

# Jadyn Zeng

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## EDUCATION

### University of Toronto

*B.A.Sc. Robotics Engineering (Engineering Science)*

*Sept. 2024 – May 2029 (Expected)*

- Program requires **12-16 month co-op** to build professional skills.
- Relevant courses: Digital and Computer Systems | Control Systems | Electronics for Robotics | Data Structures and Analysis | Mathematics for Robotics | Fundamentals of Electric Circuits

## WORK EXPERIENCES

### Max Planck Institute for the Structures and Dynamics of Matter

May 2026 – July 2026

*Engineer Research Intern*

*Hamburg, Germany*

- Designed and implemented closed-loop motion and measurement synchronization for automated raster scanning across grids of up to 121 points, with 10 position and intensity measurement acquisitions per second.
- Automated precision positioning and oscilloscope acquisition with Python/C++ automation software and hardware APIs, for motion control, synchronized data acquisition, and experiment configuration.
- Implemented event-driven synchronization across 5 hardware subsystems and a SAMD21 microcontroller using I<sup>2</sup>C, USB, and external triggers.
- Diagnosed hardware-software integration issues using oscilloscopes and multimeters.
- 3D Modeled (Fusion360 and AutoCad) and machined a custom modular mount to profile at 2+ positions.

### The Maikawa Lab at the University of Toronto

May 2025 – August 2025

*Undergraduate Intern*

*Toronto, ON*

- Designed (Solidworks), machined, and wired three custom electromechanical tools, including the Opentrons pipette, a motor-powered mechanical fragmentation tool, and a photo-polymerization actuator syringe pump.
- Designed an end-to-end lab automation platform that synthesizes inflammation-targeting polymer microgels.
- Adapted and integrated open-source Science Jubilee APIs to perform the full synthesis workflow, optimizing experimentation through-put and improving experimental repeatability.

### Sunnybrook Research Institute

July 2023 – Sept 2023

*Engineering and Technology Intern*

*North York, ON*

- Performed imaging data analyses and prototype testing to identify treatment associated patterns.
- Recognized an unexpected pattern in the imaging processing and identified the source.

## PROJECTS

### Automated Wheelchair Assistance | *Python, MuJoCo, OpenCV/ArUco, faster-whisper*

Sept 2026

- Built a two-wheeled caregiver robot simulation in MuJoCo with autonomous apartment navigation and wheelchair towing, commanded with speech and a Meta Quest interface for VR teleoperation.
- Developed camera-based mapping and navigation using RGB images, wheel encoders, and IMU data, with persistent memory of obstacles, landmarks, and routes.
- Implemented ArUco markers to identify destinations and support navigation to learned rooms.

### Forest Fire Smoke Monitoring and Notice | *Fusion 360, AutoCAD, Raspberry Pi*

Jan 2026 - Apr 2026

- Collaborated in a six-person team to develop a wildfire monitoring and evacuation notice system for remote communities by combining distributed sensor nodes, LoRaWAN communication, and tiered community alerts.
- Led the design and fabrication of the sensor-enclosure using Fusion 360 and AutoCAD.
- Electrical subsystem prototyped with Raspberry Pi and BME680 sensors, tested accuracy of  $\pm 5\%$  ppm,  $\pm 0.25^\circ\text{C}$ .

## TECHNICAL SKILLS

**Programming:** Python, C/C++, MATLAB, JavaScript, R; object-oriented programming, API development/integration

**Embedded Systems:** SAMD21, Arduino, Raspberry Pi, interrupts, timers, ADC/DAC, I<sup>2</sup>C, digital logic, sensor and actuator integration

**Robotics & Automation:** ROS 2, MuJoCo, Gazebo, RViz, OpenCV, ArUco marker detection, optical character recognition (OCR), RGB camera processing

**Tools:** Git, GitHub, Linux, CMake

**Mechanical Design:** Solidworks, Fusion 360, OnShape, AutoCAD

**Libraries & Frameworks :** NumPy, pandas, Matplotlib, OpenCV, ROS 2, PicoSDK, TinyUSB