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 Research Assistant Jul. 2025 – Present
Computational Autonomy and Robotics Laboratory *Ann Arbor, MI*
- Developed 6D pose estimation system for ASV docking using multi-sensor fusion (LiDAR, camera, IMU, GPS)
- Built ROS2 + GTSAM backend integrating odometry, landmark, and anchor factors for pose optimization
- Developed semantic SLAM combining Grounded-SAM 2 and LiDAR for object-level mapping
- Designed Mahalanobis-based data association for robust maritime object tracking
- Validated algorithms in VRX Gazebo simulation and real field trials on the WAM-V platform

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
- Conducted robot quality checks, sensor validation, and performance testing across 3+ Amazon warehouses
- Authored 3+ technical documents to standardize deployment, scaling from beta to all Amazon sites
- Built Slack app with AWS to automate deployment communication and streamline daily operations

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

Undergraduate Research Assistant Jan. 2023 – May 2024
Kinetic Intelligence Machines Lab *Champaign, IL*
- Collected motor and sensor data using ROS in C++, streamlining multi-joint robot data acquisition workflows
- Processed OptiTrack motion capture data in MATLAB to improve visualization and analysis
- Debugged pose extraction pipeline for rigid body tracking, enhancing full-system integration and reliability

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, Linux, AWS (EC2, S3, Lambda), Docker, Git, Gazebo, GTSAM, PyTorch, Control (PID, EKF, State Estimation)