Robert Zhu

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Education

Northwestern University: MS in Robotics — Sept 2025 – Present
- Robot Kinematics, Perception & ML, Physics-based simulation

McMaster University: BE in Mechatronics — Sept 2018 – Apr 2023
- Microcontrollers, Digital/Analog Electronics, Embedded Systems, PLC, C++ Firmware

Experience

AMD: System Design Engineer (Toronto, ON) — Mar 2025 – Sept 2025
- Facilitated virtual environment testing by automating validation of GPU virtualization with Python and Linux
- Implemented virtualization-support features in GPU guest and management drivers for low-level driver development
- Diagnosed GPU virtualization issues at kernel and system levels, analyzing driver behavior, and performance bottlenecks

Bell Canada: Software Developer (Toronto, ON) — Apr 2023 – June 2024
- Powered a robust order-management system with a backend system developed using Java Spring Framework APIs
- Enabled rapid investigation and management of high-volume daily order data, through automating order details in a UI
- Authored a catalog redesign adopted by the VP of Network Technology to reduce duplicates and improve search quality

Mold-Masters: Automation Engineer (Georgetown, ON) — May 2021 – Sept 2022
- Automated generation of custom hot-runner CAD models in Creo in C++, reducing design time by several hours per model
- Modularized a monolithic C++/Creo automation tool into separate independent tools to improve maintainability

Projects

Sign Language Translator: (Python, OpenCV, TensorFlow) — Sept 2023 – Apr 2024
- Created a real-time OpenCV and TensorFlow system to recognize sign language and translate 100+ signs into English
- Designed a sensorized glove with IMUs for orientation tracking and flex/joint sensors for finger-pose estimation
- Built a retrainable Python UI for adding samples and showing live English translations for non-signers.

Robotic Pick-and-Place: (YOLO, Python, MoveIt) — Oct 2025 – Dec 2025
- Developed a Franka-based pick-and-place pipeline integrating YOLO-OBB perception and ROS 2 MoveIt planning
- Implemented depth, pose, and planning modules to correctly orient objects and place them into matching outlines
- Generated a custom grasp model to predict stable grasp points and optimize robotic pick performance

Pacemaker Simulation: (Rust, Python, MATLAB/Simulink) — Jan 2022 – Apr 2023
- Implemented Python control logic on an ARM development board, modeling heart rhythms and pacing modes
- Designed state-machine behavior in Simulink to detect arrhythmias and trigger pacing responses in different modes
- Generated a Rust interface for doctors and patients to configure parameters and securely log clinical data

Core Competencies

Programming Languages: C++, Python, C, Rust, CMake, MATLAB/Simulink, Bash, SQL, Verilog

Technical Skills:
- *Robotics & Control:* ROS 2, Robot Kinematics, Control Systems, Embedded/RT Systems, ARM
- *Simulation & Planning:* Gazebo, MoveIt, SLAM
- *Perception & ML:* Computer Vision, PyTorch, TensorFlow, ML
- *Software & Systems:* Linux, Git/Gerrit, Docker, Virtualization, Backend APIs