# 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 |
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| 智能运载系统鲁棒感知、决策与控制技术 |

**组织者**

1. 胡满江，教授，湖南大学

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6. 黄鑫，讲师，重庆邮电大学

7. 李梦霞，副研究员，武汉理工大学

**个人简介**



**胡满江**，湖南大学机械与运载工程学院，教授。长期致力于智能网联技术及装备在城市出行、工程机械领域的产业应用。主持国家重点研发计划、国家自然科学基金、国防基础科研项目、国家重点实验室自主重点项目、重大校企合作项目 20 余项。发表高水平学术论文 70 余篇，参编行业报告 2 部，授权发明专利 20 余项、软件著作权 8 项。



**李洋**，湖南大学机械与运载工程学院，助理教授。主要研究方向为智能网联汽车环境感知、交通参与者行为预测、风险评估、决策规划和运动控制等。近年来主持和承担国家自然科学基金青年科学基金项目 1 项、"十四五"国家重点研发计划任务 1 项。在 IEEE TITS、TIV、AAP 等国内外著名期刊上发表高水平期刊论文 20 余篇，以核心骨干身份参与国家自然科学基金 2 项。



**边有钢**，湖南大学机械与运载工程学院，教授。主要研究方向为智能控制、协同控制及其在道路/水下运载装备运动控制中的应用。先后主持国家自然科学基金项目、整车先进设计制造技术全国重点实验室自主研究项目等 8 项、横向合作项目 4

项；发表学术论文 80 余篇，授权发明专利 30 余项；获国际/国内学术奖 7 项、省级/校级教学奖 3 项。

**常方蓉**，中南大学资源与安全工程学院，副教授，主要研究领域聚焦道路安全方向，重点开展智能交通系统与安全评估相关研究。她主持并参与多项国家级和省部级科研项目，包括"十四五"国家重点研发计划任务 1 项、湖南省科学技术厅科技创新项目等。近年来在《Science》《Accident Analysis and Prevention》《Safety Science》《Analytic Methods in Accident Research》等国际权威期刊发表高水平学术论文 20 余篇。其研究成果在道路安全机理阐释、新型技术在交通系统的融合应用等方面取得重要突破，推动了智能安全技术在实际交通场景中的落地转化。

**高铭**，湖南大学机械与运载工程学院，副研究员。主要研究领域为车路协同感知与预测、多型载运工具数字孪生系统。先后主持/核心参与了国家自然科学青年基金 1 项（课题负责人）、国家重点研发计划项目（子任务负责人）、全国重点实验室开放基金（课题负责人）、军委科技委重大项目（项目骨干）。发表 SCI/EI 论文 10 余篇，授权/申请国内外专利软著等知识产权 10 余项。

**黄鑫**，重庆邮电大学，讲师，中国自动化学会综合智能交通专业委员会委员，中国自动化学会智能车工作委员会委员，预测控制和智能决策专业委员会委员，Digital Transportation and Safety 期刊青年编委，主要从事交叉口车路耦合控制、多车协同轨迹规划与控制等研究，近年来主持和承担国家自然科学基金-青年科学基金项目 1 项、"十四五"国家重点研发计划任务 1 项、重庆市自然科学基金面上项目 1 项，主编/参编教材 2 部，已发表 SCI/EI 论文 10 余篇，授权发明专利 6 项，受理发明专利 10 项（含 PCT 专利 1 项），获得软件著作权 3 项。

**李梦霞**，武汉理工大学，特聘副研究员。主要从事船舶智能航行，远程驾驶，航行风险建模，船舶自主避碰等研究，成果广泛应用于有人船与无人船共存阶段的避撞系统。近年来，获得中国航海学会科技进步二等奖 2 项，全国创新创业优秀博士后，入选 2023 年湖北省博士后创新岗位，主持"十四五"国家重点研发计划任务 1 项，近年来发表 SCI/EI 论文 15 余篇。

## 特邀专题简介

随着人工智能与网联通信技术的深度融合，智能运载系统正重塑未来交通生态格局。作为智慧城市建设的核心载体，智能车辆通过多源传感器协同、智能算法集群决策和精准执行控制构成的闭环系统，将在城市交通、物流运输、特种作业等复杂场景中承担关键角色。然而，面对动态交通流、恶劣气象条件、突发障碍物等现实挑战，现有系统仍需突破复杂场景理解、实时风险决策、人车路协同控制等技术瓶颈，以实现从结构化道路到全域场景的安全拓展。

本专题聚焦复杂环境下智能运载系统"感知-决策-控制"关键理论创新与技术突破，征稿方向包括但不限于：

- 极端场景鲁棒感知

- 车路协同感知

- 动态场景语义理解与预测

- 风险量化与评估

- 事故分析与预测

- 多智能体协同决策与规划

- 端到端自动驾驶

- 故障诊断和容错控制

- 车路协同控制

**Title of Session**

Robust Perception, Decision-Making, and Control Technology for Intelligent Transportation Systems

**Organizers**

**1. Prof. Manjiang Hu**

Hunan University, China

**2. Prof. Yang Li**

Hunan University, China

**3. Prof. Yougang Bian**

Hunan University, China

**4. Prof. Fangrong Chang**

Central South University, China

**5. Dr. Ming Gao**

Hunan University, China

**6. Prof. Xin Huang**

Chongqing University of Posts and Telecommunications, China

**7. Prof. Mengxia Li**

Wuhan University of Technology, China

**Biosketches of Organizers**

**Manjiang Hu** is currently a Professor at Hunan University. He has been working on the industrial application of intelligent and connected vehicle technology and equipment in urban transportation and engineering machinery. He has led over 20 projects, including the National Key Research and Development Program, National Natural Science Foundation projects, National Defense Basic Scientific Research projects, National Key Laboratory Independent Key Projects, and major university-industry cooperation projects. He has published more than 70 high-level academic papers, co-authored two industry reports, obtained over 20 invention patents, and received eight software copyrights.

**Yang Li** is currently working as an Assistant Professor with Hunan University, Changsha, China. She worked as a postdoc at Algorithmics group of Delft University of Technology, the Netherlands. Her current research interests focus on intelligent and connects vehicles, including environmental perception, motion prediction, situational analysis, safe reinforcement learning-based decision making, and motion planning. In recent years, she has participated more than 5 projects and has published over 20 papers.

**Yougang Bian** (Member, IEEE) is currently an Associate Professor of Hunan University, Changsha, China. His research interests include distributed control, cooperative control, and their applications to connected and automated vehicles. Dr. Bian is a recipient of the Best Paper Award from 2017 IEEE Intelligent Vehicles Symposium. He has led eight projects funded by the National Natural Science Foundation of China and four collaborative projects. Over the years, he has published over 80 academic papers and more than 30 granted invention patents.

**Fangrong Chang** is currently an Associate Professor at the School of Resource and Safety Engineering, Central South University. Her primary research focuses on road safety, with a particular emphasis on intelligent transportation systems and safety evaluations. She has led and contributed to several projects funded by the Ministry of Science and Technology of the People's Republic of China and the Department of Science and Technology of Hunan Province. Chang has published over 20 high-impact academic papers in renowned journals such as Science, Accident Analysis and Prevention, Safety Science, and Analytic Methods in Accident Research. Her work has significantly advanced the understanding of road safety mechanisms and the integration of emerging technologies in transportation systems.

**Ming Gao**, Associate Researcher at the School of Mechanical and Vehicle Engineering, Hunan University. His primary research areas include vehicle-road cooperative perception and prediction, as well as digital twin systems for multi-modal transportation vehicles. He has successfully led or actively participated in various research projects, including one funded by the National Natural Science Foundation of China (as principal investigator), a sub-task of the National Key Research and Development Program project (as task leader), a project funded by the National Key Laboratory Open Fund (as principal investigator), and a major project supported by the Military Commission's Science and Technology Committee (as a key member). Gao has published over 10 papers in SCI/EI journals and holds more than 10 patents and copyrights for intellectual property, both domestically and internationally.

**Xin Huang** is currently a Lecturer at the School of Automation, Chongqing University of Posts and Telecommunications. His primary research interests include signal-vehicle coupled control and multi-vehicle collaborative trajectory planning and control. He has led 3 national and provincial projects, including those funded by the National Key R&D Program of China and the National Natural Science Foundation of China (NSFC). Huang has published over 10 high-level academic papers in renowned domestic and international journals such as IEEE T-ITS, IEEE ITSM, and Control Theory & Applications. He holds 6 granted patents in China for his innovations. In addition, he has co-authored and published two textbooks.

**Mengxia Li** is currently an associate researcher at the School of Navigation, Wuhan University of Technology. Her research focuses on intelligent ship navigation, remote driving, navigation risk modeling, and autonomous collision avoidance, with applications aimed at facilitating collision avoidance during the transitional stage of coexistence between manned and unmanned ships. She has been awarded the Second Prize of the China Institute of Navigation Science and Technology Progress twice, recognized as a National Outstanding Innovative and Entrepreneurial Postdoctoral Fellow, selected for the Hubei Provincial Postdoctoral Innovation Position (2023), and serves as the principal

investigator of a key research task under the National Key R&D Program. Additionally, she has authored or co-authored over 15 SCI/EI-indexed publications.

**Details of Session**

The convergence of artificial intelligence and connected vehicle technologies is fundamentally transforming the future of mobility. Intelligent transportation systems, serving as a key component of smart city ecosystems, leverage an integrated framework of multi-modal fusion, AI-driven decision-making, and robust control to address critical challenges in urban traffic optimization, intelligent logistics, and specialized operational domains. However, in the face of dynamic traffic flows, adverse weather conditions, and unexpected obstacles, current technologies must overcome the challenges in complex scenario understanding, real-time risk decision-making, and cooprative control among intelligent vehicles, infrastructure, and human factors, to safely extend from structured roadways to all-encompassing environments.

This special issue focuses on key technolgies in the perception-decision-control framework for intelligent transportation systems in complex environments. We invite submissions on, but not limited to, the following topics:

- Robust perception under adverse conditions
- V2X collaborative perception
- Semantic understanding and motion prediction
- Risk quantification and assessment
- Traffic accident analysis and prevention
- Multi-agent cooperative decision-making and planning
- End-to-end autonomous driving
- Fault diagnosis and fault-tolerant control
- Cooperative control of connected vehicle