

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

面向无人系统的全景感知、决策与执行

组织者

1. 亓鲁，教授，武汉大学
2. 杨旭，研究员，中国科学院自动化研究所
3. 张璐，副研究员，中国科学院自动化研究所

个人简介

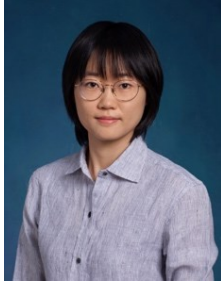


亓鲁，武汉大学计算机学院教授、博士生导师，国家级高层次青年人才，武汉大学-影石创新联合实验室负责人。累计发表学术论文 80 余篇，其中 CCF-A 类论文一作与通讯论文 30 余篇，学术引用逾 16,000 次；担任 TPAMI 编委，并长期担任 CVPR、ICCV、ICML、NeurIPS 等国际顶级会议领域

主席等学术服务工作。同时具备丰富的工程研发与技术落地经验：曾在字节跳动 Seed 大模型部门负责视频生成训练数据爬取与清洗团队，参与相关模型在即梦 App 的落地应用；后任影石 Insta360 研究院负责人，面向全景相机与无人机业务推动智能影像、自主跟拍与自动剪辑等关键 AI 技术部署，具备在相机、手机与云服务等多算力场景下的算法工程设计与系统落地能力。



杨旭，中国科学院自动化研究所复杂系统管理与控制国家重点实验室研究员，IEEE Senior Member。发表国际期刊与会议论文 90 余篇，包括 IEEE TPAMI, IJCV, SIAM SIIMS, IEEE Trans, Pattern Recognition 等人工智能与机器人领域的顶级与权威期刊。申请专利 20 余项。承担或参加国家自然科学基金委、科技部等部门项目（课题）10 余项。2020 年获自动化学会自然科学一等奖。2015 年获北京市科学技术奖二等奖。国家自然科学基金委主办的水下机器人目标抓取大赛 2017 年获得自主抓取组第 1，2018 年获得目标识别组第 1。2021 年入选中科院青促会。



张璐，中国科学院自动化研究所多模态人工智能系统全国重点实验室副研究员，获中国科学院特别研究助理人才项目资助。发表国际期刊与会议论文 20 余篇，包括 IEEE-TPAMI, IEEE-TNNLS, Information Fusion, IEEE-RAL, IEEE-ICCV, IEEE-ICRA, IEEE-ICASSP 等机器人与人工智能领域的高水平 SCI 论文及国际顶级会议，申请发明专利 8 项。承担或参与国家自然科学基金委、科技部等部门项目（课题）10 余项。在国家自然科学基金委主办的水下机器人抓取大赛中，2017、2018 连续两年取得两次第一名；获 2019 年“天智杯”人工智能挑战赛目标检测季军。

特邀专题简介

随着人工智能、机器人技术与自主无人平台的快速发展，无人系统正从感知监测、巡检测绘等单一任务，逐步走向面向开放环境的自主理解、决策与交互执行。相比传统前视角视觉，全景视觉具备大视场、强空间连续性和全局环境覆盖等优势，能够为无人系统提供更完整的场景表征与空间线索，为复杂环境下的感知、推理与动作闭环提供新的技术基础。与此同时，具身智能研究也正推动无人系统从看见环境迈向理解环境、适应环境并作用于环境，使其在复杂动态场景中的自主性与任务执行能力持续提升。

本特邀专题聚焦面向无人系统的全景感知、推理与执行相关前沿问题，旨在汇聚机器人、计算机视觉、自动化与人工智能等领域的最新研究进展，探讨全景视觉在环境建模、空间理解、自主导航、任务规划、交互操作与系统部署中的关键方法与应用价值。专题希望搭建跨学科交流平台，推动全景视觉与具身智能、自主无人系统的深度融合，促进相关理论、方法与系统在真实复杂场景中的发展与落地。

本特邀专题邀请以下与“面向无人系统的全景感知、决策与执行”主题相关、具有创新思想和应用价值的原创论文。

- 全景视觉感知与场景建模
- 全景场景理解与空间推理
- 多模态感知融合与具身认知
- 面向无人系统的自主导航与任务规划

- 全景感知驱动的交互与操作执行
- 无人机、无人车与移动机器人自主系统
- 复杂开放环境中的感知、决策与控制
- 全景智能系统的真实场景应用与部署

IEEE ICUS 2026

Invited Session Summary

Title of Session

Panoramic Perception, Reasoning, and Action in Unmanned Systems

Organizers

1. Prof. Lu Qi

Wuhan University, China

2. Prof. Xu Yang

Institute of Automation, Chinese Academy of Sciences

3. Assoc. Prof. Lu Zhang

Institute of Automation, Chinese Academy of Sciences

Biosketches of Organizers



Lu Qi is a Professor and Ph.D. supervisor at the School of Computer Science, Wuhan University. He is a national-level high-level young talent and Director of the Wuhan University–Insta360 Joint Lab. He has published more than 80 papers, including over 30 first-author or corresponding-author papers in CCF-A venues, with more than 16,000 citations. He serves on the editorial board of IEEE TPAMI and has been actively involved in academic service for major conferences such as CVPR, ICCV, ICML, and NeurIPS. He also has extensive experience in AI engineering and technology transfer. He previously worked at ByteDance Seed on video generation data pipelines and related product deployment, and later led the Insta360 Research, advancing AI technologies for panoramic imaging, active tracking, and video editing across cameras, mobile devices, and cloud platforms.



Xu Yang is a Professor at the State Key Laboratory of Complex Systems Management and Control, Institute of Automation, Chinese Academy of Sciences, and an IEEE Senior Member. He has published more than 90 papers in leading journals and conferences, including IEEE TPAMI, IJCV, SIAM SIIMS, IEEE Transactions, and Pattern Recognition. He holds more than 20 patents and has led or participated in over 10 projects supported by the NSFC, the Ministry of Science and Technology, and other funding agencies. He received the First Prize of the Natural Science Award from the Chinese Association of Automation in 2020 and the Second Prize of the Beijing Science and Technology Award in 2015. His team won first place in the autonomous grasping category in

2017 and first place in the target recognition category in 2018 at the underwater robot grasping competition (NSFC). He was selected for the CAS Youth Innovation Promotion Association in 2021.



Lu Zhang is an Associate Professor at the National Key Laboratory of Multimodal Artificial Intelligence Systems, Institute of Automation, Chinese Academy of Sciences. She was supported by the CAS Special Research Assistant Program. She has published more than 20 papers in leading journals and conferences in robotics and artificial intelligence, including IEEE TPAMI, IEEE TNNLS, Information Fusion, IEEE RAL, ICCV, ICRA, and ICASSP, and holds 8 invention patents. She has led or participated in more than 10 projects supported by the NSFC, the Ministry of Science and Technology, and other funding agencies. In the underwater robot grasping competition organized by the NSFC, her team won first place in both 2017 and 2018. She also received third place in object detection at the 2019 Tianzhi Cup Artificial Intelligence Challenge.

Details of Session

Recent progress in artificial intelligence, robotics, and autonomous platforms is driving unmanned systems from perception-centered tasks toward more integrated capabilities in environmental understanding, decision-making, and physical interaction. In this context, panoramic vision provides wider scene coverage and richer spatial context than conventional narrow field-of-view sensing, making it a promising basis for perception-action loops in complex and open environments. At the same time, embodied intelligence is reshaping how unmanned systems perceive, reason, and act in the physical world.

This invited session focuses on panoramic perception, reasoning, and execution for unmanned systems. It aims to bring together recent work at the intersection of robotics, computer vision, automation, and AI, with particular interest in methods and systems that support scene understanding, spatial reasoning, navigation, planning, interaction, and real-world deployment. The session is intended to promote exchange across related communities and encourage advances in panoramic intelligent systems for complex real-world applications.

Topics of interest include, but are not limited to:

- Panoramic visual perception and scene modeling
- Panoramic scene understanding and spatial reasoning
- Multimodal perception and embodied intelligence
- Navigation, planning, and decision-making for unmanned systems
- Panoramic perception for interaction and task execution

- Autonomous UAV, UGV, and mobile robotic systems
- Perception, control, and learning in open environments
- Real-world deployment of panoramic intelligent systems