

Jungil Ham

PH.D. CANDIDATE IN MECHANICAL AND ROBOTICS ENGINEERING, GIST

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Education

Gwangju Institute of Science and Technology (GIST)

Gwangju, South Korea

PH.D. CANDIDATE, MECHANICAL AND ROBOTICS ENGINEERING

Sep 2024 – Present

- Machine Perception and Intelligence Lab; Advisor: Pyojin Kim
- Visual localization, mapping, and 3-DoF orientation estimation using structural regularities and digital twins of the ISS

Gwangju Institute of Science and Technology (GIST)

Gwangju, South Korea

M.S. MECHANICAL AND ROBOTICS ENGINEERING

Mar 2022 – Aug 2024

- Proposed the “San Francisco World” structural model for 3-DoF visual compass (IEEE RA-L)
- Led end-to-end development of a pedestrian-following aerial robot (ICCAS)

Kwangwoon University, College of Electronics and Information Engineering

Seoul, South Korea

B.S. ROBOTICS ENGINEERING

Mar 2018 – Feb 2022

Research Experience

NASA Ames Research Center

Moffett Field, CA, USA

RESEARCH INTERN

Oct 2024 – Mar 2025

- Studied visual orientation estimation and monocular SLAM on rotation-dominant Astrobees ISS sequences
- Developed digital-twin and Gaussian Splatting methods for space robot perception

Sungkyunkwan University (SKKU)

Suwon, South Korea

RESEARCH INTERN

Dec 2021 – Jan 2022

- Robotics and computer vision research under Prof. Hyouk Ryeol Choi

Korea Institute of Science and Technology (KIST)

Seoul, South Korea

UNDERGRADUATE RESEARCH ASSISTANT

Mar 2021 – Nov 2021

- Applied robotics systems and perception research with Dr. Jung Min Park

Publications

Author's name in **bold**.

Journal Articles

- [1] **J. Ham**, M. Kim, S. Kang, K. Joo, H. Li, and P. Kim, “San Francisco World: Leveraging Structural Regularities of Slope for 3-DoF Visual Compass,” *IEEE Robotics and Automation Letters (RA-L)*, vol. 10, no. 1, pp. 382–389, 2025.

Refereed Conference & Workshop Papers

- [2] **J. Ham**, B. Coltin, R. Soussan, and P. Kim, “What Breaks Monocular SLAM in Microgravity? An Initial Benchmark on Rotation-Dominant Astrobees ISS Sequences,” *IEEE ICRA Space Robotics Workshop*, 2026.
- [3] **J. Ham**, R. Soussan, B. Coltin, H. Chun, and P. Kim, “Drift-Free Visual Compass Leveraging Digital Twins for Cluttered Environments,” *2nd Space Robotics Workshop at IEEE Space Computing Conference (SCC)*, 2025.
- [4] M. Kim, J. Han, **J. Ham**, and P. Kim, “SPLiCE: Single-Point LiDAR and Camera Calibration & Estimation Leveraging Manhattan World,” *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*, pp. 8727–8734, 2025.
- [5] **J. Ham**, I. Ryu, J. Park, J. Joeng, S. Kim, and H. Ahn, “Indoor Pedestrian-Following System by a Drone with Edge Computing and Neural Networks: Part 2 — Tracking System and Monocular Depth Estimation,” *Int. Conf. on Control, Automation and Systems (ICCAS)*, 2023.
- [6] I. Ryu, **J. Ham**, J. Park, J. Joeng, S. Kim, and H. Ahn, “Indoor Pedestrian-Following System by a Drone with Edge Computing and Neural Networks: Part 1 — System Design,” *Int. Conf. on Control, Automation and Systems (ICCAS)*, 2023.

Under Review

- [7] “PI-EAT-SLAM: Physics-Informed Edge-Aware Thermal Gaussian Splatting SLAM,” under review, *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*, 2026.

Selected Research Projects

- **Monocular SLAM in Microgravity:** Benchmarked failure modes on rotation-dominant Astrobees ISS sequences with NASA collaborators.
- **DTOR Visual Compass:** Developed drift-free 3-DoF orientation estimation using ISS digital twins in cluttered environments.
- **San Francisco World:** Extended structural-prior visual orientation estimation beyond the Manhattan World assumption to sloped scenes.
- **Pedestrian-Following Drone:** Led mechanical design, fabrication, perception, tracking, depth estimation, and system integration.

Honors & Awards

2024 GIST International Research Experience Fellowship (IREF)

Skills

Research	Visual SLAM and odometry, structural visual compass, space robotics, Gaussian Splatting
Programming	C++, Python, MATLAB
Robotics	ROS 1 / ROS 2
CAD & Modeling	Autodesk Inventor, 3ds Max
Languages	Korean (native); English — TOEIC 840, OPIc Intermediate-High