

Hassan Jardali

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Summary

PhD candidate specializing in optimization-based planning and control (MPC, NMPC, LPV-MPC) and learning-based control for autonomous vehicles, with real-time C++/ROS2 software deployed on a full-scale race car at 262 km/h and 2.8 G lateral. Lead of the IU-Luddy Autonomous Racing team in the Indy Autonomous Challenge (4th of 8, Laguna Seca 2025).

Research Publications

1. H. Jardali, K. Yin, L. Liu, **Safe Overtaking for Autonomous Racing Using Hierarchical Optimization and Learning-Based Control**, *IROS*, 2026 (to appear).
2. H. Jardali, I. S. Mohamed, D. Pushp, L. Liu, **LPV-MPC for Lateral Control in Full-Scale Autonomous Racing**, *ICRA*, 2026.
3. H. Jardali, D. Pushp, Y. Yu, M. Ali, I. S. Mohamed, et al., **From Zero to High-Speed Racing: An Autonomous Racing Stack**, *ISER*, 2025.
4. H. Jardali, M. Ali, L. Liu, **Autonomous Mapless Navigation on Uneven Terrains**, *ICRA*, 2024.
5. A. A. Leininger, M. Ali, H. Jardali, L. Liu, **Gaussian Process-based Traversability Analysis for Terrain Mapless Navigation**, *ICRA*, 2024.
6. M. Ali, H. Jardali, N. Roy, L. Liu, **Autonomous Navigation, Mapping and Exploration with Gaussian Processes**, *RSS*, 2023.

Professional Experiences

Team Lead, IU-Luddy Autonomous Racing

Aug 2025 - Present

Indy Autonomous Challenge - Bloomington, IN

- Led the team to a **4th-place finish out of 8 teams** at the IAC race, WeatherTech Raceway Laguna Seca (Jul 2025).
- Mentoring undergraduate, master's, and PhD students on the development of software modules.

Research Assistant

Aug 2022 - Present

Vehicle Autonomy and Intelligence Lab, Indiana University - Bloomington, IN

- Designed and deployed a real-time MPC for lateral control of a full-scale autonomous race car (Modern C++, ROS2), stable up to 262 km/h and 2.8 G of lateral acceleration at Las Vegas Motor Speedway (CES 2025).
- Formulated an LPV-MPC capturing speed-varying lateral vehicle dynamics for full-scale racing (ICRA 2026).
- Developed a safe overtaking framework using hierarchical optimization and learning-based control (IROS 2026).

Autonomous Racing Engineer

Jan 2024 - May 2024

Code 19 Racing - Indiana and Abu Dhabi

- Developed localization and planning features for an A2RL race car: EKF-based multi-sensor fusion and a behavioral planner (finite state machine) for overtaking opponents.
- Implemented CycloneDDS/VPN communications, CAN nodes, a mission state machine, and Foxglove analysis tools.

Software Robotics Engineering Intern

Aug 2021 - Jan 2022

BMW Group, Logistics Robotics - Munich, Germany

- Developed the decision-making module of a 3D Cartesian sorting robot using ROS and state machines (Agile, Git).

Undergraduate Researcher

Jan 2021 - May 2022

Lebanese American University - Byblos, Lebanon

- Developed a localization module using tactile sensors and particle filters for a quadruped robot (Gazebo, ROS), and prototyped a depth-camera welding seam tracking system on a 3 DoF robot (SolidWorks, Simscape, Simulink).

Education

PhD in Intelligent Systems Engineering — Indiana University Bloomington

Aug 2022 - Present

Expected graduation: December 2027

MS in Intelligent Systems Engineering — Indiana University Bloomington

Aug 2022 - Dec 2025

GPA: 3.95/4.0

B.E. in Mechatronics Engineering — Lebanese American University, Lebanon

2017 - 2022

GPA: 3.60/4.0 — Distinction — 95% Tuition Scholarship

Erasmus+ Exchange Program — Politecnico di Torino, Italy

Spring 2019

GPA: 27.54/30

Skills, Certifications, and Languages

Technical Skills

Modern C++, Python, ROS/ROS2 | MPC, NMPC, LPV-MPC, trajectory optimization, vehicle dynamics, learning-based control | EKF & sensor fusion, behavioral planning, real-time autonomy software

Certifications

Robotics Specialization, Coursera | Certified SolidWorks Associate, Dassault Systèmes

Languages

Arabic (Fluent), English (Fluent), French (Intermediate)