天大学，博士毕业于新加坡国立大学。2019 年加入西湖大学，目前是工学院特聘研究员、智能无人系统实验室负责人。加入西湖大学前，他是英国谢菲尔德大学自动控制与系统工程系的讲师和博士生导师。他的实验室致力于研发有趣、有用、有挑战性的下一代机器人系统，包括大规模机器人集群系统、空中无人机协同追捕系统、空中作业机器人系统。代表性研究成果发表在 Nature Communications、IEEE Transactions on Robotics、International Journal of Robotics Research, IEEE Control Systems Magazine 等顶级期刊。他曾获得国家海外高层次人才引进计划青年项目。在追求高品质研究成果之外，他也致力于教授高影响力的课程。他撰写的英文教材《Mathematical Foundations of Reinforcement Learning》即将由清华大学出版社和 Springer 出版社联合出版。

罗彪，中南大学自动化学院教授、博士生导师、国家优青、湖南省科技创新领军人才、湖南省杰青、IEEE Senior Member。近年来在 IEEE TPAMI、Automatica、AAAI、IEEE TNNLS、IEEE TCYB、自动化学报等领域顶级学术期刊与会议上发表学术论文 150 余篇，Google 学术引用 5200 余次。2014-2018 年在中国科学院自动化研究所任助理研究员、副研究员。现担任中国自动化学会（CAA）自适应动态规划与强化学习专业委员会副主任；现/曾担任国际期刊《IEEE Transactions on Neural Networks and Learning Systems》、《IEEE Transactions on Emerging Topics in Computational Intelligence》、《Artificial Intelligence Review》、《Neurocomputing》与《Journal of Industrial & Management Optimization》副主编；获得亚太神经网络学会（APNNS）青年科学家奖。目前研究兴趣主要有：智能控制/决策/博弈、深度学习、强化学习。

特邀专题简介

随着新一轮信息技术的快速发展，自主智能无人系统的应用与需求越来越强烈。作为人工智能的重要应用之一，其发展可大大推动人工智能技术的创新与进步。自主智能无人系统依靠控制、大数据、人工智能以及其他学科的进步

来创造具有集成感知、运动规划、决策和推理能力的无人系统，具有自主性、智能性和协作性等主要特征。典型自主无人系统包括无人机、无人车、自动驾驶汽车、智能制造机器人以及陪伴型机器人等。通过新一代人工智能技术与无人系统技术深度融合，可实现通过学习认知来增强物理系统的感知、计算分析与控制的能力。现阶段对于自主无人系统智能感知与决策研究仍有许多技术难点，包括群体智能感知、集群智能决策等。

本特邀专题邀请如下方向稿件，但不局限于这些方向，旨在推动自主无人系统的协同智能感知、优化、博弈、控制等相关方向的发展。

- 智能环境感知
- 智能协同控制
- 分布式优化与博弈
- 数据驱动控制与决策
- 基于学习的控制
- 感知与决策的安全性
- 自主无人系统应用

IEEE ICUS 2025
Invited Session Summary

Title of Session
Intelligent Perception and Decision Making for Autonomous Unmanned Systems

Organizers

1. Prof. Xiuxian Li

Tongji University, China

2. Prof. Kun Cao

Tongji University, China

3. Prof. Shiyu Zhao

Westlake University, China

4. Prof. Biao Luo

Central South University, China

**Biosketches of Organizers**

Xiuxian Li is a professor with National Key Laboratory of Intelligent Autonomous Systems, College of Electronic and Information Engineering, and Shanghai Research Institute for Intelligent Autonomous Systems, Tongji University, Shanghai, China. He is in the finalist of IEEE RCAR 2018 and other academic awards. His research interests include distributed control and optimization, game theory, as well as applications to UAVs and autonomous vehicles. He has published more than 50 SCI journal papers, and is a member of AAAI, CAAI and TCCT, and a senior member of CAA, CICC and IEEE.

Kun Cao received the B.Eng. degree in mechanical engineering from Tianjin University, Tianjin, China, in 2016, and the Ph.D. degree in electrical and electronic engineering from the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, in 2021. He was the 2022 Wallenberg-NTU Presidential Postdoctoral Fellow with the School of Electrical and Electronic Engineering at Nanyang Technological University and the School of Electrical Engineering and Computer Science at KTH Royal Institute of Technology in Sweden. In 2024, he is currently a faculty member in Tongji University, Shanghai, China. His research interests include individual (design, modeling, and control of

new robots) and swarm intelligence (model-based and learning-based multi-robot navigation). He has published over 20 papers, including TAC, Automatica, and TRO, and been awarded IROS Best Entertainment and Amusement Paper Award and ICCA Best Paper Award.
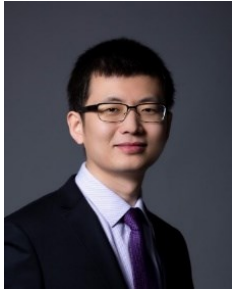
Shiyu Zhao received the BE and ME degrees from Beijing University of Aeronautics and Astronautics, and obtained the PhD degree in Electrical Engineering from National University of Singapore. In 2019, he joined Westlake University, where he is currently an Associate Professor and the Director of the Intelligent Unmanned Systems Laboratory. Before he joined Westlake University, he was a Lecturer in the Department of Automatic Control and Systems Engineering at the University of Sheffield, UK. His laboratory is dedicated to the research on interesting, useful, and challenging next-generation robotic systems, including large-scale robotic swarm systems, cooperative aerial pursuit systems, and aerial manipulation systems. Representative research results have been published in top journals such as Nature Communications, IEEE Transactions on Robotics, and IEEE Control Systems Magazine. In addition to pursuing high-quality research results, he is also committed to teaching high-impact courses. He has won the Best Teaching Award from the School of Engineering at Westlake University. The English textbook "Mathematical Foundations of Reinforcement Learning" written by him will soon be jointly published by Tsinghua University Press and Springer Nature Press.

Biao Luo, IEEE Senior Member, received the Ph.D. degree in control science and engineering from Beihang University, Beijing, China, in 2014. He is currently a Professor with the School of Automation, Central South University (CSU), Changsha, China. Before joining CSU, he was an Associate Professor and Assistant Professor with the Institute of Automation, Chinese Academy of Sciences, Beijing, China, from 2014 to 2018. He published 100+ papers, including top journals and conferences IEEE TPAMI, Automatica, AAAI, etc. He serves as an Associate Editor for the IEEE Transactions on Neural Networks and Learning Systems, the Artificial Intelligence Review, the Neurocomputing, and the Journal of Industrial and Management Optimization. He is a Senior Member of the IEEE, and the Vice-Chair of Adaptive Dynamic Programming and Reinforcement Learning

Technical Committee, Chinese Association of Automation. His current research interests include intelligent control, reinforcement learning, deep learning, and decision-making.

Details of Session

Along with the rapid development of the new wave of information technology, there is an increasingly strong demand for application scenarios and the autonomous capabilities of unmanned systems. As one of the important applications of artificial intelligence, its development can greatly promote the innovation of artificial intelligence technology. Intelligent autonomous systems are an emerging interdisciplinary field that relies on advances in big data, artificial intelligence, and other science and technology to create unmanned systems with integrated task, motion planning, decision-making, and reasoning capabilities, featuring autonomy, intelligence, and collaboration. Typical intelligent autonomous systems include UAVs, UGVs, self-driving cars, intelligent manufacturing robots, and companion robots. Through the deep integration of new-generation artificial intelligence technology and unmanned system technology, the perception, computational analysis, and control capabilities of physical systems are enhanced through learning cognition. Currently, there are still many technical difficulties in the research of intelligent perception and decision-making for autonomous unmanned systems, including group intelligent perception, swarming intelligent decision-making, etc.

This special session invites papers from the following directions, but not limited to them, with the aim of promoting the development of collaborative intelligent perception, optimization, game theory, control, and other related directions in autonomous unmanned systems.

- Intelligent Environment Perception
- Intelligent Cooperative Control
- Distributed Optimization and Game Theory
- Data-Driven Control and Decision Making
- Learning-based Control
- Safety in Perception and Decision Making
- Applications in Intelligent Autonomous Systems