2024 第七届 IEEE 国际无人系统大会
特邀专题简介表

特邀专题名称

无人系统感知、控制与优化理论技术前沿

组织者

1. 吕跃祖，副研究员，北京理工大学

2. 王琦少，副教授，北京航空航天大学

3. 彭秀辉，副教授，南京航空航天大学

4. 陈磊，副研究员，北京理工大学

5. 王佩君，副教授，安徽师范大学

个人简介

吕跃祖，北京理工大学副研究员，博士生导师，中国科协青托，北京市科技新星。分别于 2013、2018 年在北京大学获学士与博士学位。曾访问香港城市大学、德州农工大学卡塔尔分校、澳大利亚皇家墨尔本理工大学。在多智能体系统完全分布式自适应控制、分布式抗饱和协同控制、分布式观测器设计与安全协同控制等方面做出一系列研究成果，发表 SCI 论文 70 余篇（含控制领域顶刊 IEEE TAC 和 Automatica 长文 6 篇，短文 6 篇，其他 IEEE 汇刊 40 余篇），谷歌引用 1900 余次，出版中英文专著 2 部。主持国家自然科学基金面上项目、JKW 1××工程项目等国家级项目 10 余项。曾获中国指挥与控制学会科技进步一等奖，IEEE SMC 学会 Zadeh 最佳会议论文奖， IEEE 国际无人系统大会最佳论文奖，亚太神经网络学会（APNNS）青年研究者奖，日内瓦国际发明展金奖等。任 IEEE SMC Magazine 编委、IJDY 青年编委，任 IEEE IES 工业信息学技术委员会秘书长、中国指挥与控制学会青工委委员、网络科学与工程专委会委员和集群智能与协同控制专委会委员、中国指挥与控制学会高级会员、IEEE Senior Member。

王琦少，北京航空航天大学副教授，航空学院院长助理。本科毕业于北京航空航天大学，博士毕业于北京大学力学系统与控制专业。主要从事多无人系统协同控制方面的科研工作，研究方向为：无人机集群协同编队控制、异质动力学网络的分布式最优控制、无人系统跨域智能协作控制等。近年来在控制领域国际重要学术期刊发表 SCI 论文 30 余篇；授权国家专利 4 项；主持国家自然科学基金项目 3 项，中国博士后科学基金项目 2 项；入选全国博士后创新人才支持计划、北京市青年人才托举工程、小米青年学者，获评中国指挥与控制学会优秀博士学位论文、北京航空航天大学优秀博士后、IEEE 国际无人系统大会最佳论文奖；现任 International Journal of Dynamics and Control 期刊（SCI）青年编委、IEEE IES 技术委员会（中国）常务理事、中国指挥与控制学会集群智能与协同控制专业委员会委员、中国指挥与控制学会青年工作委员会委员。

彭秀辉，南京航空航天大学副教授，自动化学院自动控制系副主任。2019 年博士毕业于北京大学力学（力学系统与控制）专业，主要从事空天飞行器智能决策与控制方法及应用的研究。入选第八届中国科协“青年人才托举工程”，2021 年澳门青年学者计划，2020 年江苏省“双创博士”等。主持承担了 173 基础加强计划技术领域基金项目、国家自然科学基金青年项目、国防科技重点实验室项目、江苏省自然科学基金青年项目、博士后特别资助项目、博士后面上项目、航空基金项目等 10 余项，作为骨干成员参与了国家自然基金重点项目、面上项目等多项，相关成果发表学术论文 30 余篇。担任中国指挥与控制学会青年工作委员会委员、江苏省自动化学会青年工作委员会委员、《电光与控制》青年编委、《指挥控制与仿真》青年编委等。

陈磊，2018 年毕业于东南大学，获得控制科学与工程博士学位。自 2021 年至今就任北京理工大学前沿交叉科学研究院副研究员，曾于 2018-2021 在北京航空航天大学自动化科学与电气工程学院从事博士后研究工作，分别曾在 2014 年、2015 年至 2017 年间以访问学者身份在日本冈山县立大学、澳大利亚皇家墨尔本理工大学从事科学研究工作。研究领域为复杂网络下的群体智能、特征建模与自适应控制，近五年发表学术论文近 20 篇（一作及通信近 10 篇），共计影响因子近 90（一作及通信近 50）。以负责人承担及获批自然科学基金青年项目、博士后基金面上项目、院士咨询项目、北京理工大学朗月项目、北京理工大学青年计划、科技部重点研发计划子课题等项目。

王佩君，2019 年博士毕业于东南大学，现为安徽师范大学副教授、博士生导师，并于 2021 年入选安徽省“青年皖江学者”，先后多次学术访问澳大利亚皇家墨尔本理工大学和美国德州 A&M 大学卡塔尔分校。主要从事多智能体系统协同控制与强化学习理论及其应用的研究，出版学术专著 1 部，发表 IEEE Trans.系列汇刊 15 篇，《中国科学》系列杂志 2 篇，主持国家自然科学基金 2 项，荣获 2022 年安徽省青年数学奖。

特邀专题简介

无人系统领域已受到国内外学者的广泛关注。随着智能技术的发展，无人系统在无人车辆、卫星编队、传感器网络、智能电网和智能交通等各个领域得到了大量应用。分布式感知、控制和优化是无人系统的关键技术，它们在保障系统高效运行、全面提升性能方面起到至关重要的作用。近年来，各类先进的感知、控制和优化方法先后迸发出来。本专题旨在汇聚来自不同领域的科研人员，探讨无人系统的新型感知、控制和优化方法。该专题还将着重讨论无人系统的安全相关问题。本邀请专题将为科研人员提供一个交流新思想和方法、讨论与无人系统相关挑战性问题的平台。该专题包括但不限于以下主题：

- 智能感知系统
- 无人系统分布式滤波与融合

- 无人系统分布式控制
- 无人系统事件触发控制
- 无人系统分布式优化
- 无人系统分布式博弈
- 无人系统攻击检测
- 无人系统安全控制
- 无人系统深度学习
- 无人系统强化学习
- 无人系统应用

IEEE ICUS 2024
Invited Session Summary

Title of Session

Advanced Sensing, Control, and Optimization of Unmanned Systems

Organizers

1. Prof. Yuezu Lv

Beijing Institute of Technology, China

2. Prof. Qishao Wang

Beihang University, China

3. Prof. Xiuhui Peng

Nanjing University of Aeronautics and Astronautics, China

4. Prof. Lei Chen

Beijing Institute of Technology, China

5. Prof. Peijun Wang

Anhui Normal University, China

Biosketches of Organizers

Yuezu Lv received the B.S. degree in engineering mechanism and Ph.D. degree in mechanical systems and control from the College of Engineering, Peking University, Beijing, China, in 2013 and 2018, respectively. He is currently an Associate Researcher with Advanced Research Institute of Multidisciplinary Sciences, Beijing Institute of Technology, Beijing, China. His research interests include cooperative control of multi-agent systems, adaptive control, robust control of uncertain systems, and distributed resilient control. He was a finalist for Zhang Si-Ying (CCDC) Outstanding Youth Paper Award in 2015. He received the 2021 APNNS Young Researcher Award by Asia Pacific Neural Network Society, and the Lotfi A. Zadeh Best Conference Paper Award at IEEE ICCSS 2022. He was selected for the fifth Young Elite Scientists Sponsorship Program by CAST in 2020.

Qishao Wang received the B.S. degree in Automation from Beihang University, Beijing, China, in 2014, and Ph. D. degree in engineering from Peking University, Beijing in 2019. He is currently an Associate Professor with Department of Dynamics and Control, Beihang University, Beijing, China. From 2019 to 2021, He worked as a post-doctor in Department of Dynamics and Control, Beihang University, Beijing, China. His research interests include cooperative control of multi-agent systems, adaptive control, and distributed optimization. He received Excellent Doctoral Dissertation Award of Chinese Institute of Command and Control. He was selected for the Postdoctoral Innovative Talent Support Program in 2019. He received Best Paper Award at IEEE ICUS 2022.

Xiuhui Peng received the Ph.D. degree in mechanics and engineering science from Peking University, Beijing, China, in 2019. He is currently an associate professor with the College of Automation Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing, China. He was a Post-Doctoral Fellow with the State Key Laboratory of Internet of Things for Smart City, University of Macau, Macau, China. He was selected for the Eighth Young Elite Scientists Sponsorship Program by CAST in 2022, and a recipient of the 2021 Macao Young Scholars Scheme. His research interests include cooperative mission planning, cooperative control, unmanned systems control, and nonlinear control of mechanical systems.

Lei Chen graduated from Southeast University in 2018 with a Ph.D in Control Science and Engineering. Since 2021, he has served as an Associate Research Fellow at the Advanced Research Institute of Multidisciplinary Sciences of Beijing Institute of Technology. He conducted postdoctoral research at Beihang University from 2018 to 2021 and worked as a visiting scholar at Okayama Prefectural University in Japan in 2014 and the Royal Melbourne Institute of Technology in Australia between 2015 and 2017, engaging in scientific research. His research fields include collective intelligence under complex networks, feature modeling, and adaptive control. In the past five years, he has published nearly 20 academic papers (nearly 10 as the first author and corresponding author) with a total impact factor of nearly 90 (nearly 50 as the first author and corresponding author). He has led and

obtained funding for various projects including the National Natural Science Foundation of China Youth Project, the Postdoctoral Science Foundation project, Academician Advisory Project, Beijing Institute of Technology Lang Yue Project, Beijing Institute of Technology Young Plan, and sub-projects of the Ministry of Science and Technology's Key Research and Development Program.

Peijun Wang received the B.S. degree in mathematics and applied mathematics from Huainan Normal University, Huainan, China, in 2011, and the M.S. degree in basic mathematics from Southeast University, Nanjing, China, in 2014, where he received the Ph.D. degree in mathematics in 2019. Currently, he is an associate professor with the School of Mathematics and Statistics, Anhui Normal University, Wuhu, China. His current research interests include cooperative control of multi-agent systems and reinforcement learning. He received the Talent Programme of Anhui Province for Young Scholars in 2021. He was awarded the Youth Mathematical award of Anhui Province in 2022.

Details of Session

In recent years, the field of unmanned systems has gained significant attention worldwide. With the development of advanced technologies, unmanned systems have found widespread applications in various domains such as unmanned vehicles, satellite formation, sensor networks, smart grid, and intelligent transportation. Distributed sensing, control, and optimization are critical components of unmanned systems. They enable efficient and effective operation of these systems and play a crucial role in improving their performance. With the development of artificial intelligence, several advanced sensing, control, and optimization methods have been developed.

This special session aims to bring together researchers from diverse fields to discuss novel sensing, control, and optimization approaches for unmanned systems. The session will also focus on cyber security for unmanned systems, which is critical for ensuring their safe and secure operation. The objective of this invited session is to provide a platform for researchers to exchange new ideas and methods and discuss challenging problems related to unmanned systems. The session will cover topics such as:

- Intelligent sensing systems
- Distributed filtering and fusion of unmanned systems

- Distributed control of unmanned systems
- Event-triggering control of unmanned systems
- Distributed optimization of unmanned systems
- Distributed games for unmanned systems
- Attack detection of unmanned systems
- Security control of unmanned systems
- Deep learning of unmanned systems
- Reinforcement learning of unmanned systems
- Applications of unmanned systems