

## RESEARCH INTEREST

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- **Mapping** : Semantic SLAM, Point Cloud Registration, Map Representations
- **Navigation** : Risk-aware, Uncertainty-aware, Active SLAM

## EDUCATION

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### The University of Tokyo

Apr. 2023 – Mar. 2025

M.E.S. Student in Human & Engineered Environmental Studies

- Thesis: Switching-based Multi-modal SLAM for Extreme and Degraded Environments

### Osaka University

Apr. 2017 – Mar. 2023

B.E. in Mechanical Engineering

(Military Service included)

- Thesis: LiDAR-visual SLAM for Online Mapping of Unpaved Road Surface

## PUBLICATIONS

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- [1] **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)* (in revision)
- [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* (under review)
- [3] **TC-LTIO: Tightly-coupled LiDAR Thermal Inertial Odometry for LiDAR and Visual Odometry Degraded Environments - *Best Paper Award* (0.25%)**  
Junwoon Lee, Taisei Ando, Mitsuru Shinozaki, Toshihiro Kitajima, Qi An, Atsushi Yamashita  
*International Conference on Control, Automation and Systems (ICCAS), 2024.* [\[Link\]](#)
- [4] **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.* [\[Link\]](#)
- [5] **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 ICRA40.* [\[Link\]](#)
- [6] **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.* [\[Link\]](#)

## HONORS AND AWARDS

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### Best Paper Award

Oct. 2024

- Top 1 of 400 submitted papers, ICCAS '24 (0.25%)

### IEEE RAS Travel Grant

Sep. 2024

- Travel support for ICRA@40, \$2,000 USD

### Rotary Yoneyama Memorial Foundation Scholarship

Apr. 2023 – Mar. 2025

- Full scholarship for academic excellence, \$30,000+ USD

### Korea-Japan Joint Government Scholarship

Apr. 2017 – Mar. 2023

- Government-sponsored full scholarship, \$75,000+ USD

## RESEARCH EXPERIENCE

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**Research Assistant**, The University of Tokyo  
Real World Robot Informatics Lab.

*Apr. 2023 – Mar. 2025*

- Developed a multi-modal SLAM system for complex scenes [1, 4].
- Developed a self-supervised point tracker for thermal inertial odometry [3].

**Research Assistant**, Osaka University  
Komatsu MIRAI Construction Equipment Cooperative Research Center

*Apr. 2022 – Mar. 2023*

- Suggested an intensity-weighted point cloud registration [6].
- Developed a mapping system for an unpaved road surface.

## PATENT

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1. Kaoru Adachi, Masamitsu Kurisu, Junwoon Lee, “Terrain Detection System and Method,” *Japanese Patent 2023-105215*, Filed on June 27, 2023.

## SERVICES

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**Academic Reviewer**

*2024*

- IEEE RA-L, IEEE T-ASE, ICRA, ICCAS

**Special Lecturer**, Rotary International

*Apr. 2023 – Mar. 2025*

- Lectured on the introduction to mobile robotics and artificial intelligence

**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

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Research Skills

- Program Languages : C/C++, Python
- Professional : ROS1, ROS2, GTSAM, Ceres Solver, OpenCV, PyTorch, TensorRT
- Etc. : Git, Docker, Open3D, OpenMP, SolidWorks, Blender, LaTeX

Languages

- English (Professional)
- Japanese (Professional)
- Korean (Native)

## REFERENCES

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**Dr. Atsushi Yamashita**

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**Dr. Qi An**

Associate Professor, The University of Tokyo  
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**Dr. Ren Komatsu**

Engineer, Mujin, Inc. (Former Professor in UTokyo)  
komatsu@robot.t.u-tokyo.ac.jp

**Dr. Kazuya Kuriyama**

Project Professor, Osaka University  
kazuya\_kuriyama@global.komatsu