OWEN MOOGK

Mechatronics Engineering Student

at the University of Waterloo

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# EXPERIENCE

## Software Developer – 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.
* Developed and maintained SQL database structures, ensuring efficient data storage, retrieval, and manipulation.
* Improved codebase structure, refactoring and optimizing existing code to enhance readability, 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.

## Powertrain Member – Formula SAE Team September 2022 – Present

* Working to design and build a powertrain system for a Formula racecar.
* Designed assembly and manufacturing aids in SolidWorks.
* Fabricated parts using 3-axis milling machine and lathe.

## Subteam Lead – FIRST Robotics Team August 2018 – September 2022

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

## Drivetrain Lead – Electric Racecar Team September 2021 – June 2022

* Designed and manufactured a fully electric racecar in under a year.
* Designed a 3D printed emergency stopping system in OnShape.
* Optimized drivetrain systems to increase efficiency.
* With the team, achieved first place in all races attended.

# EDUCATION

## Mechatronics Engineering – University of Waterloo 2022 - 2027

Candidate for Bachelor of Applied Science, studying Mechatronics Engineering. Working with likeminded students building collaboration, time management, and technical skills. Maintaining a grade average of 95%, with a 4.0 GPA. Expected graduation April 2027.

# SKILLS

## Design

Proficient in mechanical design, using CAD tools such as SolidWorks (5 years), AutoCAD (1 year), Onshape (1 year).

Have used these tools to create flexible mechanical models, design machined parts, design 3D printed parts, and create technical drawings/drafts (with GD&T).

Experience designing and integrating hardware with software, using Arduino and simple electronics.

## Other

Proficient with power tools and working in machine shop environments.

Experience in customer service and leadership roles, carrying a positive attitude while demonstrating teamwork and cooperation.

# ACHIEVEMENTS

## JamHacksV Winner

Won first place in the JamHacksV hackathon, where I designed and built a complete 3D printed cat feeding robot in 48 hours.

## AP Scholars Award

Awarded the AP scholars Award for exceptional performance on Chemistry, Physics, and Economics advanced placement exams, all of which I achieved a qualifying score.

## Duke of Edinburgh’s Award

Awarded the prestigious Bronze and Silver Duke of Edinburgh awards for exceptional community service and personal growth.

## SHAD Canada

Engineered an award-winning solution interfacing Canadians with their water consumption habits, including custom 3D printed pipe mounting.

# PROJECTS

## Chess Robot

* A picture containing indoor, automaton

  Description automatically generatedDesigned 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>

## A picture containing wall, indoor, pink Description automatically generatedAI-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>

## A picture containing floor, indoor, keyboard Description automatically generatedCustom 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>

## A picture containing automaton Description automatically generated

## 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>