

# JINGKUN LIU

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## EDUCATION

### Northwestern University

Sept 2023 - Dec 2024

*Master of Science in Robotics*

*Evanston, IL*

Relevant Courses: Embedded System for Robotics, Robotic Manipulation, Sensing Navigation and Machine Learning for Robotics, Mechatronics, Active Learning for Robotics, Deep Reinforcement Learning.

### Rose-Hulman Institute of Technology

Sept 2018 - May 2022

*Double Major with Bachelor of Science in Mechanical Engineering and Computer Science*

*Terre Haute, IN*

Minor in Disiplinary Robotics and Dynamics and Control Systems.

Awards: Magna Cum Laude, Top Project in Computer Architecture, Best Sophomore Mechanical Engineering Student, Dean's List for 11 consecutive quarters.

## TECHNICAL SKILLS

**Languages:** C, C++, Python, Java, Shell, C#, Lisp, SQL, JavaScript, TypeScript, HTML, CSS, Swift, Kotlin

**Robotics:** ROS/ROS2, SLAM, EKF, MoveIt/MoveIt2, Nav/Nav2, OpenCV, OCR, YOLO, Dynamics

**Mechanical:** SOLIDWORKS, ANSYS, Simulink, LoggerPro, LabView, KiCAD, Machine Shop, PCB Design

**Frameworks/Platforms:** Linux, Git, Docker, Shell, REST, React, SpringBoot, SQL, MATLAB, PIC32, CMake, Unit Testing, Forth, YAML, XML, LaTeX, Firebase, Networking, .NET, React, MS Office, Visual Studio, Xilinx

## EXPERIENCE

### MitoAI, Inc. (Internship)

June 2024 - September 2024

*Robotic Software Engineer Intern*

*Pittsburgh, PA*

- Lead the development of the entire software system of a autonomous robotic system for cell culture from scratch.
- Designed and implemented the C++ robotic embedded software system on ROS2 platform
- Architected a full-stack web application using React.js, Java and MySQL for teleoperation and user interaction.
- Deployed a fine-tuned YOLOv8 vision model for flask detection and segmentation with 90% of accuracy.
- Integrated the embedded C++ motor control software to ensure precise motion control with less than 2% error.
- Implemented teleportation of robot over web application through Rest API including motion control, live streaming.

### DEKA Research and Development, Corp. (Full-time)

July 2022 - July 2023

*Robotic Embedded Software Engineer*

*Manchester, NH*

- Developed C++ software in ROS for autonomous-driving delivery robot.
- Implemented real-time data streaming and hardware monitoring over an internet connection.
- Engineered novel firmware in C and C++ for custom multi-channel cellular modem.
- Configured network on robot over VLAN for bonding multiple cellular network channels.

### Breast Cancer Early Detection (Research)

June 2021 - September 2021

*Research Assistant*

*Terre Haute, IN*

- Engineered a 4-DOF robotic arm for accurate tumor location detection through force and displacement data.
- Implemented a C++ embedded software for low-level control of the robotic arm, enabling precise manipulation.
- Developed a MATLAB GUI software for high-level control of the arm, enabling user-interaction and data-collection.

## PROJECTS

### Polyglot Bot | ROS2, Emika Franka Panda, Python, MoveIt, YOLOv8, OCR

November 2023

- Developed Python on ROS2 for Franka Panda, enabling real-time text translation and whiteboard writing.
- Applied OCR and YOLOv8 for text and human detection, facilitating interactive text translation.
- Integrated MoveIt! with AprilTags for exact trajectory planning and whiteboard detection, ensuring robot safety.

### Extended Kalman Filter based SLAM on Turtlebot3 | ROS2, C++, SLAM, Extended Kalman Filter

March 2024

- Developed C++ SLAM software on ROS2 for Turtlebot3's autonomous localization in dynamic settings.
- Implemented kinematics and odometry models for Turtlebot3, offering precise location and orientation estimates.
- Integrated both Unsupervised and Supervised Learning models for effective data clustering and landmark detection from 2D LiDAR inputs, facilitating precise landmark positioning recognition.

### Autonomous Pick-and-Place using Sawback Mobile Manipulator | ROS, C++, Python,

March 2024

- Deployed C++ and Python on ROS for Ridgeback, Sawyer and PincherX 100 arm's pick-and-place automation.
- Applied MoveIt and ROS Navigation for efficient motion planning and obstacle-free target access.
- Configured network for robust communication among three robots and a PC, ensuring smooth connectivity.