# ChanHui Jung

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## Summary

Robotics engineer with three years of industry experience developing and deploying autonomous robot systems for warehouse automation and agricultural robotics. Experience spans multi-agent path finding, multi-robot navigation and fleet coordination, autonomous navigation, and ROS 2 architecture, with two journal papers on MAPF and upstream contributions to Navigation2. Currently an M.S. Robotics student at the University of Michigan.

## Education

**University of Michigan** **Aug 2026 – Present**

M.S. in Robotics Ann Arbor, MI, United States

*Coursework (in progress):* ROB 501 Mathematics for Robotics, ROB 550 Robotic Systems Laboratory

**Hanyang University ERICA** **Mar 2016 – Feb 2023**

B.S. in Robotics Engineering | GPA: 3.39 / 4.0 Ansan, Republic of Korea

*Coursework:* Automatic Control, Design & Analysis of Dynamic Systems, Engineering Mathematics I–II, Numerical Computation, Mathematical Statistics, Machine Learning

## Experience

### Metafarmers Co. site

**Sep 2025 – Apr 2026**

**Robotics Software Team Lead** Seoul, Republic of Korea

*AI and robotics for sustainable agriculture, automating repetitive skilled farm work.*

- Built and led a 7-person Robotics AI team, defining team structure, technical roadmap, and system-level architecture.
- Owned the robotics stack behind **Omni Farmer** end to end, taking it from architecture to production with 2 robots operating in unstructured smart-farm environments and infrastructure built to extend to larger fleets.

### Floatic Co.

**Jul 2022 – Sep 2024**

**Robotics Software & Platform Engineer** Seoul, Republic of Korea

*Warehouse automation: autonomous mobile robots and a real-time fleet management platform.*

- Architected the robot software system behind **Flody**, from the foundational structure of the robotics stack to the middleware separating robot software from backend services.
- Designed and deployed multi-robot navigation across 3 warehouse sites — 2 partner-operated production facilities and 1 internal testbed.

## Research

**Multi-Agent Path Finding in Congested Environments** **2024 – 2025**

Independent research collaboration with AIRO Lab, Hanyang University ERICA

- Studied conflict-based search with continuous time and agent merging/splitting as routes to keeping multi-agent path finding tractable as congestion rises.
- Reviewed experimental design, data analysis, and algorithmic consistency across both studies, and proposed follow-up directions.

**AIRO Lab, Hanyang University ERICA** **2019 – 2021**

Undergraduate Student Researcher | Advisor: Prof. Min-Sung Kang

Vision research for the Item Assembly AI Robot Challenge; TA and instructor for undergraduate robotics courses.

## Publications

*"A Study on Improving Multi-agent Path Finding in Congested Environments Using Agent Merging and Splitting"*, *Journal of the Korean Society for Precision Engineering*, co-author, vol. 43, no. 2, pp. 123–131, 2026.

*"A Study on Improving Conflict Based Search with Continuous Time Using Space Utilization"*, *Journal of the Korean Society for Precision Engineering*, co-author, vol. 43, no. 4, pp. 317–324, 2026.

## Selected Projects

**Omni Farmer** **2025 – 2026**

*Autonomous Multi-Robot System for Agricultural Operations.* **Metafarmers Co.**

- Defined the ROS 2 software architecture spanning embedded control, perception, and navigation for a venture-funded smart-farm deployment.
- Designed a UART packet protocol and the embedded development platform bridging low-level motor and sensor boards with the ROS 2 stack, implementing wheel-speed PID control on the motor controllers.
- Built the perception stack: multi-object tracking, 3D reconstruction through colored voxelization, and long-term SLAM fusing 3D LiDAR odometry with 2D mapping (FAST-LIO + Cartographer), holding stable localization across a 100 × 200 m site.
- Delivered autonomous navigation on ROS 2 Nav2 and migrated task execution to a C++ behavior tree.

**Flody** demo **2022 – 2024**

*Autonomous Mobile Robot for Warehouse Logistics.* **Floatic Co.**

- Built a DDS-style middleware layer abstracting robot–backend communication behind one interface, letting Kafka and AWS IoT be swapped without touching robot software.
- Developed the multi-robot navigation system on ROS 2 Nav2 — cost functions for custom costmap layers, a Kalman filter correcting wheel odometry, and planner/controller tuning for reliable motion in dense warehouse aisles.
- Implemented behavior-tree task execution backed by an edge database server that tracked each robot's allocated tasks.
- Implemented peer-to-peer sharing of robot poses and planned paths over a site-local Redis pub/sub bus, injecting neighboring robots into each robot's local costmap for decentralized collision and congestion avoidance — cutting fleet deadlocks from 3–4 per hour to roughly one per two hours.
- Operated a fleet of 10 autonomous robots over 300+ hours of live warehouse operation, with fleet management software integrating task allocation, routing, and monitoring.

**Item Assembly AI Robot Challenge** press **2020**

*Government-Funded Multi-Lab Project for Furniture Assembly Automation.* **AIRO Lab**

- Implemented a pose estimation pipeline for screw insertion using stereo triangulation and camera calibration, reaching millimeter-level insertion accuracy.

## Open Source Contributions

**ROS 2 & Navigation2** **2022 – 2023**

- Proposed the plugin-oriented architecture for Navigation2's Behavior Tree Navigator; the lead maintainer adopted the design and reimplemented it upstream, where it now ships as `nav2_core::NavigatorBase`. [#3068]
- Merged fixes to the MPPI controller build and to launch-file YAML rewriting. [#3927] [#3141]

## Skills

- **Languages** C++, C, Python, MATLAB / Simulink, Java, Kotlin, SQL
- **Robotics** ROS 2, ROS 1, Nav2, Behavior Trees, Gazebo, Isaac Sim, FAST-LIO, Cartographer, PyTorch
- **Platform & Data** Kafka, AWS IoT, Redis, MySQL, Docker, Kubernetes, AWS
- **Tools** Qt, PyQt, Arduino, SolidWorks

## Awards & Honors

- National Capstone Design Competition, Special Prize, South Korea **2022**
- Creative Engineering Design Competition, Silver Award **2021**