OWEN MOOGK

Mechatronics Engineering Student

at the University of Waterloo

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# EXPERIENCE

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

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

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

* Designed and manufactured a fully electric racecar in under a year.
* Optimized drivetrain systems to increase efficiency and energy deployment.
* Developed offboard battery management system, optimizing power use.
* Designed a 3D printed emergency stopping system in OnShape.
* With the team, achieved first place in all races attended.

## FIRST Robotics – Subteam Lead 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 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.

## Merry Hill Golf Club – Clubhouse Employee May 2020– September 2022

* Demonstrated excellent customer service by implementing communication, responsibility, and cooperation skills.
* Navigated difficult situations through accountability and professionalism.

## Choose to Lead – Student September 2018 – June 2022

* Developed teamwork, cooperation, management, and leadership skills in a variety of community activities and volunteering efforts.
* Developed public speaking skills, hosting the Waterloo Regional Mayors forum.

## Personal Projects

* Developed complex webpages using HTML, CSS, JavaScript, and ReactJS.
* Implemented advanced algorithms and data structures to solve problems.
* Designed and built full stack applications with ReactJS and Django (Python).
* Built a responsive personal portfolio website with ReactJS, showcasing many personal projects and endeavours (linked above).

# 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 above 95%, with a 4.0 GPA. Expected graduation April 2027.

# SKILLS

## Software Development

Proficient in object-oriented programming, with Python (4 years), JavaScript (4 years), C++ (1 year), and Java (1 year).

## Frameworks / Tools

Experienced in website development tools such as HTML (5 years), CSS/LESS (5 years), Javascript (4 years), ReactJS (3 years), Django (1 year), Git/GitHub (4 years).

## Design & Engineering

Experienced using CAD software such as SolidWorks (5 years), AutoCAD (1 year), and Onshape (1 year) for 3D printing and manufacturing.

## Other

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

# ACHIEVEMENTS

## SHAD Canada

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

## 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.

# 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>

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## 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>