CAMRON SABAHI

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SKILLS

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

EDUCATION

BASc Mechatronics Engineering | GPA: 3.93 | University of Waterloo **Sep 2022 – Apr 2027**
- Courses: Systems Models, Actuators/Power Electronics, RTOS, Sensors, Systems/Signals, DSA (C++), Feedback Control

National University of Singapore (Exchange Semester) **Aug 2025 – Dec 2025**

EXPERIENCE

Robotics Research Engineering Intern | SickKids | *ROS, Python, C++, Jax, NumPy* **Apr 2025 – Aug 2025**
- Developed controls software for collaborative surgical co-bot, implementing an admittance controller with force filtering and virtual-fixture constraints for safe physical Human-Robot Interaction in sim, real, and digital twin modes
- Achieved position error of **+- 0.5mm** in skull cutting using a 2nd order admittance controller in **C++** and **ROS,** with force filter/smoothing and advanced virtual fixture constraint for **collaborative motion** and **teleoperation** modes
- Modeled a custom tendon-driven continuum robot + Franka Research 3 joint system, and implemented an augmented-Jacobian **Follow-The-Leader** inverse kinematics to coordinate 9-DoF motion
- Shared 1st author of Force Control and Simulator with Follow-The-Leader motion for Surgical Bone-Cutting Robot, submitted to **ICRA 2026**, available publicly Jan 2026

Robotics Engineering Intern | BH Frontier | *ROS2, Docker, Linux, EtherCAT* **Sep 2024 – Dec 2024**
- Developed an autonomous mobile farming robot to electrocute weeds with a novel mechanism and controls software
- Improved movement speed by **3km/h** (from 1 to 4km/h) using a broad-phase filtering algorithm to detect and electrocute weeds operating at **53µs cycles** to feed into torque-PID controlled servos through **EtherCAT**
- Increased position tracking resolution by **150%** by implemented **Visual-Inertial Odometry** with **Python** and **ROS2**

Optical Systems Engineering Intern | Musashi AI | *Bash, Solidworks, Basler* **Jan 2024 – Apr 2024**
- Designed systems for AI defect detection in factory parts, including mechanical design, data capturing, and processing
- Cut scan time by **87.5%** for **150µm** defects via **OpenCV** feature-tracked focus stacking algorithm
- Reduced data-collection time by **43%** through **multithreaded** camera/motor API pipelines
- Developed prototype system increasing detection of scratches **<100µm** by **29%** through Photometric Stereo imaging

R&D Engineering Intern | Bend All Automotive ULC | *SolidWorks, GD&T* **May 2023 – Aug 2023**
- Led the deployment of hydrogen fuel lines in **material selection**, **test & validation**, and **prototype manufacturing**
- Designed **3D printed** models to create visual representations of AC product assemblies for R&D feasibility
- Reduced experimental cycle time by **17%/1hr** by designing tools for coupling integrity step blocks using **SolidWorks**

PROJECTS

Co-Founder | UW RoboSoccer | *Python, MuJoCo, Brax, Circuit Design* **Aug 2024 – Present**
- Co-founded team and co-led controls subteam to build autonomous bipeds, to play in RoboCup's 4v4 soccer matches
- Utilized 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++* **Feb 2024 – May 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