# Min Kyu Kim

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## Education

**University of Michigan** Aug. 2024 – May. 2026
*M.S. in Robotics* *GPA: 4.0/4.0*

**University of Illinois at Urbana-Champaign** Aug. 2020 – May 2024
*B.S. in Mechanical Engineering, Minor in Computer Science* *GPA: 3.93/4.0*

## Experience

**Graduate Student Researcher (Industry-Sponsored)** Sep. 2025 – Present
*CURLY · Honda Research Institute* *Ann Arbor, MI*
- Designed a multi-sensor perception stack for state estimation and mapping on a field robotics platform
- Developed object-level localization to support downstream planning and control
- Deployed real-time fine-tuned semantic segmentation on project hardware
- Executed cross-sensor calibration and time synchronization for robust multi-modal fusion

**Graduate Research Assistant** Jul. 2025 – Present
*Computational Autonomy and Robotics Laboratory* *Ann Arbor, MI*
- Developed Pose-graph based Semantic Object SLAM using multi-sensor fusion (LiDAR, camera, IMU, GPS)
- Implemented Kalman Filter and Mahalanobis gating algorithm for robust object tracking
- Fine-tuned YOLOv11-seg with SAM 2 masks for real-time instance segmentation on target hardware
- Validation and testing in Gazebo Simulation and field trials on physical robot

**Robotics System Engineer Intern** Jan. 2025 – Jun. 2025
*Amazon Robotics* *North Reading, MA*
- Led team of 25+ staff on $10M retrofit project to deploy robotics systems to fully automate outbound dock
- Executed robot deployment test (QA, sensor validation, performance testing) across 3+ Amazon warehouses
- Collected data and summarized failures to unblock operations and inform follow-up tests with engineering teams
- Authored 3+ technical documents to standardize deployment, scaling from beta test to all Amazon sites

**Graduate Research Assistant** Sep. 2024 – Dec. 2024
*Bio-Inspired Robotics and Dynamical Systems Lab* *Ann Arbor, MI*
- Integrated IR, IMU, and time-of-flight sensors to collect data for onboard pose estimation
- Applied Radon Transform and Gaussian Blur to detect and isolate staircase edges from raw camera images
- Developed OpenCV pipeline to map detected edges to image coordinates and overlay them for visual verification

**Mechanical Engineering Intern** Aug. 2023 – Jan. 2024
*Hinetics LLC* *Champaign, IL*
- Designed and analyzed Kevlar spoke mechanism in Ansys to ensure structural integrity under cryogenic conditions
- Built experimental setup using RTDs and load cells to test Kevlar's thermal conductivity under mechanical tension
- Designed and fabricated assembly setup, improving motor build efficiency and product quality

## Projects

**Vision-Guided Robot Arm Control with Intel RealSense** | *ROS2, Python, OpenCV* 2025
- Developed autonomous motion control functionality for a 5-DOF robot using ROS2 in Python
- Calibrated camera extrinsic and intrinsic parameters and performed depth/block detection with OpenCV
- Implemented forward and inverse kinematics; calculated waypoint distances to optimize motion speed

**MBot Autonomous Navigation / SLAM & A*** | *ROS2, C++, SLAM, LIDAR* 2025
- Implemented PID wheel speed controller using gyrodometry and tuned gains for stable motion
- Developed SLAM pipeline with Monte Carlo Localization and LIDAR-based occupancy grid mapping in C++
- Executed A* path planning and frontier-based exploration for autonomous navigation

## Technical Skills

**Hardware**: SolidWorks, Autodesk Inventor, Ansys, FEA, CAD, 3D Printing, Arduino, LabVIEW, GD&T, Sensors (IMU, LiDAR, Camera), Prototyping, Testing/Validation
**Software**: Python, C++, ROS2, SLAM, OpenCV, MATLAB/Simulink, SQL, Linux, AWS (EC2, S3, Lambda), Docker, Git, Gazebo, GTSAM, PyTorch, Control (PID, EKF, State Estimation)