CAMRON SABAHI

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SKILLS

Languages	Python, C++, C, MATLAB
Libraries and Frameworks	Brax, Jax, ROS2, NumPy, MuJoCo, MatPlotLib
Technologies	Git/Github, Bash, Docker, Linux, RaspberryPi, Basler Cameras
Tools	SolidWorks, AutoCAD, SimulationX, 3D Printing

EDUCATION

BASc Honors Mechatronics Engineering | GPA: 3.93 | University of Waterloo **Sept 2022 - April 2027**

- Systems Models (MATLAB, SimX), Actuators/Power Electronics, RTOS, Sensors, Linear Systems/Signals, DSA (C++)

EXPERIENCE

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

Co-Founder | UW RoboSoccer | *Python, MuJoCo, Brax, XML, Circuit Design* **Aug 2024 – Present**

- Co-founded team aimed at developing autonomous bipedal robots, limited to human sensory inputs, for the RoboCup Competition, to compete in 4-on-4 soccer competitions - working alongside 4 PhD students and industry professionals
- 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 involving power management and integrating servos, servo driver, RaspberryPi, and various sensors - as well as applying filter on sensor data for clean input to reinforcement learning model.

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

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

Powertrain Engineer | UW Baja SAE | *GD&T, Manufacturing* **Jan 2023 – Aug 2023**

- Designed and manufactured custom CVT cover using **SolidWorks,** bender, shear, lathe, drill press, and welding
- Led sub team to design, manufacture, and install safety features such as firewall, seat mounting, and harnesses

Toyota AV Challenge | *ROS2, Gazebo, Python* **May 2024**

- Leveraged **ROS2** and **Gazebo** simulator to develop autonomous vehicle algorithm to navigate factory plant
- Navigated course using combination of **LiDAR** and **Computer Vision** to detect AprilTags, stop signs and obstacles.