

OWEN MOOGK

*Mechatronics Engineering Student
at the University of Waterloo*

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SKILLS

Software Development: Python, TypeScript, JavaScript/jQuery, C++, C#, Java, R, SQL (Postgres / MS SQL Server).

Frameworks / Tools: React, Docker, Next.js, Django, FastAPI, WSL, Ubuntu, Linux, MVC/ASP.NET, TanStack, Visual Studio, VS Code.

Design & Engineering: SolidWorks, AutoCAD, and Onshape for 3D printing / manufacturing. Altium for circuit and PCB design.

Other: Experience working closely with a team, using agile development techniques, including version control with Git / TFS.

EXPERIENCE

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.
- Implemented web application features for part and assembly tracking, directly improving production workflow.
- 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.
- Optimized codebase structure, refactoring and enhancing existing code to enhance performance, reusability, and scalability.
- Utilized Git pipelines to improve testing and deployment of applications, ensuring quality and usability of tools.
- Implemented CRUD features in a modular manner, allowing for optimal code reuse and development ease.
- Utilized planning, project management, and communication skills to ensure adoption and integration of tools (studying workflows and designing with the user in mind).

Research and 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), React (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 tools 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 maintained CNC tools, optimizing production speed and performance.
- Optimized hardware development workflow through an improved file storage and communication procedure.

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.
- Resolved issues on both the frontend and backend, employing debugging skills to identify and fix bugs, optimize performance, and enhance application usability with tools including C#, JavaScript/jQuery, and Bootstrap.
- Designed SQL database solutions and advanced SQL queries for efficient data retrieval and manipulation.
- Improved codebase structure, refactoring and optimizing existing code to enhance performance, reusability, and scalability.
- Utilized Azure DevOps and TFS version control to manage source code and participate in code reviews among team members.
- Conducted thorough testing of web applications to identify issues, ensuring optimal functionality and user experiences.

EDUCATION

Mechatronics Engineering – University of Waterloo

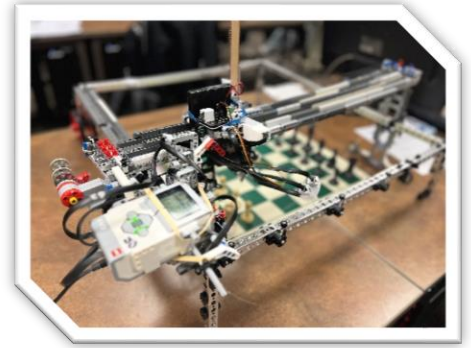
2022 – 2027

- 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: Circuits, Digital Logic, Thermodynamics, Statics / Dynamics, Advanced Calculus, Real-time systems.

PROJECTS

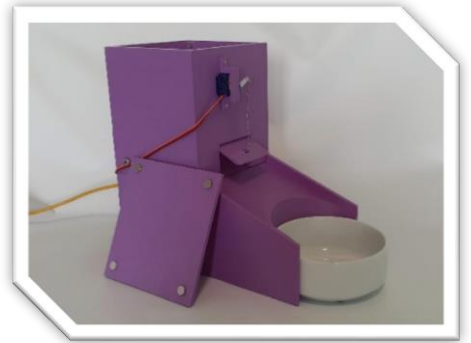
Chess Robot

- Designed and built an **autonomous** chess robot, which performs moves against players.
- Capabilities include maneuvering chess pieces, executing moves, receiving player input, and chess clock integration.
- Designed and assembled a robotic claw, pulley systems, and precise actuation mechanisms, using **3D printed** and **laser-cut** parts.
- **Debugged** mechanical and software systems, solving integration issues.
- Programmed the robot in **C++** and **RobotC**. Built feedback loops with the use of color sensors and motor encoders.
- Project details: <https://owenmoogk.github.io/projects/chess-bot>



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>



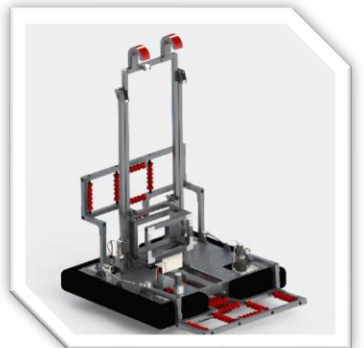
Custom Built MacroPad

- 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>



Vortex - FRC Robot Design Challenge

- Designed a complete FRC Robot in **SolidWorks**, with the design intended to be used in a competitive robotics match.
- Integrated object intake systems with a robot feeder and shooter, giving full control to game pieces.
- Designed an object elevator, opening additional manipulation and movement opportunity.
- Designed a swerve drive system for optimal movement and drivability.
- Project Details: <https://owenmoogk.github.io/projects/vortex>



These are some of my favourite and most applicable projects.

For a complete list of projects and more details, please visit my website's project page, located at:

<https://owenmoogk.github.io/projects>