Jeongyong Yang

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Summary

M.S. candidate student in safety-critical control and planning under uncertainty for autonomous and robotic systems. My research integrates 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 intelligent systems.

Education

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

- Advisor: Prof. SooJean Han
- GPA: 4.26 / 4.3

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

- Advisor: Prof. Kunsoo Huh
- GPA: 4.24 / 4.5

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

[2] **Jeongyong Yang***, Seunghwan Jang*, and SooJean Han, "SafeFlowMatcher: Safe and Fast Planning using Flow Matching with Control Barrier Functions," *arXiv preprint*, Oct. 2025. (under review at machine learning conference)

[3] **Jeongyong Yang***, KwangBin Lee*, and SooJean Han, "Heterogeneous Predictor-based Risk-Aware Planning with Conformal Prediction in Dense, Uncertain Environments," *arXiv preprint*, Jul. 2025. (under review at ACC 2026)

[4] **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 — Jul. 2025 - Present

- Developed an uncertainty propagation method for drone using the duality between Per-

ron–Frobenius and Koopman operators, leveraging data-driven Koopman modeling to estimate probabilistic risk regions for safe urban drone operations (related publication: [1]).

ETRI: Fail Detection and Self-Improving Systems for Robotic Tasks — May 2025 - Present

- Developed an out-of-distribution detection module for robotic manipulation tasks using conformal prediction and success-only data to ensure safe task execution and enable self-improving imitation 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.
- Applied a low-pass-filtered look-ahead curvature as a feedforward term to improve cornering stability and safety.
- Designed and validated the controller and estimator in MATLAB/Simulink, and verified performance through 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

3 papers in IEEE Robotics and Automation Letters (RA-L)
1 paper in IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

Students Mentored

Mentored on vehicle dynamics and model predictive control

- Hohyeon Song (Electrical Engineering, KAIST)

Mentored on linear systems and control theory fundamentals

- Yongmin Kim (Electrical Engineering, KAIST)
- SeungEon Lee (Electrical Engineering, KAIST)

Mentored on computational thinking, data structures, and programming fundamentals

- Hongryeol Lim (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