ZHIHAO LIN

Google Scholar ⋄ Personal Website

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EDUCATION

University of Glasgow (UofG)   *Feb. 2023-Feb. 2026 (expected)*
Ph.D. in Autonomous Systems & Connectivity
Supervisor: Dr. Jianglin Lan
Research Interests: Structure RL, Multi-Agent Decision Making, and Perception-Integrated Autonomy.

Jilin University (JLU)   *Sep. 2019-Jul. 2022*
M.S. in Circuits and Systems

Liaocheng University (LCU)   *Sep. 2014-Jul. 2018*
B.S. in Electronic Information Engineering

HONORS AND AWARDS

Doctoral Scholarship, China Scholarship Council (CSC)   *2023-2026*
Research Mobility Fund, University of Glasgow   *Apr. 2025*
Editor's Choice Award, "Enhanced Visual SLAM for Collision-Free Driving with Lightweight Autonomous Cars", *Sensors* Journal   *Apr. 2025*
Academic Scholarship, Jilin University   *2020-2021*

PUBLICATIONS

Google Scholar: h-index 10, 370 citations (as of Dec. 2025)

Published Papers

[1] **Zhihao Lin** et al., "Scalable and safe multi-agent coordination with reconstructed level-k monte carlo tree search," in *Proc. 25th Int. Conf. on AAMAS 2026 (CORE A*)*, Accepted, 2026.

[2] **Zhihao, Lin** et al., "Uncertainty-Aware Roundabout Navigation: A Switched Decision Framework Integrating Stackelberg Games and Dynamic Potential Fields," *IEEE Trans. Veh. Technol.*, pp. 1–13, Nov. 2025.

[3] **Zhihao, Lin** et al., "Contingency-Aware Spatiotemporal Optimization for Safe Autonomous Vehicle Trajectory Planning," *IEEE Trans. Intell. Transp. Syst.*, vol. 26, no. 11, pp. 18 487–18 499, 2025.

[4] **Zhihao, Lin** et al., "Safety-Critical Multi-Agent MCTS for Mixed Traffic Coordination at Unsignalized Intersections," *IEEE Trans. Intell. Transp. Syst.*, vol. 26, no. 11, pp. 18 992–19 006, 2025.

[5] **Zhihao, Lin** et al., "KAN-LSTM Enhanced Multi-Agent Advantage Actor-Critic Reinforcement Learning for Autonomous Ramp Merging," *IEEE Trans. Veh. Technol.*, pp. 1–12, 2025.

[6] **Zhihao, Lin** et al., "A Conflicts-Free, Speed-Lossless KAN-Based Reinforcement Learning Decision System for Interactive Driving in Roundabouts," *IEEE Trans. Intell. Transp. Syst.*, vol. 25, 2025.

[7] **Zhihao, Lin** et al., "SLAM2: Simultaneous Localization and Multimode Mapping for indoor dynamic environments," *Pattern Recognit.*, vol. 158, p. 111 054, 2025.

[8] **Zhihao, Lin** et al., "Enhanced Visual SLAM for Collision-Free Driving with Lightweight Autonomous Cars," *Sensors*, vol. 24, no. 19, p. 6258, 2024.

[9] **Zhihao, Lin** et al., "DPL-SLAM: Enhancing Dynamic Point-Line SLAM Through Dense Semantic Methods," *IEEE Sens. J.*, vol. 24, no. 9, pp. 14 596–14 607, 2024.

[10] Z. Tian, **Z. Lin**, et al., "Evaluating Scenario-based Decision-making for Interactive Autonomous Driving Using Rational Criteria: A Survey," *IEEE Trans. Intell. Transp. Syst.*, 2025.

[11] Z. Tian, D. Zhao, **Z. Lin**, et al., "Balanced reward-inspired reinforcement learning for autonomous vehicle racing," in *Proc. 6th Annu. Learn. Dyn. Control Conf.*, vol. 242, Jul. 2024, pp. 628–640.

[12] Z. Tian, D. Zhao, **Z. Lin**, et al., "Efficient and Balanced Exploration-Driven Decision Making for Autonomous Racing Using Local Information," *IEEE Trans. Intell. Veh.*, pp. 1732–1748, 2025.

[13] Z. Tian, D. Zhao, **Z. Lin**, et al., "Balanced exploration and attention-inspired decision making for autonomous driving," *IEEE Trans. Veh. Technol.*, 2025.

Under Review

[14] **Zhihao Lin**, "One paper on reinforcement learning," Oct. 2025, Currently under rebuttal at a top-tier ML venue (ICLR). (CORE A*, Initial Scores: ∼top 18%).

[15] **Zhihao Lin** et al., "Dynamic Risk-Aware Trajectory Planning for Autonomous Vehicles: A Two-Stage Optimization with Space-Time Graphs," *IEEE Trans. Veh. Technol.*, Apr. 2025, Underreview.

RESEARCH EXPERIENCE

Structure-Aware Learning for Policy, Reasoning, and Decision [14] Jul. 2025 - Current
Supervisors: Dr. Jianglin Lan UofG

· Developed advantage-guided and preference-based methods for adaptive exploration in RL.
· Designed stability-aware objectives and proxy signals to improve structural generalization.
· Currently exploring structured latent control via diffusion with meta-reasoning integration.

Multi-Agent Safety Planning in Dynamic Scenarios [1, 3, 4, 15] Aug. 2024 - Jul. 2025
Supervisors: Dr. J. Lan, Prof. D. Flynn, Dr. Chris A. and Dr. A. Nguyen UofG & LAMIH

· Developed MCTS-based coordination algorithms for interactive driving at unsignalized intersections.
· Proposed a scalable framework for mixed traffic with centralized and decentralized policies.
· Designed contingency-aware trajectory optimization for safe planning under uncertainty.
· Integrated game-theoretic and spatiotemporal planning for robust behavior in complex scenarios.

Interactive Decision Making for Autonomy [2, 5, 6, 10–13, 15] Nov. 2023 - Aug. 2024
Supervisors: Dr. Jianglin Lan and Prof. Dezong Zhao UofG

· Developed KAN-based RL systems for driving tasks like roundabouts and ramp merging.
· Proposed multi-agent actor-critic models with LSTM intention modeling for road interactions.
· Designed reward shaping and exploration for efficient policy learning in racing scenarios.
· Built a rational evaluation framework for decision-making under diverse traffic conditions.

Robust and Dynamic-Aware SLAM for Autonomy [7–9] Feb. 2023 - Nov. 2023
Supervisor: Dr. Jianglin Lan and Dr. Hanyang Zhuang UofG & SJTU

· Developed visual SLAM for dynamic environments using point-line features and semantic cues.
· Built a multi-modal mapping pipeline that filters dynamic objects via detection and epipolar constraints.
· Integrated SLAM with CLF-CBF and TEB planning for safe navigation in unstructured scenes.
· Optimized trajectories with stability and dynamic-awareness for long-term autonomous deployment.

SKILLS

Programming Languages	Python, C/C++, MATLAB, R, and LaTeX
Machine Learning Tools	PyTorch, Sklearn, Pandas, and NumPy

ACADEMIC SERVICE

Reviewer	*IEEE Trans. on Intelligent Transportation Systems*
Reviewer	*IEEE Trans. on Transportation Electrification*
Reviewer	*IEEE Trans. on Circuits Syst. Video Technol.*
Program Committee Student Member	*45th IEEE ICDCS 2025*