# HOJUNE KIM

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## RESEARCH INTERESTS

**Safe Autonomy**: State Estimation, Safety-Critical Control, Multi-agent Systems
**Optimization**: Graph Optimization, Distributed Optimization, Recursive Estimation
**Applications**: System Design, Experimental Validation (Worked on Car / Quadcopter / Quadruped Robot / Humanoid)

## EDUCATION

**Seoul National University (SNU)** — Mar. 2019 – Present
B.S. in Aerospace Engineering, summa cum laude (expected) — *Seoul, South Korea*
- GPA: **4.00/4.00(Major)**, 3.91/4.00(Overall) - Kwanjeong Scholar — *\* 1.5-year absence from military service*

**ETH Zürich** — Feb. 2024 – Aug. 2024
Visiting Student in Mechanical Engineering — *Zurich, Switzerland*

## PUBLICATION

1. 2D Ego-Motion with Yaw Estimation using Only mmWave Radars via Two-Way weighted ICP
   **Hojune Kim**, Hyesu Jang, Ayoung Kim.
   *IEEE ICRA 2024 Workshop on Radar in Robotics, Yokohama, Japan, 2024. (Oral)*

## WORK EXPERIENCE

**German Aerospace Center (DLR)** — Sept. 2024 – Present
*Humanoid TORO team, Guest Researcher*, Advisor: Prof. Jinoh Lee — *Munich, Germany*
- Developing Active Learning for Semantic Mapping in Humanoid Navigation via Kinematic-Aided Visual Odometry

## RESEARCH EXPERIENCE

**Vision for Robotics Lab** | ETH Zürich — Feb. 2024 – Aug. 2024
*Semester Project Intern*, Advisor: Prof. Margarita Chli — *Zurich, Switzerland*
- Improved the open-source package of continuous-time SLAM via distributed optimization

**Robust Perception and Mobile Robotics Lab** | SNU — Jan. 2023 – Mar. 2024
*Undergraduate Researcher*, Advisor: Prof. Ayoung Kim — *Seoul, South Korea*
- Devised robust mmWave radar 2D odometry and implemented direct SLAM by fusing infrared camera and LiDAR
- Designed handheld sensor system development and held camera-LiDAR-radar calibration via graph optimization

**Satellite Geophysics Lab** | SNU — Aug. 2020 – May. 2021
*Undergraduate Researcher*, Advisor: Prof. Duk-jin Kim — *Seoul, South Korea*
- Developed real-time flood monitoring system via semantic segmentation using satellite SAR image

## HONORS & AWARDS

Awards:

**1st Place, IEEE-RAS Humanoids 2024 Competition Adult-sized Biped Free Walk** — Nov. 2024

**Minister of National Defense Award, Minister of Defense Startup Competition**, $5,000 funding — Dec. 2022
*Ministry of National Defense, Republic of Korea*

**Gold Prize, International Student Car Competition Autonomous Driving Sector** — Oct. 2021
*Ministry of Land, Infrastructure and Transport, Republic of Korea*

**Final Selected, Star-Exploration Startup Support Project**, $9,000 funding — Feb. 2021
*Korea Aerospace Research Institute(KARI)*

Honors:

**Korea-Germany Junior Research Fellowship Support**, $9,000 | Max Planck POSTECH/KOREA — Sept. 2024
- Full coverage of expenses during in DLR as a guest researcher

**Global Leadership Program Scholarship** | SNU — Feb. 2024

**Certificate of Appreciation (AI Tech Play)** | Dean, College of Engineering in SNU          Jun. 2021

**Kwanjeong Undergraduate Scholarship**, $17,000 | Kwanjeong Educational Foundation          Mar. 2021
- Full coverage of junior and senior tuition and stipend

**Undergraduate Research Internship Scholarship** | SNU          Mar. 2021

**Merit-based Scholarship** | SNU          Fall 2019, Spring & Fall 2020

## SELECTED GRADUATE COURSE PROJECTS

**Crowd Navigation for Quadruped robot**, Perception and Learning for Robotics | ETH Zürich          Spring 2024
- Developed teacher-student reinforcement learning policies with LiDAR data using Proximal Policy Optimization

**Fault Tolerant Conrol of Quadrotor**, Decision Making for Autonomous Aerospace Systems | SNU          Spring 2023
- Designed Feedback Linearization, Sliding Mode and Backstepping Controllers on faulty condition

**Analysis of LiDAR-Inertial SLAM**, Sensor-Based Spatial Intelligence | SNU          Fall 2023
- Analyzed and evaluated the LiDAR-inertial SLAM(Fast-LIO2, Faster-LIO) in urban long-term dataset

## MEMBERSHIPS & ACTIVITIES

**SNU Tomorrow's Engineers Membership(STEM)** | SNU          Sept. 2023 – Present
- Served as Mentor : Organized a mentoring seminar for over 150 undergraduate engineering students
- Served as Speaker : Held academic talks for 'LiDAR vs Radar in perception' and 'Start-up business model building'

**Bulnabi**, Autonomous Flight Drone Club | SNU          Feb. 2023 – Jan. 2024
- Developed auto-landing algorithm with path planning via bézier curve for continuous trajectory and control
- Verified in Gazebo simulation and on-board flight tests; finalizing technology transfer to the company

**Army Aviation Operations Command** | Republic of Korea Army          Aug. 2021 – Feb. 2023
*CH-47D Helicopter Flight Attendant & Maintenance Mechanics*
- Produced CH-47D maintenance and put on tactical missions including forest fire extinguish for 60+ hours flight

**SNU ZERO**, Autonomous Driving Car Club | SNU          Jan. 2021 – Oct. 2021
- Performed Extended-Kalman Filter with IMU, GPS and line detection for robust localization
- Developed dynamic obstacle avoidance by clustering LiDAR and combining vision detection

**AI Tech Play(KAIT Foundation)**, Non-Profit Organization for AI education          Feb. 2021 – Aug. 2021
*Co-organizer & Hardware Team Leader*
- Served as Organizer : Hosted nationwide AI camp and autonomous race car competition for over 200 students
- Served as Hardware Leader : Developed novel autonomous race car system for education and competition

**Science Volunteer Corps** | SNU          Jul. 2019
- Held science experiment and mentoring camp for middle and high school students in Gochang

## TEACHING EXPERIENCES

**Teaching Assistant**
(M3228.001300) Basic of Robot Programming and Mechanical System Design | SNU          Spring 2023
- Taught machine learning algorithms in Python and developed propeller competition kits for over 100 students

**Teaching Tutor**
(033.014) Engineering Mathematics 1 | SNU          Fall 2023
(M2795.002100) Dynamics | SNU          Fall 2023

## PATENT

1. Parking Location Tracking System, *KR102291377B1*, 2021
   **Hojune Kim**, Taekin Kim, Jinhwan Na, Jaeyoung Lee, Seunghwan Jeong

## SKILLS

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|---|---|
| **Programming**: C/C++, Python, Matlab, Javascript | **Sensors**: Radar, LiDAR, RGB-d/Thermal camera |
| **Frameworks**: ROS, Isaac Sim, Gazebo, Ceres, Pytorch | **Manufactures**: SolidWorks, 3D printer, Laser cutter |