

Education

Taiyuan University of Technology (Project 211 University) <i>B.Eng. in Vehicle Engineering</i>	2021.09–2025.06 <i>GPA: 3.47/5.0, Top 30% of Cohort</i>
Selected coursework: Automotive Design; Vehicle Theory; Vehicle Vibration and Noise Control; Computer-Aided 3D Design; Finite Element Analysis; Mechanical Control Engineering; Fundamentals of Mechanical Design; Mechanical Manufacturing Technology.	
Nanyang Technological University, Singapore <i>M.Sc. in Smart Manufacturing</i>	2025.08–Present <i>CGPA: 4.56/5.0</i>
Selected coursework: Manufacturing Control and Automation; Lasers and Optics in Smart Industry; Fundamentals of Precision Engineering; Fundamentals and Advanced Topics in Additive Manufacturing; Manufacturing in the Circular Economy; Semiconductor Manufacturing and IC Packaging.	

Research Outputs

1. Liu Xu, et al. **Copy-Paste: Toward Whole-Body Intelligence through an Iterative World Action Model for Precise Scene Restoration.** *IEEE International Conference on Robotics and Automation (ICRA)*, Under Review. (First Author)
2. Liu Xu, et al. **Spot the Difference: One Flow-Matching Model over Online 3D Gaussian Splatting for Image-Goal Object Search and Restoration.** *AAAI Conference on Artificial Intelligence (AAAI, CCF-A)*, Under Review, 2026.07. (First Author)
3. N. Wen, et al. **Uncertainty-Aware Dynamics Learning via Offline Generative Prior Extraction and Online Bayesian Posterior Refinement.** *IEEE Transactions on Industrial Informatics*, Regular Paper, Under Review, 2026.04. (Third Author)

Project Experience

Singapore AeroMaze UAV Swarm Autonomous Exploration and House Traversal Project <i>Simulation Lead; Real-World Localization and Hardware Integration</i>	2025.07–2026.05
Simulation Stage: 10-UAV Swarm Autonomous Exploration and House Traversal	2025.07–2025.11
• Tech stack: ROS2, Unity HiFi Simulator, EGO-Planner, Python, C++, Linux, rqt_graph. • Project background: Enable autonomous exploration, cooperative obstacle avoidance, and house traversal by multiple UAVs in unknown, heavily occluded indoor environments across multiple houses. • My responsibilities: Fully responsible for simulation-stage algorithm adaptation and implementation of the complete mission loop; modified EGO-Planner's local planning, obstacle avoidance, and replanning logic for multi-UAV house traversal, adjusting safety distances, velocity constraints, takeoff order, and mission execution procedures to address narrow gates, corners, and multi-UAV path conflicts. • System implementation: Encapsulated simulation mission interfaces using ROS2 Topics / Services and integrated data streams for mission initialization, odom / pose, camera, trajectory, and mission results to monitor multi-UAV states, validate planning performance, and compile mission outcome statistics. • Project result: In the Singapore AeroMaze Challenge simulation evaluation (8 teams), all 10 UAVs completed the mission (Completed Agents 10/10), with Team Time 166 s, ranking 1st by completion speed.	
Real-World Stage: 3-UAV Swarm Deployment and Flight Validation for House Traversal	2025.12–2026.05
• Tech stack: ROS1, Ubuntu 20.04, EGO-Planner, FAST-LIO, Livox Mid-360, monocular camera, NVIDIA Jetson Orin NX, flight controller, Python, C++. • Project background: Transfer the system to real UAV platforms following simulation validation, requiring 3 UAVs to achieve stable localization, object detection, cooperative obstacle avoidance, and house traversal in real houses / indoor environments. • Localization integration: Responsible for part of the LIO / FAST-LIO localization debugging; contributed to increasing the LIO update rate from 10 Hz to 100 Hz and reducing localization latency. Supported UAV relocalization in the official coordinate frame through scan-to-map matching, initial pose alignment, and odom anomaly investigation; participated in implementing initial scan alignment based on Manhattan-world features and IMU gravity estimation to reduce global coordinate alignment errors and height drift. • Hardware integration and debugging: Participated in hardware selection and integration for the real-world UAV platform, involving the Livox Mid-360 LiDAR, a monocular camera, NVIDIA Jetson Orin NX, flight controller, and airframe; responsible for part of the component mounting and securing, wiring and power connections, interface configuration, integration testing, and troubleshooting to support platform deployment and flight tests. • Module metrics: In module tests, the team system achieved localization error < 10 cm and dynamic trajectory tracking error < 10 cm at 3 m/s, and supported a single UAV traversing a 60 cm narrow doorway at 3 m/s. • Evaluation results: Basic Sequence, Alternate Sequence, and Demo Day tests were completed in 50 s / 60 s / 72 s, respectively, all achieving a 100% success rate (3/3); ranked 2nd by completion speed in the Singapore AeroMaze Challenge real-world evaluation (8 teams).	

Internship Experience

Bofeike (Tianjin) Technology Co., Ltd. <i>Mechanical Engineer, R&D Department</i>	2023.07–2023.08
Participated in the structural design of automotive fluid pipeline components, using UGNX for 3D modeling and assembly checks and ANSYS for finite element analysis to evaluate deformation under load and weak regions, support structural optimization, and build a foundation in structural and mechanical analysis for robot body / mechanism design.	
SF Airlines Co., Ltd. <i>Aircraft Maintenance Engineering Trainee (Intern), Excellent Engineer Program</i>	2024.06–2024.08
Participated in cargo aircraft line maintenance and non-routine troubleshooting; applied structured coding to maintenance records by aircraft type, ATA system, fault symptom, and closure status, and used Python / Excel for data cleaning, anomaly classification, and statistics on frequent faults to help identify recurring faults.	
Tianjin Luxin Machinery Co., Ltd. <i>Mechanical Equipment Engineer, Maintenance Department</i>	2024.08–2024.10
Participated in troubleshooting and replacing production-equipment sensors, encoders, limit switches, and actuators; developed familiarity with the correspondence between position feedback signals and actuator motions, building practical hardware intuition relevant to robot joint position feedback and actuator state assessment.	

Honors and Awards

University-level Academic Excellence Scholarship, multiple times	2023.06 / 2024.06 / 2025.03
Bronze Award, “Chuangyi Cup” Student Innovation and Entrepreneurship Competition	2023.08
First Prize, Knowledge Quiz Group, 2023 2nd University Student AI Technology Competition	2023.09
3D Mechanical Design Application Engineer Certificate (3Dv4)	2024.09

Research Interests

3D Gaussian Splatting, SLAM (calibration / LIO / VIO), Whole-Body Control, Sim-to-Real, World Action Model.

Relevant Skills

Programming and systems: C++11/14, Python, Linux Shell, Linux, Git, CMake, Docker.
Robotics and simulation: ROS1/2, MuJoCo, LIBERO, Unity HiFi Simulator, EGO-Planner, Nav2, URDF, Habitat, RViz2.
Perception and learning: FAST-LIO, YOLO, LiDAR-IMU localization, multi-sensor fusion, PyTorch, OpenCV; familiar with platforms and sensors including NVIDIA Jetson Orin NX, LiDAR, Hikvision cameras, depth cameras, flight controllers, and UWB.
Mechanical and engineering software: SolidWorks, Catia, ANSYS, AutoCAD.
Language scores: TOEFL 95; GRE 319.