Junwoon Lee

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EDUCATION

University of Michigan *Aug. 2025 –*
Ph.D. Student in Robotics
- Advisor: Prof. Yulun Tian

University of Tokyo *Apr. 2023 – Mar. 2025*
M.E.S. in Human & Engineered Environmental Studies
- Advisor: Prof. Atsushi Yamashita
- Thesis: Switching-based Multi-modal SLAM for Extreme and Degraded Environments

University of Osaka *Apr. 2017 – Mar. 2023*
B.E. in Mechanical Engineering (Military Service included)
- Advisor: Prof. Masamitsu Kurisu
- Thesis: LiDAR-visual SLAM for Online Mapping of Unpaved Road Surface

PUBLICATIONS

[1] **Robot Localization by Data Integration of Multiple Thermal Cameras in Low-light Environment**
Masaki Chino, Junwoon Lee, Qi An, Atsushi Yamashita
International Journal of Automation Technology, 2025.

[2] **Accurate and Rapid Reduction of Spherical Image Distortion for Feature-Based Pose Estimation**
Taisei Ando, Junwoon Lee, Mitsuru Shinozaki, Toshihiro Kitajima, Qi An, Atsushi Yamashita
International Journal of Automation Technology, 2025.

[3] **Self-TIO: Thermal-Inertial Odometry via Self-supervised 16-bit Feature Extractor and Tracker**
Junwoon Lee, Taisei Ando, Mitsuru Shinozaki, Toshihiro Kitajima, Qi An, Atsushi Yamashita
IEEE Robotics and Automation Letters (RA-L), 2025. Will presented at IROS'25. [Link]

[4] **TC-LTIO: Tightly-coupled LiDAR Thermal Inertial Odometry for LiDAR and Visual Odometry Degraded Environments**
Junwoon Lee, Taisei Ando, Mitsuru Shinozaki, Toshihiro Kitajima, Qi An, Atsushi Yamashita
International Conference on Control, Automation and Systems (ICCAS), 2024. [Link] (Best Paper Award)

[5] **Highly Accurate and Fast Two-view Pose Estimation by Fast Reduction of Spherical Image Distortion Effects**
Taisei Ando, Junwoon Lee, Mitsuru Shinozaki, Toshihiro Kitajima, Qi An, Atsushi Yamashita
International Conference on Control, Automation and Systems (ICCAS), 2024. [Link]

[6] **Switch-SLAM: Switching-Based LiDAR-Inertial-Visual SLAM for Degenerate Environments**
Junwoon Lee, Ren Komatsu, Mitsuru Shinozaki, Toshihiro Kitajima, Hajime Asama, Qi An, Atsushi Yamashita
IEEE Robotics and Automation Letters (RA-L), 2024. Presented at ICRA@40. [Link]

[7] **Three-dimensionalized Feature-Based LiDAR-visual Odometry for Online Mapping of Unpaved Road Surface**
Junwoon Lee, Masamitsu Kurisu, Kazuya Kuriyama
Journal of Field Robotics, 2024. [Link]

RESEARCH EXPERIENCE

Research Assistant, University of Michigan *Aug. 2025 –*
Scalable Spatial Intelligence Lab.
- Developing a VLM features-embeded Gaussian Splatting SLAM system.
- Developing a LiDAR-visual-GNSS-inertial experimental platform.

Research Assistant, University of Tokyo *Apr. 2023 – Jul. 2025*
Real World Robot Informatics Lab.
- Developed a multi-modal SLAM system for complex scenes.
- Developed a self-supervised point tracker for thermal inertial odometry.

Research Assistant, University of Osaka *Apr. 2022 – Mar. 2023*
Komatsu MIRAI Construction Equipment Cooperative Research Center
- Suggested an intensity-weighted point cloud registration.
- Developed a mapping system for an unpaved road surface.

HONORS AND AWARDS

Department Fellowship *Sep. 2025 – Aug. 2026*
- Fellowship for 1st-year doctorate studies.

BOOST NAIS AI Fellowship (declined) *Apr. 2025 – Mar. 2028*
- Fellowship at UTokyo, $75,000+ USD

Dean's Award *Mar. 2025*
- Graduated at the top of the department (1/39)

Best Paper Award *Oct. 2024*
- ICCAS'24 (1/400)

IEEE RAS Travel Grant *Sep. 2024*
- ICRA@40, $2,000 USD

Rotary Yoneyama Memorial Foundation Scholarship *Apr. 2023 – Mar. 2025*
- Full scholarship, $30,000+ USD

Korea-Japan Joint Government Scholarship *Apr. 2017 – Mar. 2023*
- Full scholarship, $75,000+ USD

TEACHING

Teaching Assistant, UTokyo FEN-SC3102S1 Exercises for Mathematics 2C *Apr. 2024 – Jul. 2024*

MENTORING

Yiyu Wang (B.S., University of Michigan) *Sep. 2025 –*
Kohei Yamaguchi (B.S., University of Tokyo) *Apr. 2025 – Dec. 2025*
Taisei Ando (M.S./B.S., University of Tokyo) *Apr. 2023 –*

SERVICES

Academic Reviewer
- T-RO (2025), RA-L (2024–2026), ICRA (2025–2026), IROS (2025), T-ASE (2024–2025), Journal of Field Robotics (2025), IEEE Sensors Journal (2024–2025), ICCAS (2024), Scientific Reports (2024)

Sergeant, Republic of Korea Army *Apr. 2020 – Oct. 2021*
- Served as a frontline guardian at a coastline observation post in the 23rd Security Brigade

SKILLS

Research Skills
- Program Languages : C/C++, Python
- Professional : ROS1, ROS2, GTSAM, Ceres Solver, OpenCV, PyTorch, TensorRT, Git, 3D CAD

Languages: English (Professional), Japanese (Professional), Korean (Native)

PATENT

1. Kaoru Adachi, Masamitsu Kurisu, Junwoon Lee, "Terrain Detection System and Method," *Japanese Patent app:2023-105215 / open:2025-005158*, Filed on June 27, 2023.

REFERENCES

References available upon request.