CAMRON SABAHI

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SKILLS

Languages	Python, C++, C, MATLAB
Libraries/Frameworks	Brax, Jax, ROS/ROS2, NumPy, SciPy, MuJoCo, MatPlotLib, AMBF, libfranka
Technologies	Git/Github, Bash, Docker, Linux, Basler Cameras, Franka Research 3
Tools	SolidWorks, AutoCAD, SimulationX, 3D Printing

EDUCATION

BASc Honors Mechatronics Engineering | GPA: 3.93 | University of Waterloo **Sep 2022 - Apr 2027**
- Systems Models (MATLAB, SimX), Actuators/Power Electronics, RTOS, Sensors, Linear Systems/Signals, DSA (C++)

National University of Singapore (Exchange Semester) **Aug – Dec 2025**
- Bachelor of Applied Science, Mechatronics Engineering

EXPERIENCE

Robotics Research Engineering Intern | SickKids | *ROS, Python, C++, Jax, NumPy* **Apr 2025 – Aug 2025**
- Developed low-level controllers and UI, for a **collaborative surgical robot** designed for Craniosynostosis operations, comprised of a custom tendon continuum robot attached to a Franka Research 3, in total 9 Degree-of-Freedom system
- Implemented a **force-guided human-robot interaction** controller for collaborative surgical procedures, using **ROS** and **C++**, based on a 2nd order system model, with force filter/smoothing, and virtual fixtures achieving **<1mm** error
- Developed custom controls suite and user interface for **teleoperation** in cartesian level, joint level movement, and skull cutting, operating in either simulation, real hardware, or digital twin
- Shared 1st author of paper submission to **ICRA 2026**, titled: Force Control and Simulator with Follow-the-Leader Motion for Surgical Bone-Cutting Robot

Robotics Engineering Intern | BH Frontier | *ROS2, Docker, Linux, EtherCAT* **Sep 2024 – Dec 2024**
- Developed an autonomous mobile farming robot to zap weeds with a custom weeding system and controls software
- Detected collisions using broad-phase filtering in C++ to feed into torque-PID controlled servos through EtherCAT
- Increased position tracking resolution to **10mm** by implementing **Visual-Inertial Odometry** with ROS2

Optical Systems Engineering Intern | Musashi AI | *Bash, Solidworks, Basler* **Jan 2024 – Apr 2024**
- Implemented feature-tracked focus stacking algorithm with **OpenCV,** reducing scan time by **87.5%** of **150µm** defects
- Developed **multi-threaded** Python programs to reduce data collection time by **43%** with camera and motor APIs
- Redesigned and upgraded vision systems to increase defect detection by **29%** through Photometric Stereo imaging

R&D Engineering Intern | Bend All Automotive ULC | *GD&T* **May 2024 – Aug 2023**
- Led the deployment of hydrogen fuel lines in material selection, design testing, and **prototype manufacturing**
- Designed and **3D printed** models to create visual representations of AC product assemblies for R&D feasibility
- Designed experimental tooling for coupling integrity step blocks using **SolidWorks**, decreasing cycle time by **17%**

PROJECTS

Co-Founder | UW RoboSoccer | *Python, MuJoCo, Brax, Circuit Design* **Aug 2024 – Present**
- Co-founded team building autonomous bipeds, for RoboCup Competition, to compete in 4-on-4 soccer matches
- Utilizing Reinforcement Learning to develop complex behaviour skill policies such as kicking and running with **MuJoCo** and **Brax**, along with a **Zero-Moment Point** classical controls stabilizer
- Designed electrical system prototype for power management, integrating servos, RaspberryPi, and various sensors

Embedded Software Engineer | Waterloo Aerial Robotics | *C, C++* **Jan 2024 – Aug 2024**
- Improved flight controller stabilization with a **PID controller**, converting angles and yaw rates to motor percentage
- Developed firmware to convert **CAN** signal from ArduPilot to **PWM** on STM32 board to control servo motors