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

面向自动驾驶系统的智能感知、估计和主动安全控制

组织者

1. 汪奘，研究员，香港理工大学

2. 韩金恒，助理研究员，新加坡国立大学

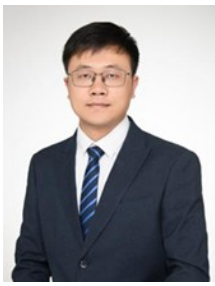
3. 陈志城，副教授，吉林大学

4. 徐利伟，副研究员，东南大学

个人简介

汪奘于 2022 年获得中国南京东南大学机械工程博士学位。他曾任新加坡南洋理工大学助理研究员，现任香港理工大学研究员。他主持过国家自然科学基金青年科学家基金项目，并参与过其他五项科研项目。他在顶级期刊发表论文 50 余篇，其中包括两篇 ESI 高被引论文和一篇 SCI 期刊封面论文。他荣获 2023 年江苏省优秀博士学位论文奖和 IEEE ICUS 国际会议最佳论文奖。他拥有 22 项授权发明专利。他担任八种 SCI、ESCI 和 EI 期刊的副主编、编委或青年编委，其中包括《中国机械工程学报》和《IEEE 信号处理开放期刊》。他还是 IEEE 消费电子学会汽车委员会成员，并曾多次担任 IEEE 会议分会主席。他的研究兴趣包括车辆状态估计和汽车主动安全控制。

韩金恒于 2019 年获得中国科学技术大学自动化系学士学位，并于 2025 年获得清华大学车辆与运载学院博士学位。他目前是新加坡国立大学土木与环境工程系的助理研究员。他已在顶级 SCI 期刊上发表 20 余篇论文，拥有 10 余项授权发明专利，并担任过两份期刊的青年编委。他的研究方向包括智能车辆的运动规划和安全控制，尤其关注极端工况下的自动驾驶安全。



陈志成，吉林大学汽车工程学院副教授，智能网联汽车创新中心副主任。入选吉林大学首批“工科集群青年人才专项支持计划”。先后主持国家自然科学基金青年科学基金项目（C类）、中国博士后科学基金特别资助项目、吉林省长春市重大科技专项等省部级课题 8 项。以第一/通讯作者身份，在 IEEE TTE、《汽车工程》等国内外相关领域知名期刊录用 SCI/EI 论文 40 余篇，荣获 CEVVE2024 最佳论文奖 1 项，授权发明专利 10 余项。研究成果荣获吉林省科技进步奖一等奖、中国汽车工业科技进步奖一等奖等省部级奖励 4 项。

徐利伟，博士，东南大学机械工程学院副研究员，硕士导师。主要研究方向为：车辆动力学与控制、智能网联汽车等。在 IEEE Transactions 等国际权威期刊上发表学术论文 50 余篇，申请/授权发明专利 25 余件。主持国家自然科学基金项目、广西自治区重点研发计划项目等国家级、省部级项目 3 项，获江苏省科学技术一等奖（排 2）、中国发明学会发明创新一等奖等奖励 2 项，担任第六届 CAA 车辆控制与智能国际会议（CVCI 2022）组委会副主席。兼任《Discovery Vehicle》期刊编委，新加坡 viser 出版集团机械专家委员会委员等职。

特邀专题简介

随着自动驾驶技术的不断发展，其安全性已成为其在大规模部署前亟需解决的关键问题，尤其是在复杂与极端驾驶环境下。传统的被动安全机制和感知技术已难以应对复杂驾驶条件中自动驾驶车辆所面临的不确定环境、实时动态交互以及突发危险事件等难题。近年来，随着智能感知、状态估计以及数据驱动/学习型运动控制技术的快速发展，赋予了自动驾驶车辆更加准确地理解周围环境、估计关键动力学状态、主动预知驾驶风险的能力，使其能对车辆运动行为进行实时调节，从而显著提升自动驾驶系统的安全性与可靠性。

本受邀专题旨在汇聚自动驾驶车辆智能感知、状态估计与主动安全控制方面的最新研究成果、方法与观点，重点关注复杂环境下安全关键与高可靠性的自动驾驶技术。征稿方向包括但不限于：

- 面向自动驾驶车辆的智能感知与多传感器融合估计方法
- 受限观测与极端驾驶工况下的高可靠感知与状态估计技术

- 自动驾驶风险感知与安全决策方法
- 融合动力学安全约束的端到端自动驾驶框架
- 面向自动驾驶的安全潜动力学建模与预测表征方法
- 基于视觉－语言模型的自动驾驶安全推理与控制方法
- 数据驱动的自动驾驶车辆运动控制方法
- 面向自动驾驶的智能底盘先进运动控制技术

IEEE ICUS 2026
Invited Session Summary

Title of Session

Intelligent Perception, Estimation, and Active Safety Control for Autonomous Vehicle Systems

Organizers

1. Dr. Yan Wang
Hong Kong Polytechnic University, Hong Kong

2. Dr. Jinheng Han
National University of Singapore, Singapore

3. Assoc. Prof. Zhicheng Chen
Jilin University, China

4. Assoc. Prof. Liwei Xu
Southeast University, China

Biosketches of Organizers

Yan Wang received the Ph.D. degree in mechanical engineering from Southeast University, Nanjing, China, in 2022. He was a Research Fellow with Nanyang Technological University, Singapore. He is currently a Research Fellow with The Hong Kong Polytechnic University, Hong Kong. He has presided over a National Natural Science Foundation of China (NSFC) Young Scientist Fund project and participated in five other research projects. He has published more than 50 papers in top journals, including two ESI Highly Cited Papers and one SCI journal cover paper. He received the 2023 Excellent Doctoral Dissertation Award of Jiangsu Province and the Best Paper Award at the IEEE ICUS International Conference. He holds 22 authorized invention patents. He serves as an Associate Editor, Editorial Board Member, or Young Editorial Board Member for eight SCI, ESCI, and EI journals, including the Chinese Journal of Mechanical Engineering and the IEEE Open Journal of Signal Processing. He is also a member of the IEEE Consumer Electronics Society Automotive Committee and has served as Session Chair for multiple IEEE conferences. His research interests include vehicle states estimation and automotive active safety control.

Jinheng Han received the B.E. degree in Department of Automation from the University of Science and Technology of China, Hefei, 2019 and Ph.D degree in School of vehicle and Mobility from the Tsinghua University, Beijing, 2025. He is currently a Research Fellow with Department of Civil and Environmental Engineering, National University of Singapore. He holds more than 10 authorized invention patents. He has published more than 20 SCI papers in top journals and served as Young Editorial Board Member for two journals. His research interests include motion planning and safety control of intelligent vehicle, especially on extreme driving condition.

Zhicheng Chen is an Associate Professor at the College of Automotive Engineering and the Deputy Director of the Intelligent and Connected Vehicle Innovation Center, Jilin University. He was selected for the first batch of Jilin University's "Special Support Program for Young Talents in Engineering Clusters." He has presided over 8 provincial and ministerial-level projects, including the National Natural Science Foundation, the China Postdoctoral Science Foundation Special Funding Project, and Major Science and Technology Special Projects of Changchun City, Jilin Province. As the first or corresponding author, he has had more than 40 SCI/EI papers accepted in renowned domestic and international journals in related fields, such as IEEE TTE. He received one Best Paper Award at CEVVE 2024 and holds over 10 authorized invention patents. His research achievements have won 4 provincial and ministerial-level awards, including the First Prize of the Jilin Province Science and Technology Progress Award and the First Prize of the China Automotive Industry Science and Technology Progress Award.

Liwei Xu received the Ph.D. degree in vehicle engineering from Southeast University, Nanjing, China, in 2019. He is currently an Associate Professor with the School of Mechanical Engineering, Southeast University, Nanjing, China. His research interests include vehicle dynamics and control, as well as intelligent and connected vehicles. Dr. Xu has published more than 50 papers in leading international journals and has served as principal investigator for three competitive research projects at the national and provincial levels, including an NSFC General Program grant and a sub-project of the Guangxi Key R&D Program. He received the First Prize of the Jiangsu Provincial Science and Technology Award in 2022, the First Prize of the Invention and Innovation Award from the China Association of Inventions in 2021, and the Excellent Doctoral Dissertation Award from the Chinese

Society of Automotive Engineering in 2020. He also served as a Vice Chair of the Organizing Committee for the 6th CAA International Conference on Vehicular Control and Intelligence in 2022. He currently serves on the Editorial Board of Discovery Vehicle and on the Mechanical Engineering Expert Committee of Viser Publishing Group (Singapore).

Details of Session

Autonomous driving technologies are rapidly advancing toward higher levels of autonomy, while safety has become a critical concern prior to large scale deployment, especially in complex and extreme driving condition. Traditional passive safety mechanisms are insufficient to address perception uncertainty, dynamic interactions, and unforeseen hazardous events encountered by autonomous vehicles (AVs) on complex driving condition. Recent advances in intelligent perception, state estimation, and data-driven/learning based control techniques enable autonomous vehicles to better interpret surrounding environments, infer safety critical states, proactively anticipate driving risks, and regulate vehicle motion behaviors, thereby enhance autonomous driving safety and reliability. This invited session aims to present recent research advances, methodologies, and perspectives on intelligent perception, state estimation, and active safety control for autonomous vehicle systems, with a focus on safety-critical and highly reliable autonomous driving in complex environments.

Topics of interest within the scope of this Special Session include (but are not limited to) the following:

- Intelligent perception and multi sensor fusion estimation for autonomous vehicles
- High reliable perception and estimation under limited observability and extreme driving conditions
- Safety critical decision making for autonomous driving
- End-to-end autonomous driving frameworks with dynamical safety considerations
- Latent dynamical modeling and predictive representations for autonomous driving safety
- Vision–Language–Model-based safety reasoning and control for autonomous vehicle systems
- Data-driven and learning-enhanced motion control for autonomous vehicles
- Advanced Intelligent Chassis Control for autonomous vehicles