

Yucheng LI

PhD Candidate — Autonomous Driving & Integrated Motion Control

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PROFILE

PhD candidate in autonomous driving and integrated motion control, experienced across **vehicle dynamics modeling**, **MPC**, **motion planning**, and SIL/HIL real-time validation; currently a visiting researcher at École Centrale de Nantes working on **UAV–UGV cooperative planning**. Fast learner, fluent with ROS 2 and LLM-based AI agent tooling. Seeking R&D roles in autonomous driving and vehicle control in Europe.

RESEARCH EXPERIENCE

École Centrale de Nantes (ECN) — Visiting PhD Researcher

03/2026 – 08/2026

UAV–UGV Cooperative Planning, Nantes, France

- Proposed **X-VAO**, an intent-conditioned **cross-agent active perception** objective that scores UAV viewpoints by their expected impact on the UGV's downstream task return, and embedded it in a sampling-based **UAV MPC** to optimize the UGV's occlusion-aware **APF**-planned path.
- Validated the framework in a high-fidelity **CARLA-Air co-simulation** of occluded urban maneuvers, confirming task-relevant perception gains over Shannon-information-gain baselines.
- Built a **hardware simulation** of the aerial–ground stack using a **ROSBot 2R** ground robot and an air drone on **ROS 2**, demonstrating the full perception–planning loop on physical platforms.

University of Modena and Reggio Emilia (UNIMORE) — PhD Researcher

11/2023 – 10/2026

Integrated Vehicle Motion Control, Modena, Italy

- Designed a **risk-aware active suspension MPC** that optimizes **ride comfort** in normal driving while protecting the tire friction margin in safety-critical maneuvers, cutting peak worst-wheel tire utilization by **19–31%** across nine full-car scenarios.
- Developed a **super-twisting observer** for finite-time per-wheel **tire normal-load estimation**, driving a sigmoid risk scheduler that trades off comfort and friction-margin protection online.
- Ran simulation experiments on a nonlinear **CarSim FMU co-simulation** with Pacejka tires (up to **74%** utilization reduction) and verified real-time execution at a **5 ms** sampling period.

State Grid Corporation of China — Machine Vision Engineer

09/2022 – 08/2023

Machine Intelligence R&D Department

- Developed deep-learning image recognition pipelines (YOLO-family detectors) for automated inspection of power-grid infrastructure, from data preparation to model deployment.

Westlake University — Research Assistant

07/2019 – 06/2020

Vision-and-Language Navigation, Mechanical Intelligence Lab, Hangzhou, China

- Research on vision-and-language navigation for embodied agents, combining visual perception with natural-language instructions.

EDUCATION

PhD in Autonomous Driving and Integrated Motion Control — UNIMORE, Italy

11/2023 – 10/2026

Full PNRR scholarship. Vehicle dynamics, MPC, SIL (Simulink–CarSim), HIL (Ubuntu/NVIDIA).

Erasmus Mundus Joint MSc, Engineering in Information and Automation — UNIVAQ, Italy

03/2021 – 07/2022

GPA 110/110. Nonlinear Control (30/30L), System Identification (30/30L), Hybrid Systems, Optimization.

Erasmus Mundus Joint MSc, EV Propulsion and Control — École Centrale de Nantes, France

09/2020 – 02/2021

GPA 29/30. Control Systems (A+), Embedded Software Systems (A+), EV Modeling & Simulation.

BEng in Electrical Information Science and Technology — Jilin University, China

09/2015 – 07/2019

Incl. exchange year in Advanced Robotics at École Centrale de Nantes (GPA 17/20), 2018–2019.

SELECTED PROJECTS

UAV-Assisted Active Perception for Autonomous Driving (X-VAO) — ECN 03/2026 – Present

- Counterfactual, task-conditional viewpoint selection for an assisting UAV: an intent-conditioned demand field confines phantom risk to the intersection of occluded regions and the UGV's maneuver-reachable tubes, enabling early detection of hidden cross-traffic and smooth, non-conservative UGV motion.
- Full validation chain from CARLA-Air co-simulation to ROSBot 2R + air drone hardware simulation on ROS 2; first-author paper in preparation for **IEEE RA-L**.

Risk-Aware Active Suspension Control for Tire Friction Margin Protection — UNIMORE 2025 – Present

- Framework combining super-twisting normal-load estimation, tire-utilization-based risk scheduling, and finite-horizon MPC with a convex friction-margin constraint on a 14-state full-car model.
- Validated across nine scenarios and a CarSim FMU co-simulation with real-time feasibility at 5 ms; first-author paper in preparation for **IEEE Access**.

SLAM and Autonomous Navigation on TurtleBot3 — Graduate Work, ECN 11/2018 – 05/2019

- Mapped real and simulated (Gazebo) environments and implemented autonomous navigation; programmed the robot to search for a target object using the built map.

SKILLS

Control & Planning: MPC, vehicle dynamics modeling, motion planning (APF, sampling-based), platoon control, SIL/HIL validation, real-time embedded control.

Programming: C/C++, Python, MATLAB/Simulink.

Software & Tools: ROS 2, CARLA, CarSim, Gazebo, Ubuntu/Linux, NVIDIA Jetson, YOLOv8, Git.

AI & Agents: Practical use of LLM-based AI agents (e.g., Claude, GPT) for code generation, literature review, and simulation-pipeline automation; deep-learning vision (YOLO). Fast learner — quickly adopts new tools, frameworks, and research domains.

PUBLICATIONS

- “Action-Intent-Conditioned Cross-Agent Active Perception for UAV-Assisted Autonomous Driving,” first-author, in preparation for **IEEE Robotics and Automation Letters (RA-L)**.
- Y. Li, P. Burgio, and S. Di Gennaro, “Risk-Aware Active Suspension Control for Tire Friction Margin Protection Using Super-Twisting Normal Load Estimation,” in preparation for **IEEE Access**.
- Y. Li, “Adaptive Sampling Control in Motion Planning of Autonomous Vehicle,” Master's thesis, arXiv:2307.00482, 2023.

HONORS & AWARDS

PNRR UNIMORE PhD Program Full Scholarship	2023 – 2026
Erasmus Mundus+ Scholarship (ranked 19/339)	2020 – 2022
Runner-up, Robotics Competition (2/150)	2017
National Endeavor Fellowship ×2, Jilin University (6/126)	2016 – 2018
Excellent Independent College Student (10/2000)	2016 – 2017

LANGUAGES

English — C1 (IELTS 7.0; GRE 325 + 3.5) · **Mandarin** — native · **French** — B1 · **Italian** — A2