OWEN MOOGK

Mechatronics Engineering Student
at the University of Waterloo

226-989-0602
owenmoogk@gmail.com
linkedin.com/in/owenmoogk
owenmoogk.github.io

SKILLS

CAD Software: SolidWorks (6 years), Altium (1 year), AutoCAD (1 year), and Onshape (1 year) for 3D printing and manufacturing.

Mechanical Skills: Proficient in 3D printing, design for manufacturing, custom circuit design, PCBs, and microcontrollers.

Other: Experience planning and developing end-to-end hardware/mechanical solutions. Eager to learn and apply new skills.

EXPERIENCE

R&D Development Engineering (Co-op) – Hub for Neuroengineering Solutions
January 2024 – April 2024

- Developed engineering solutions to create innovative neuroscience research devices at the University of Lethbridge.
- Built full-stack websites for serving collected data, using Django (Python), ReactJS (JavaScript), and SQL databases.
- Programmed Raspberry Pi microprocessors using Python, to process, interface, and relay recorded information to a user.
- Developed embedded systems code in Python for Linux based operating machines, optimizing speed and performance.
- Leveraged SolidWorks CAD to design mechanical components for 3D printed production, rapid iteration, and prototyping.
- Designed and built electrical circuitry with microprocessors, sensors, and actuators for ease of use and implementation.
- Designed electrical schematics and printed circuit boards (PCBs) for mass production in Altium Designer.
- Debugged electrical systems with multimeter and oscilloscope testing techniques to find and resolve development issues.
- Improved and customized CNC tools, optimizing for production speed and performance.
- Optimized hardware development workflow through an improved version control system and communication procedure.

Operational Software Developer (Co-op) – Rocket Factory Augsburg
September 2024 – December 2024

- Developed operational tools for a 300-person team building advanced rocket technology, using React and FastAPI.
- Built and deployed a web application for part and assembly tracking, directly improving production workflows.
- Designed and built a time tracking application used company-wide, reducing administrative overhead by an estimated 60-70%.
- Improved advanced database ORM architectures for scalability and speed in PostgreSQL, reducing complexity immensely.
- Utilized planning, project management, and communication skills to ensure adoption and integration of tools.

Software Developer (Co-op) – BusPlanner Inc.
May 2023 – September 2023

- Developed and maintained web applications using the MVC ASP.NET framework, ensuring robust solutions for clients.
- Implemented and improved many web application features, directly affecting hundreds of clients across North America.
- Conducted thorough testing of web applications to identify issues, ensuring optimal functionality and user experiences.

Subteam Lead – FIRST Robotics Team
August 2018 – September 2022

- Led a subteam of students using project management and teamwork skills to design and build a robotic subsystem.
- Designed flexible assemblies and robotic systems in SolidWorks for manufactured and 3D printed fabrication.
- Fabricated complex parts and assembled robotic systems, troubleshooting and optimizing mechanical systems.
- Led the team's sponsorship program, using networking and interpersonal skills to attract and retain sponsorship for the team.

Drivetrain Lead – Electric Racecar Team
September 2021 – June 2022

- Designed and manufactured a fully electric racecar in under a year, optimizing drivetrain systems to increase efficiency.
- Developed offboard battery management system in Python, tailoring power use and energy deployment in competition.
- Designed a 3D printed emergency stopping system in Onshape, ensuring safety and ease of use in emergencies.

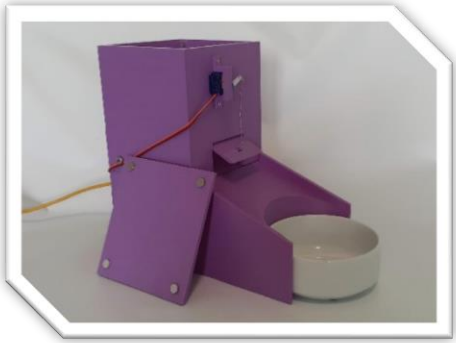
EDUCATION

Mechatronics Engineering – University of Waterloo
2022 – 2027

- Candidate for Bachelor of Applied Science studying Mechatronics Engineering, with a grade average of 95% / 4.0 GPA.
- Presidents Scholarship of Distinction, Douglas Wright Award, International Experience Award, Dean's Honors.
- Relevant courses: Deformable Solids, Sensors / Instrumentation, Statics / Dynamics, Design of Machines, Materials.

PROJECTS

AI-Powered Cat Feeding Robot

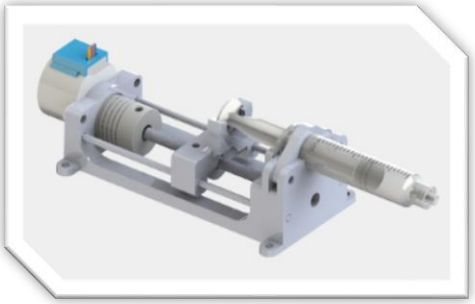


- Designed and programmed a **3D printed** robot to autonomously feed pets.
- Developed CAD models for 3D printing in **SolidWorks**.
- Built microcontroller circuits, integrating an **Arduino** with other simple electronic components, such as LEDs, limit switches, and servos.
- Utilized **Computer Vision** to detect a cat via an onboard webcam.
- Programmed the robot in **C++** and **Python** to detect a cat's presence and dispense food, given specific criteria.
- Project details: https://owenmoogk.github.io/projects/cat-feeder

Custom Built MacroPad

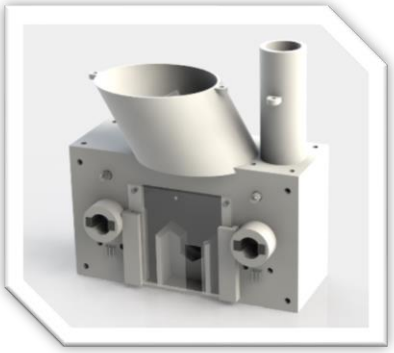
- Designed, built, and programmed a complete MacroPad. Capabilities include executing complex keystroke instructions, Spotify API calls, and much more.
- Designed the custom **3D printed** housing and keycaps in **SolidWorks**.
- Designed a custom **PCB (printed circuit board)** for ease of integration.
- Built a custom mounting system that allowed integration with existing keyboards.
- Integrated hardware switches with an **Arduino Nano**, which interfaces with a PC.
- Programmed logic with **C++** and **Python**.
- Project Details: https://owenmoogk.github.io/projects/macropad

Syringe Pump – Hub for Neuroengineering Solutions



- Designed and built an **autonomous** water dispensing system, for feeding lab animals after a behavioral trigger or on a timer.
- **3D printed** precision components designed in **SolidWorks** for ease of assembly.
- Implemented a threaded rod carriage for precise output volumes (to the **µL**).
- Designed and built circuitry for wired for communication with a **Raspberry Pi** microcontroller (over **SPI** and **I2C**).
- Debugged mechanical and software systems, solving integration issues.
- Programmed the device in **Python**, optimizing for precision and ease of use.
- Integrated device with standardized mice cages, for neuroscience research purposes.

Multi-Function Feeder – Hub for Neuroengineering Solutions



- Designed a rodent cognitive testing device in **SolidWorks**, with an inbuilt logic and reward feeding system.
- **3D printed** components for rapid prototyping, assembly, and use.
- Designed a **modular accessory system**, allowing for a variety of functionality, dependant on a researcher's goals and use-case.
- Integrated **sensors** with **actuators** through system-level logic in **Python**.
- Utilized communication protocols including **I2C** and **SPI**.
- Tested device with rodent behavior, ensuring proper functionality and usability.

These are some of my favourite and most applicable projects.

For a complete list of projects and more details, visit my website's project page, located at: https://owenmoogk.github.io/projects