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.
- Designed assembly and manufacturing aids in SolidWorks.
- Fabricated parts using 3-axis milling machine and lathe.

FIRST Robotics – Subteam Lead 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.

Electric Car Team – Senior Student 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.

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.

SHAD Canada – UPEI Fellow July 2021

- Engineered an award-winning solution interfacing Canadians with their water consumption habits, including custom 3D printed pipe mounting.
- Networked and learned from global leaders regarding environmental sustainability and business practices.

FLL Robotics Team – Mentor August 2018 – March 2022

- Co-founded and mentored a FIRST Lego League team, teaching engineering and teamwork skills to students.
- Built a framework to foster creativity, learning, cooperation, and teach the design process in the context of solving real world problems.

EDUCATION

Mechatronics Engineering – University of Waterloo Present

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.

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

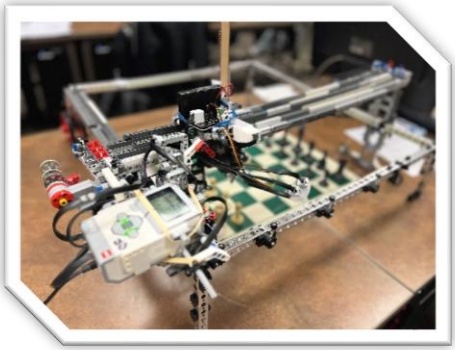
Awarded the prestigious Bronze and Silver Duke of Edinburgh awards for exceptional community service and personal growth.

Harvard CS50

Completed the Harvard CS50 computer science course, in which I learned software design principles, C++ and Python, and built a full stack application.

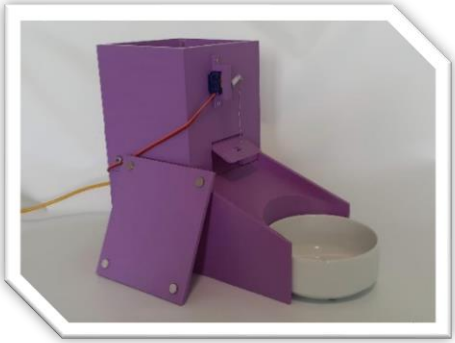
PROJECTS

Chess Robot



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

AI-Powered Cat Feeding Robot

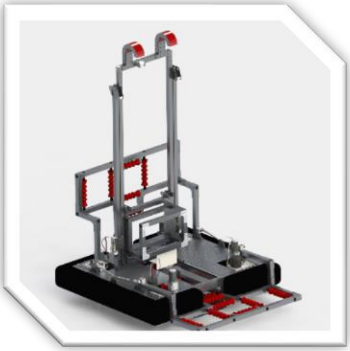


- Designed and programmed a **3D printed** robot to autonomously feed pets.
- Developed CAD models for 3D printing in **SolidWorks**
- Programmed the robot in **C++** and **Python** to detect a cat's presence and dispense food.
- Built microcontroller circuits, integrating an **Arduino** with other simple electronic components, such as LED's, limit switches, and servos.
- Utilized **Computer Vision** to detect a cat via an onboard webcam.
- 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 maneuvering systems with a robot feeder and shooter, giving full control to game pieces.
- Designed an object elevator, opening scoring opportunity and enhanced manipulation.
- Designed a swerve drive system for optimal ease of movement.
- 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 some details please visit my website's project page, located at: https://owenmoogk.github.io/projects