Jeongyong Yang

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Summary

My research focuses on safety-critical control and planning under uncertainty for autonomous and robotic systems. I integrate data-driven learning with formal safety guarantees to develop autonomy that is provably safe, scalable, and reliable. With a multidisciplinary background in mechanical, electrical, and computer engineering, I pursue the unification of learning, control, and formal verification toward trustworthy autonomous systems.

Education

Korea Advanced Institute of Science and Technology (KAIST) — Daejeon, Korea
M.S. in Electrical Engineering — Mar. 2024 – Feb. 2026

- Advisor: Prof. SooJean Han
- GPA: 4.26 / 4.3 (4.0 / 4.0)

Hanyang University — Seoul, Korea
B.S. in Automotive Engineering — Mar. 2018 – Feb. 2024
B.S. in Convergence Technology for Advanced Vehicles (Dual Degree)–Computer Science Program for Vehicle Software Systems

- Advisor: Prof. Kunsoo Huh
- GPA: 4.24 / 4.5 (3.86 / 4.0) | Department Rank: 2 / 54

Work Experience

ACEWORKS, Control Engineer Intern — Seoul, Korea
Jun. 2022 – Aug. 2022

- Implemented the fuel quantity calculation logic for the K2 tank engine in MATLAB/Simulink, covering modules such as engine start, speed control, drivability, fuel limitation, etc.
- Built a dashboard interface for vehicle status monitoring in C++.

Republic of Korea Army, Sergeant — Seoul, Korea
Apr. 2020 – Oct. 2021

- Air Defense Systems Maintenance

Publications / Preprints

[1] **Jeongyong Yang***, Seunghwan Jang*, and SooJean Han, "SafeFlowMatcher: Safe and Fast Planning using Flow Matching with Control Barrier Functions", in *The Fourteenth International Conference on Learning Representations (ICLR)*, Apr. 2026. (to appear).

[2] Minseok Jeong*, Yechan Lee*, Hyewon Choi, **Jeongyong Yang**, and SooJean Han, "A Gaussian Process Perspective on Overgeneralization in Random Network Distillation", Jan. 2026. (under review at a machine learning conference).

[3] **Jeongyong Yang**, Minseok Jeong, Hyo-Sang Shin, and SooJean Han, "Random Fourier Features Lifted Physics-Informed Koopman Network", in *Proceedings of the Korean Society for Aeronautical & Space Sciences (KSAS)*, Nov. 2025. (in Korean).

[4] **Jeongyong Yang***, KwangBin Lee*, and SooJean Han, "Heterogeneous Predictor-based Risk-Aware Planning with Conformal Prediction in Dense, Uncertain Environments", *arXiv preprint*, Oct. 2025.

[5] **Jeongyong Yang**, Hojin Ju, and SooJean Han, "Curvature- and Energy-based Trajectory Optimization in Unstructured Environments", in *Proceedings of the Korea Robotics Society Annual Conference (KRoC)*, Feb. 2025. (in Korean).

(Equal contribution)*

Projects

MOLIT & KIAST: Risk Prediction and Safety Assessment of Drone Operations in Urban Environment (Related Pub. [3]) Jul. 2025 - Present

- Developing an uncertainty propagation method for drone using the duality between Perron–Frobenius and Koopman operators, leveraging data-driven Koopman modeling to estimate probabilistic ground impact regions for urban drone operations.

ETRI: Fail Detection and Self-Improving Systems for Robotic Tasks (Related Pub. [2]) May 2025 - Present

- Developing a robot-gated interactive imitation learning framework using Random Network Distillation (RND) to produce expert-free uncertainty estimates from success-only demonstrations, enabling autonomous gating with minimal human intervention.
- Mitigating RND's false-negative rate to achieve more accurate and reliable gating, thereby improving the stability of self-improving robotic learning.

Capstone Project: Lane Keeping System for Passenger-Trailer Vehicle Mar. 2023 - Dec. 2023

- Modeled the error dynamics of an articulated passenger-trailer vehicle and designed a lane keeping controller based on Linear Quadratic Gaussian control with a low-pass-filtered look-ahead curvature feedforward term to improve cornering stability and safety.
- Implemented the controller in MATLAB/Simulink and validated performance via CarMaker simulations.

Vehicle Electronic Control: Electronic Stability Control (ESC) Sep. 2023 - Dec. 2023

- Designed an ESC algorithm including desired yaw rate computation, entrance/exit criteria, and brake pressure control using MATLAB/Simulink.
- Implemented embedded code for the Infineon XC167CI board and performed real-time testing on a dSPACE MicroAutoBox HIL system under a double-lane change maneuver.

Operating Systems: Kernel Extension of xv6 Mar. 2022 - Jun. 2022

- Implemented new system calls, Multilevel Queue/Multilevel Feedback Queue (MLQ/MLFQ) CPU schedulers, and lightweight process management in the xv6 operating system.

Peer Review Experience

4 papers in IEEE Robotics and Automation Letters (RA-L)
2 papers in International Conference on Learning Representations (ICLR) Workshops
1 paper in IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

Students Mentored

Vehicle Dynamics and Model Predictive Control

- Hohyeon Song (Undergraduate, Electrical Engineering, KAIST)
- SeungEon Lee (Undergraduate, Electrical Engineering, KAIST)

Linear Systems and Control Theory Fundamentals

- Yongmin Kim (Undergraduate, Electrical Engineering, KAIST)

Computational Thinking, Data Structures, and Programming Fundamentals

- Hongryeol Lim (Undergraduate, Mechanical Engineering, Hanyang University)

Scholarships

Hanyang Brain (Academic Excellence) Scholarship, Hanyang University Fall 2022, Spring 2023

AE Academic Excellence Scholarship, Automotive Engineering, Hanyang University Spring 2022, Fall 2023

Diamond-7 Scholarship, Hanyang University 2018 – 2019

Skills

Languages: C, C++, Python, MATLAB/Simulink

Frameworks & Tools: CarMaker, CarSim, ROS1, ROS2

CAD: CATIA