Gavin Tranquilino

Mechatronics Engineering Student

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Experience

Hardware Engineering Intern — April 2024 – Present
Wire; Walker Industries Research And Experimentation — *Miami, FL*

- Designed VR headset lens frames using **SolidWorks**, ensuring precise fit and optimal visibility.
- Developed a **C/C++** WebSocket interface to transmit tracking data to allow wireless headset connectivity.
- Contributed to a crowdfunded open-source project, driving innovation and accessibility in the XR/VR/AR space.

Mechanical Engineering Intern — January 2024 – April 2024
Sheartak Tools Ltd. — *Waterloo, ON*

- Utilized **SolidWorks** and **GD&T** practices to design 15 mechanical assemblies, ensuring manufacturing specifications.
- Followed engineering standards to create 24 installation manuals based on parts lists for the clients.
- Streamlined version control for website updates using **Git**, reducing deployment time by 20%.
- Developed a **Python** script to upload 2000+ products on Shopify, saving 5 hours of manual work per week.

Robotics Engineering Lead — February 2023 – May 2023
Skills Ontario — *Etobicoke, ON*

- Developed embedded **C/C++** Arduino program to drive 3-phase motors and bluetooth controls.
- Designed custom protoboard assembly using **SMD** and **TH soldering**, saving 30% chassis space.
- Routed electronics using **KiCad**, resulting in efficient and customized layouts for a custom robot from scratch.
- Drafted aluminum chassis using **AutoCAD**, increasing durability and space in the robot chassis.

Mechanical Designer — November 2021 – June 2023
FIRST Robotics Canada — *Waterloo, ON*

- Collaborated to design an intake mechanism using **SolidWorks** for large tennis balls, contributing to our qualification for the FIRST Robotics Worlds championship.
- Enhanced intake reliability through material testing and **3D printing**, boosting ball pickup success from 50% to 80%.
- Optimized tight corner performance, improving the robot's maneuverability and efficiency during competitions.

Projects

Self-Balancing Unicycle | *C++, OpenGL, CMake, Raylib, Control Theory, PID, OOP*

- Derived equations of motion using linearization techniques to estimate and optimize trigonometric calculations.
- Utilized **C++** and **CMake** to develop a graphical simulator that demonstrates **PID control** to keep the unicycle upright.
- Implemented **Git** submodules to reference third-party **OpenGL** wrappers, to visualize the simulation.

Blink Twice If You Need Help | *Python, OpenCV, Twilio, Git, GitHub, Face Tracking*

- Engineered a computer vision wearable using **OpenCV** for real time eye tracking, triggering immediate calls for assistance.
- Integrated Twilio for swift emergency contact, reducing response time.

IoT Light Switch Bot/Mount | *Python, Flask, 3D Modelling, 3D Printing, Fusion360, Linux, HTTP*

- Designed a **3D-printed** mount with an integrated web application for remote light switch control.
- Implemented an Ubuntu **Linux** web server, enabling remote **HTTP** access to room lights globally.
- Innovatively enhanced safety by designing a physical light switch mount, eliminating high-voltage work.

Technical Skills

Mechanical: SolidWorks, AutoCAD, Fusion360, GD&T, CAD, 3D Printing, Machine Tools

Electrical: KiCAD, I2C, SPI, UART, Arduino, ESP-IDF, Soldering, Multimeter, Oscilloscope

Software: Python, C, C++, CMake, SQL, OpenGL, OpenCV, Linux, Ubuntu, Git, Flask, HTML, CSS, JavaScript

Education

University of Waterloo — **June 2028**
Candidate for BASc in Mechatronics Engineering — *Waterloo, ON*

- **Coursework**: Data Structures, Algorithms, Linear Algebra, Circuits, Structure and Properties of Materials, Object Oriented Programming