

# Minwoo Jung

## EDUCATION

---

**Seoul National University**, Republic of Korea *Sep. 2023 - Present*

- **Ph.D. Candidate** in Mechanical Engineering
- Cumulative GPA 3.71/4.3
- Robust Perception and Mobile Robotics Lab, advised by Prof. Ayoung Kim

**Seoul National University**, Republic of Korea *Sep. 2021 - Aug. 2023*

- **M.S.** in Mechanical Engineering
- Cumulative GPA 4.06/4.3
- Thesis: “Asynchronous Multiple LiDAR-Inertial Odometry using Point-wise Inter-LiDAR Uncertainty Propagation”
- Robust Perception and Mobile Robotics Lab, advised by Prof. Ayoung Kim

**KAIST**, Republic of Korea *Mar. 2021 - Aug. 2021*

- **M.S. Student** in Civil and Environmental Engineering
- Moved to Seoul National University
- Advised by Prof. Ayoung Kim

**KAIST**, Republic of Korea *Mar. 2017 - Feb. 2021*

- **B.S.** in Civil and Environmental Engineering
- Cumulative GPA 3.76/4.3
- Graduated *cum laude*

## RESEARCH INTERESTS

---

- LiDAR SLAM, sensor fusion, place recognition, robust localization, and long-term autonomy

## LANGUAGES & SKILLS

---

- Korean (native), English
- Programming: C/C++, Python, MATLAB, PyTorch
- Robotics: LiDAR SLAM, sensor fusion, place recognition, autonomous navigation
- Tools: ROS, GTSAM, SymForce, Docker, Linux, L<sup>A</sup>T<sub>E</sub>X

## RESEARCH EXPERIENCE

---

**Collaborative Research with Oxford Robotics Institute DRS Group** *2024 - 2025*

- Visiting Research Student at Oxford Robotics Institute, Feb. 2025 - Mar. 2025.
- Implemented LiDAR place recognition using vision foundation models.
- Implemented forest localization using inter-tree geometric matching.

**Global Re-localization for LiDAR SLAM** *2023 - 2024*

- Developed global re-localization for scan-to-submap registration in GPS-denied environments.
- Integrated the module into an existing SLAM framework and validated it with real-world multi-session data.

## Multiple LiDAR-IMU SLAM

2022 - 2023

- Developed a multiple LiDAR-IMU SLAM framework for trajectory estimation in unstructured environments.
- Integrated the module into a hardware platform and validated it in real-world forest environments.

## Autonomous Navigation in Construction Sites

2021 - 2025

- Implemented an autonomous navigation module for a mobile robot equipped with LiDAR, IMU, and GPS.
- Demonstrated the system across multiple construction sites.

## PUBLICATIONS

---

### International Journal

1. Minwoo Jung, Dongjae Lee, Nived Chebrolu, Haedam Oh, Maurice Fallon, and Ayoung Kim. TreeLoc++: Robust 6-DoF LiDAR Localization in Forests with a Compact Digital Forest Inventory. *Transactions on Field Robotics (Submitted)*, 2026.
2. Wooseong Yang, Dongjae Lee, Minwoo Jung, and Ayoung Kim. Geometrically-Constrained Radar-Inertial Odometry via Continuous Point-Pose Uncertainty Modeling. *IEEE Robotics and Automation Letters (RA-L)*, 11(5):6098–6105, 2026.
3. Hyesu Jang, Wooseong Yang, Hanguen Kim, Dongje Lee, Yongjin Kim, Jinbum Park, Minsoo Jeon, Jaeseong Koh, Yejin Kang, Minwoo Jung, Sangwoo Jung, and Ayoung Kim. MOANA: Multi-Radar Dataset for Maritime Odometry and Autonomous Navigation Application. *The International Journal of Robotics Research (IJRR)*, 45(2):193–203, 2026.
4. Hanjun Kim, Minwoo Jung, Wooseong Yang, and Ayoung Kim. SHeRLoc: Synchronized Heterogeneous Radar Place Recognition for Cross-Modal Localization. *IEEE Robotics and Automation Letters (RA-L)*, 10(12):13264–13271, 2025.
5. Minwoo Jung, Wooseong Yang, Dongjae Lee, Hyeonjae Gil, Giseop Kim, and Ayoung Kim. HeLiPR: Heterogeneous LiDAR Dataset for inter-LiDAR Place Recognition under Spatiotemporal Variations. *The International Journal of Robotics Research (IJRR)*, 43(12):1867–1883, 2024.
6. Dongjae Lee, Minwoo Jung, Wooseong Yang, and Ayoung Kim. LiDAR Odometry Survey: Recent Advancements and Remaining Challenges. *Intelligent Service Robotics (ISR)*, 17:95–118, 2024.
7. Hyesu Jang, Minwoo Jung, Myung-Hwan Jeon, and Ayoung Kim. LodeStar: Maritime Radar Descriptor for Semi-Direct Radar Odometry. *IEEE Robotics and Automation Letters (RA-L)*, 9(2):1684–1691, 2024.
8. Sangwoo Jung, Hyesu Jang, Minwoo Jung, Ayoung Kim, and Myung-Hwan Jeon. Imaging Radar and LiDAR Image Translation for 3-DOF Extrinsic Calibration. *Intelligent Service Robotics (ISR)*, 17:167–179, 2024.
9. Jeongyun Kim, Myung-Hwan Jeon, Sangwoo Jung, Wooseong Yang, Minwoo Jung, Jaeho Shin, and Ayoung Kim. TRansPose: Large-Scale Multispectral Dataset for Transparent Object. *The International Journal of Robotics Research (IJRR)*, 43(6):731–738, 2024.
10. Minwoo Jung, Sangwoo Jung, and Ayoung Kim. Asynchronous Multiple LiDAR-Inertial Odometry using Point-wise Inter-LiDAR Uncertainty Propagation. *IEEE Robotics and Automation Letters (RA-L)*, 8(7):4211–4218, 2023.
11. Jeongyun Kim, Seungsang Yun, Minwoo Jung, Ayoung Kim, and Younggun Cho. Automatic Wall Slant Angle Map Generation using 3D Point Clouds. *ETRI Journal*, 43(4):594–602, 2021.

### Domestic Journal

1. Eunho Lee, Minwoo Jung, Jongho Kim, Kyongsu Yi, and Ayoung Kim. Robust 3D Object Detection through Distance based Adaptive Thresholding. *The Journal of Korea Robotics Society*, 19(1):106–116, 2024.
2. Sangwoo Jung, Minwoo Jung, and Ayoung Kim. Map Error Measuring Mechanism Design and Algorithm Robust to LiDAR Sparsity. *The Journal of Korea Robotics Society*, 16(3):189–198, 2021.
3. Minwoo Jung, Sangwoo Jung, Hyesu Jang, and Ayoung Kim. Intensity and Ambient Enhanced LiDAR-Inertial SLAM for Unstructured Construction Environment. *The Journal of Korea Robotics Society*, 16(3):179–188, 2021.

### International Conference Proceedings

1. Minwoo Jung, Nived Chebrolu, Lucas Carvalho de Lima, Haedam Oh, Maurice Fallon, and Ayoung Kim. TreeLoc: 6-DoF LiDAR Global Localization in Forests via Inter-Tree Geometric Matching. *IEEE International Conference on Robotics and Automation (ICRA)*, 2026.
2. Minwoo Jung, Lanke Frank Tarimo Fu, Maurice Fallon, and Ayoung Kim. ImLPR: Image-based LiDAR Place Recognition using Vision Foundation Models. *Conference on Robot Learning (CoRL)*, pages 3318–3340, 2025.
3. Chiyun Noh, Wooseong Yang, Minwoo Jung, Sangwoo Jung, and Ayoung Kim. GaRLIO: Gravity enhanced Radar-LiDAR-Inertial Odometry. *IEEE International Conference on Robotics and Automation (ICRA)*, pages 9869–9875, 2025.
4. Hanjun Kim, Minwoo Jung, Chiyun Noh, Sangwoo Jung, Hyunho Song, Wooseong Yang, Hyesu Jang, and Ayoung Kim. HeRCULES: Heterogeneous Radar Dataset in Complex Urban Environment for Multi-session Radar SLAM. *IEEE International Conference on Robotics and Automation (ICRA)*, pages 4649–4656, 2025.
5. Minwoo Jung, Sangwoo Jung, Hyeonjae Gil, and Ayoung Kim. HeLiOS: Heterogeneous LiDAR Place Recognition via Overlap-based Learning and Local Spherical Transformer. *IEEE International Conference on Robotics and Automation (ICRA)*, pages 2204–2211, 2025.
6. Sanghyun Hahn, Seunghun Oh, Minwoo Jung, Ayoung Kim, and Sangwoo Jung. Quantitative 3D Map Accuracy Evaluation Hardware and Algorithm for LiDAR (-Inertial) SLAM. *International Conference on Control, Automation and Systems (ICCAS)*, pages 568–572, 2024.
7. Hyesu Jang, Minwoo Jung, and Ayoung Kim. RaPlace: Place Recognition for Imaging Radar using Radon Transform and Mutable Threshold. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 11194–11201, 2023.
8. Seungsang Yun, Minwoo Jung, Jeongyun Kim, Sangwoo Jung, Younghun Cho, Myung-Hwan Jeon, Giseop Kim, and Ayoung Kim. STheReO: Stereo Thermal Dataset for Research in Odometry and Mapping. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 3857–3864, 2022.

## Preprints and Workshops

1. Hyunho Song, Dongjae Lee, Seunghun Oh, Minwoo Jung, and Ayoung Kim. The City that Never Settles: Simulation-based LiDAR Dataset for Long-Term Place Recognition Under Extreme Structural Changes. *Construction Robotics Workshop, ICRA*, 2025.
2. Eunho Lee, Minwoo Jung, and Ayoung Kim. Toward Robust LiDAR based 3D Object Detection via Density-Aware Adaptive Thresholding. *Field Robotics Workshop, ICRA*, 2024.
3. Dongjae Lee, Minwoo Jung, and Ayoung Kim. ConPR: Ongoing Construction Site Dataset for Place Recognition. *Closing the Loop on Localization Workshop, IROS*, 2024.
4. Minwoo Jung, Dongjae Lee, Wooseong Yang, and Ayoung Kim. HeLiPR: Heterogeneous LiDAR Dataset for inter-LiDAR Place Recognition in Spatial and Temporal Variation Environments. *Novel Sensors Workshop, IROS*, 2023.
5. Minwoo Jung, Sangwoo Jung, and Ayoung Kim. MA-LIO: Multiple Asynchronous LiDAR-Inertial Odometry with Time-dependent Point-wise Uncertainty. *Towards Safe Autonomy Workshop, Robotics: Science and Systems (RSS)*, 2023.
6. Hyesu Jang, Minwoo Jung, Sangwoo Jung, and Ayoung Kim. Radar-based Angular Correction for Tightly-coupled LiDAR Odometry. *IROS Workshop on Perception and Navigation for Autonomous Robotics in Unstructured and Dynamic Environments*, 2022.
7. Minwoo Jung and Ayoung Kim. Pointclouds Integration from Aerial and Ground View Exploiting Normal Vector and Pose Graph Optimization. *ICRA Late Breaking Results*, 2022.

## TEACHING & TUTORIALS

---

<b>Tutorial: ICP and LiDAR Localization</b> Multidisciplinary Creative Class	<i>Apr. 2026</i>
<b>Tutorial: Understanding 3D LiDAR Point Clouds and Their Practical Usage</b> Machine Intelligence Industry-Academia Open Lecture and Consulting	<i>Mar. 2026</i>
<b>Tutorial: LiDAR Point Cloud Matching</b> [M3228.000300] Sensor-Based Spatial Intelligence, Seoul National University	<i>Nov. 2025</i>
<b>Head Teaching Assistant, [M3228.000300] Sensor-Based Spatial Intelligence</b> Seoul National University	<i>Sep. 2025</i>

## PROFESSIONAL SERVICE

---

- Reviewer: The International Journal of Robotics Research (IJRR)
- Reviewer: The International Conference on Control, Automation and Systems (ICCAS)
- Reviewer: The International Journal of Digital Earth (IJDE)
- Reviewer: IEEE Transactions on Robotics (T-RO)
- Reviewer: IEEE Robotics and Automation Letters (RA-L)
- Reviewer: IEEE International Conference on Robotics and Automation (ICRA)
- Reviewer: IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- Reviewer: Conference on Neural Information Processing Systems (NeurIPS)
- Reviewer: Conference on Robot Learning (CoRL)
- Reviewer: IEEE International Conference on Ubiquitous Robots (UR)
- Reviewer: IEEE Transactions on Automation Science and Engineering (T-ASE)

## AWARDS AND HONORS

---

<i>2025</i>	Paper Award (2nd author), Korea Robotics Society (KROS)
<i>2023</i>	Best Overall Presentation Award (2nd author), IROS Workshop
<i>2023</i>	Best M.S. Thesis Award, Seoul National University
<i>2023</i>	Ranked 4th in the LiDAR Single Session category, Hilti SLAM Challenge
<i>2021</i>	Graduation Citation, Korea Concrete Institute
<i>2021</i>	Development Foundation Chairman Award, KAIST
<i>2021</i>	Cum Laude, Civil and Environmental Engineering, KAIST
<i>2019</i>	Dean's List, Civil and Environmental Engineering, KAIST