

# Joonkyung Kim

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## Education

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### Texas A&M University

- Ph.D. student in Computer Science and Engineering, (Advisor: Yiwei Lyu)

College Station, TX, United States

Aug. 2025 – Present

### Sogang University

- M.S. in Electronic Engineering (Advisor: Changjoo Nam)

Seoul, South Korea

- B.S. in Electronic Engineering (Cum Laude)

Mar. 2023 – Aug. 2025

### Carnegie Mellon University

- Visiting Scholar in School of Computer Science (S3D)

Pittsburgh, PA, United States

Aug. 2024 – Feb. 2025

## Research Experiences

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### Robotics Lab, Texas A&M University

Graduate Research Assistant

College Station, TX, United States

Aug. 2025 – Present

- Conducting research on risk-aware decentralized heterogeneous multi-robot safe control, focusing on adaptive and control barrier function (CBF)-based frameworks under uncertainty

### AI Robotics Lab, Sogang University

Graduate Research Assistant, Undergraduate Intern

Seoul, South Korea

Sep. 2022 – Aug. 2025

- Developed a collision-avoidance module for visual navigation foundation models to reduce fine-tuning dependency (*in collaboration with the Advanced Agent-Robotics Technology Lab, CMU, during visiting research*) [\[Project page\]](#)
- Built multi-robot simulation (PyBullet, Isaac Sim) and real-robot systems (ROS 2, TurtleBot 4) to evaluate safety and conflict resolution in navigation experiments [\[Video1\]](#), [\[Video2\]](#), [\[Video3\]](#)
- Developed a deep reinforcement learning-based navigation method for mobile robots in confined spaces with randomly placed obstacles [\[Video\]](#)
- Contributed to a pick-and-place project using a mobile manipulator, integrating and testing the ROS Navigation Stack [\[Video\]](#)

## Publications

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### CONFERENCE

- [4] Wonjong Lee, Joonyeol Sim, Joonkyung Kim, Siwon Jo, Wenhao Luo, and Changjoo Nam\*, "Merry-Go-Round: Safe Control of Decentralized Multi-Robot Systems with Deadlock Prevention," *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*, 2025., [\[Project page\]](#)
- [3] Joonkyung Kim<sup>†</sup>, Joonyeol Sim<sup>†</sup>, Woojun Kim, Katia Sycara, and Changjoo Nam\*, "Enhancing Safety of Visual Navigation through Collision Avoidance via Repulsive Estimation," *Conference on Robot Learning (CoRL)*, 2025. (<sup>†</sup>Equal contribution) [\[Project page\]](#)
- [2] Joonkyung Kim, Sangjin Park, Wonjong Lee, Woojun Kim, Nakju Doh, and Changjoo Nam\*, "Escaping Local Minima: Hybrid Artificial Potential Field with Wall-Follower for Decentralized Multi-Robot Navigation," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, 2025. [\[Paper\]](#), [\[Video\]](#)
- [1] Joonkyung Kim, and Changjoo Nam\*. "Room for me?: Mobile Navigation for Entering a Confined Space Using Deep Reinforcement Learning," *Int. Conf. on Ubiquitous Robots (UR)*, IEEE, 2023. [\[Paper\]](#), [\[Video\]](#)

## PREPRINT

- [2] Bingyao Du, Joonkyung Kim, and Yiwei Lyu\*, "Gaussian Mixture-based Inverse Perception Contract for Uncertainty Aware Safe Navigation," *Under Review*, 2025.
- [1] Joonyeol Sim, Joonkyung Kim, and Changjoo Nam \*, "Safe Interval RRT\* for Scalable Multi-Robot Path Planning in Continuous Space," *preprint*, 2024. [\[Paper\]](#), [\[Video\]](#)

## Patents

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- [1] Changjoo Nam, Joonkyung Kim, "Distributed Mapless Multi-Robot Autonomous Navigation Based on Omnidirectional Distance Sensors," *Korean Patent Application No. 10-2025-0011954* (filed Jan 2025, pending)

## Scholarships & Grants

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### AI Intensive Program at Carnegie Mellon University

Fully funded by the South Korean government (IITP, Ministry of Science and ICT)

Aug. 2024 – Feb. 2025

### Sogang Scholarship

Funded by Sogang University (graduate program)

Mar. 2023 – Aug. 2025

## Academic Service & Other Experiences

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### Reviewer

- Conference: ICRA (2025), IROS (2025), CoRL (2025)
- Journal: Autonomous Robots (2025)

### Teaching Assistant

- [EEE3141] *Introduction to Control Systems*

Sogang University, South Korea

Spring 2024

### Military Service

- Republic of Korea Army (ROKA)

Donghae, South Korea

Oct. 2018 – May. 2020

## Technical Skills

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**Programming Languages:** Python, C, MATLAB

**Tools & Frameworks:** PyTorch, PyBullet, Isaac Sim, ROS2