

Seungjae Baek

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Education

Carnegie Mellon University
Visitor at Robotics Institute
Collaborator: Sebastian Scherer

Pittsburgh, PA
Aug. 2025 – Present
Aug. 2024 – Feb. 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 mandatory military service, Republic of Korea Army, Feb. 2020 – Sep. 2021

Research Interests

Planning

Informative Path Planning (IPP), Motion Planning

Reinforcement Learning

Model-Free Learning, Multi-Agent Reinforcement Learning (MARL)

Autonomous System

Unmanned Aerial Vehicles (UAVs), Autonomous Vehicles (AVs)

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 Institute of Control, Robotics and Systems June 2024

Preprints

1. 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 Revision
2. STOMP-Guided Diffusion for Motion Planning
Sunhwi Kim, Seungjae Baek, Jungeun Lee, Jaechan Shin, Junsu Kim, Seongjae Lee, Sungjun Yang, Kyungdon Joo, Jeong hwan Jeon
Under Review

Research Experiences

Carnegie Mellon University
Robotics Institute, AirLab
Visitor

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

- Developed an indoor map exploration algorithm that leverages path-wise information gain from predicted global maps.
- Contributing to an end-to-end multi-drone 3D exploration simulation project.

Ulsan National Institute of Science and Technology Robotics & Mobility Lab Graduate Research Assistant	Ulsan, Korea Aug. 2023 – Present
<ul style="list-style-type: none"> Developed MARL learning algorithms for cooperative control of UAVs in enemy surveillance scenarios. Conducting experiments and simulations for multi-objective ride-sharing RL algorithms. 	
Undergraduate Research Assistant	Jul. 2022 – Aug. 2023
<ul style="list-style-type: none"> Adapted a CTDE MARL method in video-game simulations, culminating in a B.S. research thesis. Developed and ran Python experiments using the CARLA AV simulator. 	

Teaching & Working Experiences

Ulsan National Institute of Science and Technology ITP117: Introduction to AI Programming II, Head Teaching Assistant	Ulsan, Korea Feb. 2024 – Jul. 2024
<ul style="list-style-type: none"> Assisted in teaching a course with 120 students alongside four other teaching assistants. Lectured on MLPs, CNNs, and RNNs using TensorFlow and PyTorch in English. 	
EEE351: Automatic Control, Student Lecturer of AFEE	Aug. 2022 – Dec. 2022
<ul style="list-style-type: none"> AFEE is an official student organization within Electrical Engineering at UNIST. Organized and facilitated group study sessions for both domestic and international students. 	
Clinomics Inc. Project-Based Learning (PBL) Teaching Assistant	Ulsan, Korea Feb. 2023 – Jul. 2023
<ul style="list-style-type: none"> Supported a project collaborating with office workers to integrate AI solutions into their workflows. Used AnoGAN and VAE to generate hypothetical disease-associated DNA methylation data. 	

Achievements

Honors	
<ul style="list-style-type: none"> Korean Government Scholarship Program for Study Overseas (total \$150,000) Government of the Republic of Korea 	Aug. 2026 – Aug. 2029 (exp.)
<ul style="list-style-type: none"> Industrial Innovation Talent Growth Support (Overseas Linkage) (total \$21,500) Ministry of Trade, Industry, and Energy (MOTIE) & Korea Univerity 	Aug. 2025 – Feb. 2026
<ul style="list-style-type: none"> AI Excellence Global Innovative Leader Education Fellowship (total \$40,000) Ministry of Science and ICT (MSIT) & Sogang University 	Aug. 2024 – Feb. 2025
<ul style="list-style-type: none"> Government-funded Graduate Scholarship (Full-funded) Ministry of Science and ICT (MSIT) 	Aug. 2023 – Aug. 2025
<ul style="list-style-type: none"> UNIST Academic Performance Scholarship (4-Year Full-funded) Ulsan National Institute of Science and Technology 	Feb. 2017 – Aug. 2023
Awards	
<ul style="list-style-type: none"> Undergraduate Research Excellent Poster Session Award Department of Electrical Engineering, Ulsan National Institute of Science and Technology 	Jul. 2023

Skills & Services

Languages: <ul style="list-style-type: none"> Korean: Native English: Advanced (TOEFL iBT: 106 of 120, Reading: 28, Listening: 29, Speaking: 24, Writing: 25)
Programming Languages: C++, Python, MATLAB
Software and Tools: ROS, Git, Docker, CARLA, SUMO, NVIDIA Isaac-sim, PyTorch, TensorFlow
Reviewer: <i>IROS</i> (2025)