OWEN MOOGK

Mechatronics Engineering Student
at the University of Waterloo

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SKILLS

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

Mechanical Skills: Proficient with 3D printing and design for manufacturing, including creating advanced drawings (with GD&T).

Other: Experience in customer service and leadership roles, demonstrating teamwork, communication, and cooperation.

EXPERIENCE

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.
- 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 style racecar, competing against other schools.
- Designed 3D printed parts and manufacturing aids in SolidWorks, created drawings for production.
- Fabricated precision parts using 3-axis milling machine and lathe.

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, optimizing power use and energy deployment in competition.
- Designed a 3D printed emergency stopping system in OnShape, ensuring safety and ease of use in emergencies.

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.
- Sponsorship program lead, using networking and interpersonal skills to attract and retain sponsorship for the team.

ACHIEVEMENTS

SHAD Canada: Engineered an award-winning solution interfacing Canadians with their water consumption habits.

JamHacksV Hackathon Winner: Won first place, where I designed and built a complete 3D-printed cat feeding robot in 48 hours.

AP Scholars Award: Awarded for exceptional performance on Chemistry, Physics, and Economics AP exams.

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

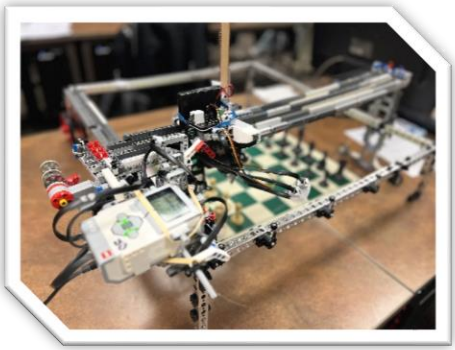
EDUCATION

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.

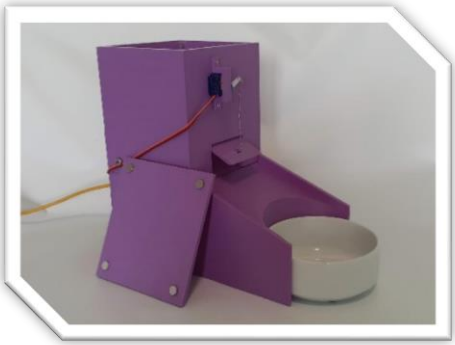
PROJECTS

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

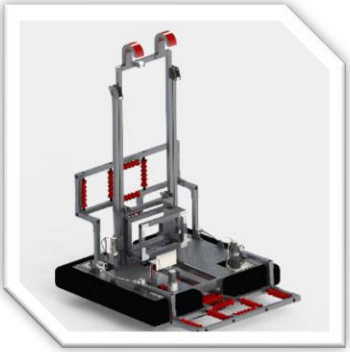


- Designed and programmed a **3D printed** robot to autonomously feed pets.
- Developed CAD models for 3D printing in **SolidWorks**.
- Built microcontroller circuits, integrating an **Arduino** with other simple electronic components, such as LEDs, limit switches, and servos.
- Utilized **Computer Vision**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