

Seungjae Baek

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🌐 <https://bsj970.github.io>

Education

Carnegie Mellon University

Visiting Researcher at Robotics Institute
Collaborator: Sebastian Scherer

Pittsburgh, PA
Aug. 2024 – Present
(Remote: Mar. 2025 – Jul. 2025)

Ulsan National Institute of Science and Technology

M.S. in Artificial Intelligence
Advisor: Jeong hwan Jeon

Ulsan, Korea
Aug. 2023 – Aug. 2026 (exp.)

B.S. in Electrical Engineering
Graduated Cum Laude

Feb. 2017 – Aug. 2023*

* Including military service, Republic of Korea Army, Feb. 2020 – Sep. 2021

Publications

* indicates equal contribution

Conferences

1. **PIPE Planner: Pathwise Information Gain with Map Predictions for Indoor Robot Exploration**
Seungjae Baek*, Brady Moon*, Seungchan Kim*, Muqing Cao, Cherie Ho, Sebastian Scherer, Jeong hwan Jeon
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2025

Journals

1. **Cooperative Multi-Agent Reinforcement Learning for Multiple Anti-Aircraft Target Surveillance**
Kangbeen Lee*, Seungjae Baek*, Philjoon Jung, Tae-Hyun Kim, Jeong hwan Jeon
Journal of the Institute of Control, Robotics and Systems June 2024

Preprints

1. **Progressive Confinement on Explorative Guidance for Diffusion Planners**
Under Double-blind Review
2. **LLM-Driven Semantic Hypotheses and Dynamic Graph Planning for UAV Inspection**
Under Double-blind Review
3. **Multi-Objective Deep Reinforcement Learning for Eco-Friendly Fleet Rebalancing in Autonomous Mobility-on-Demand Systems**
Jungeun Lee*, Seungjae Baek*, Sunhwi Kim, Chanju Kim, Seongjae Lee, Jeong hwan Jeon
Under Journal Revision

Research Experiences

Carnegie Mellon University

Robotics Institute, AirLab

Visiting Researcher

Pittsburgh, PA

Aug. 2024 – Present (remote Mar. 2025 – Jul. 2025)

- Designed an indoor exploration algorithm leveraging pathwise information gain from predicted global maps.
- Developing ROS 2 Gazebo simulation environments to evaluate semantics-aware navigation with LLM-based prediction and TSP-based path planning.

Ulsan National Institute of Science and Technology
Robotics & Mobility Lab
Graduate Research Assistant

Ulsan, Korea
Aug. 2023 – Present

- Conduct experiments and simulations on multi-objective ride-sharing RL.
- Designed and implemented multi-agent reinforcement learning (MARL) algorithms for cooperative UAV surveillance.

Undergraduate Research Assistant

Jul. 2022 – Aug. 2023

- Adapted a centralized training with decentralized execution (CTDE) MARL method to video-game simulations and authored a B.S. thesis.
- Engineered an autonomous race car platform as a team leader; won 1st place in a university racing competition.

Teaching & Working Experiences

Ulsan National Institute of Science and Technology

Ulsan, Korea

- Head Teaching Assistant, ITP117: Introduction to AI Programming II
- Student Lecturer, EEE351: Automatic Control

Feb. 2024 – Jul. 2024
Aug. 2022 – Dec. 2022

Clinomics Inc.

Ulsan, Korea

- Project Based Learning (PBL) Teaching Assistant

Feb. 2023 – Jul. 2023

Achievements

Honors, Scholarships & Fellowships

- **Korean Government Scholarship Program for Study Overseas** (USD 150,000)
Government of the Republic of Korea. USD 50,000 per year (3 years).

Aug. 2026 – Aug. 2029 (exp.)
- **Industrial Innovation Talent Growth Support (Overseas Linkage)** (USD 21,500)
Korea University. Funding for visiting research at Carnegie Mellon University.

Aug. 2025 – Feb. 2026
- **AI Excellence Global Innovative Leader Education Fellowship** (USD 40,000 incl. tuition)
Sogang University. Funding for visiting research at Carnegie Mellon University.

Aug. 2024 – Feb. 2025
- **Government-funded Graduate Scholarship (Fully funded)**
Ministry of Science and ICT

Aug. 2023 – Aug. 2025
- **UNIST Academic Performance Scholarship (4-year, fully funded)**
Ulsan National Institute of Science and Technology

Feb. 2017 – Aug. 2023

Awards & Grants

- **IEEE IES SYPA Travel Award (IROS 2025)** (USD 1,500)
IEEE Industrial Electronics Society. Selected for participation in IROS 2025.

Oct. 2025
- **Undergraduate Research Excellent Poster Session Award**
Department of Electrical Engineering, Ulsan National Institute of Science and Technology

Jul. 2023

Skills & Services

Languages:

- **Korean:** Native
- **English:** Advanced (TOEFL iBT: 106/120)

Programming Languages: C++, Python, MATLAB
Software and Tools: ROS, Gazebo, Git, Docker, CARLA, SUMO, NVIDIA Isaac-sim
Reviewer: IROS (2025)