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

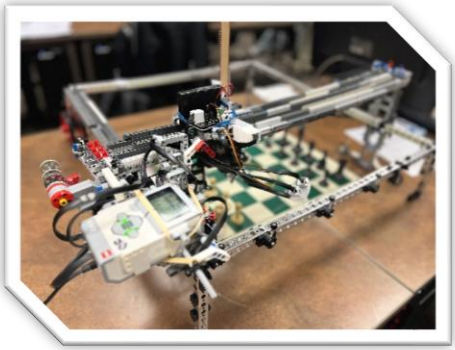
Awarded the AP scholars Award for exceptional performance on Chemistry, Physics, and Economics advanced placement exams, all of which I achieved a qualifying score.

Duke of Edinburgh's Award

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

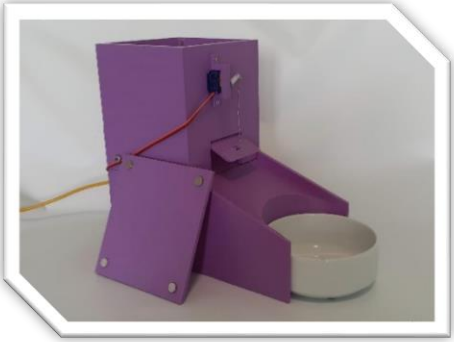
PROJECTS

Chess Robot



- 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

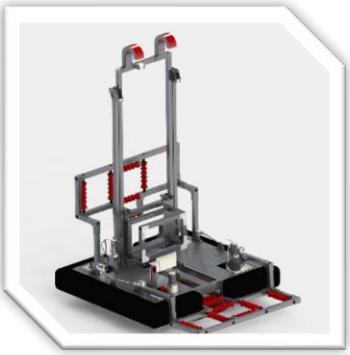


- Designed and programmed a **3D printed** robot to autonomously feed pets.
- Developed CAD models for 3D printing in **SolidWorks**.
- Built microcontroller circuits, integrating an **Arduino** with other simple electronic components, such as LEDs, limit switches, and servos.
- Utilized **Computer Vision** 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