

# Joshua C. Brown

Edmonton, Alberta Canada

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*Follow this link for my most up-to-date portfolio*

## Skills

<b>Programming</b>	Python, OpenCV, PyTorch(Machine Learning), LaTeX, C++, MATLAB
<b>Robotics Technologies</b>	ROS/ROS2, Linux, Docker
<b>Mechanical Design</b>	SolidWorks, Ansys Mechanical, Onshape, Fusion 360
<b>Manufacturing</b>	3D Printing, CNC Router, Carbon Fiber, Power/Hand Tools

## Education

### B.Sc. in Mechanical Engineering – University of Alberta

Sept. 2019 - Jan. 2024

- Finish December 2024
- Cumulative GPA 3.8 of 4.0

## Experience

### Mechatronic Systems Lab

*University of Alberta*

UNDERGRADUATE RESEARCHER

Jan. 2024 - Apr. 2024

- Implemented a 6D pose detection algorithm capable of detecting drones with  $< 2$  cm of error
- Combined OpenCV, ROS2, Pytorch, and drone hardware in a single real-time project
- Created evaluation metrics and visualization tools to objectively monitor progress toward a complex goal
- Standardized runtime environment docker containers decreasing code set up time from a day to  $<$  an hour
- Wrote and tuned a PID controller for a quadcopter drone capable of flying indoors in C++

### Pegasus Imagery

*Villeneuve, Alberta Canada*

MECHANICAL ENGINEERING STUDENT

Sept. 2022 - Nov. 2023

- Designed and manufactured a carbon fiber tail capable of controlling a 20 kg drone
- Designed landing gear structural test and created apparatus to reduce testing time from days to hours
- Lead the creation of build manuals to reduce in-house manufacturing defects by  $10\times$
- Designed and manufactured  $> 5$  electronics mounts while following weight and size constraints
- Lead use of resin infusion manufacturing to improve consistency of manufacturing from 80% to 99%

### Defence Research and Development Canada (DRDC)

*Suffield, Alberta Canada*

DEFENCE ROBOTICS RESEARCH STUDENT

Sept. 2021 - Apr. 2022

- Used a clustering algorithm on LiDAR data to detect and locate a person
- Created tests for GPS-denied localization algorithms using GPS position as a ground truth
- Managed the use of a \$300,000 UGV and tested and evaluated several localization algorithms
- Created and implemented a control algorithm based on LiDAR capable of following a person

## Projects

### Autonomous Robotic Vehicle Robot (ARVP)

*University of Alberta*

SOFTWARE CO-LEAD

Jan. 2022 - Aug. 2024

- Implemented a Kalman filter to estimate an AUV's state by combining velocity and IMU sensor data
- Implemented a P-controller algorithm for autonomous vision-based underwater control
- Troubleshooted network, CAN, and ROS communications live while leading full system tests

### Wheeled Wall Detecting Mobile Robot

*Home*

PERSONAL PROJECT

Jan. 2023 - Dec. 2023

- Designed, manufactured, and assembled a simple mobile robot capable of driving indoors
- Sourced motors, motor drivers, sensors, and microcontrollers
- Designed and 3D printed a chassis to mount all electronics

### Bimanual Force Controlled Robot

*University of Alberta*

UNDERGRADUATE VOLUNTEER RESEARCHER

Jan. 2024 - Apr. 2024

- Wrote a control algorithm for a bimanual 7DoF robot to lift objects with a desired clamping force in Python
- Reviewed force control and dynamical systems control literature for arm robots