Gavin Tranquilino

Mechatronics Engineering Student

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Education

University of Waterloo — Waterloo, ON
Candidate for BASc in Mechatronics Engineering — *Expected Jun. 2028*

Experience

Mechanical Engineering Associate — Jan. 2024 – Present
Sheartak Tools Ltd. — *Waterloo, ON*

- Utilized SolidWorks to create 15 custom woodworking machinery parts, ensuring precision and manufacturing specifications.
- Applied engineering knowledge to create 24 installation manuals based on parts lists, ensuring accurate assembly processes for the clients.
- Utilized Adobe Premiere and Photoshop to record, script, and edit tutorials and troubleshooting guides for clients, garnering over 1,000 views on YouTube and enhancing client satisfaction.
- Implemented Git to log frontend JavaScript, HTML, and CSS changes, simplifying the UI for elderly users and providing documentation for future co-op students.
- Developed a Python script to upload 2000+ products on Shopify and OpenCart, automating the process and saving 5 hours of manual work per week.

Intake Mechanism Designer — Nov. 2021 – Jun. 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.
- Leveraged CNC machining to craft a wooden prototype, uncovering the opportunity to enhance chain engagement by 10% through optimized linkage placement.
- Enhanced intake reliability and maneuverability through material testing, 3D modelling and 3D printing boosting pickup success from 50% to 80% and optimizing tight-corner performance.

Robotics Design Team Leader — Feb. 2023 – May 2023
Skills Ontario Competition — *Etobicoke, ON*

- Streamlined 3-axis milling techniques to fabricate competition compliant hardware housing.
- Employed innovative design techniques, utilizing drill batteries and avoiding pre-built kits for electronics housing to reduce 80% of project expenses.
- Leveraged Arduino programming and electrical signal processing to enhance wheel torque through 3-phase motors.

Air and Noise EHS Engineering Co-op — Jun. 2022 – Jul. 2022
GHD — *Waterloo, ON*

- Cataloged ventilation system updates in the company database, streamlining data accessibility for engineers.
- Transcribed raw vibration data from Kitchener ion light rail train tracks into Excel spreadsheets, facilitating data analysis for modeling, resulting in improved insight into daily vibration patterns.

Projects

Self-Balancing Unicycle Game/Physics Simulation | *C++, OpenGL, CMake, Raylib, Control Theory, PID*

- Derived equations of motion using Lagrangian and linearization techniques to estimate and optimize trig calculations.
- Utilized C++ and CMake to develop a graphical simulator, demonstrating cascading PID control to effectively manage both the angle and position of the unicycle.
- Implemented Git submodules to reference third-party OpenGL wrappers, creating a UI for the simulator.

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

- Engineered wearable device for real-time double blink detection, 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, TLS*

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