Shay McKim *Mechatronics Engineering - Student Athlete*

Personal Portfolio smckim@uwaterloo.ca linkedin.com/in/shaymckim

Skills

Software: C++, Python, JavaScript, HTML/CSS, Java, RobotC, LLM Integration, Arduino IDE, Git
Hardware: Arduino, Microcontrollers, Embedded Programming, Motor Control, Power Electronics, Sensor Integration, PCB Design, Circuit Wiring, Soldering, UART, I2C, PWM, GPIO, Oscilloscope, Multimeter, Power Supply
Tools: Fusion 360, SolidWorks, AutoCAD
Manufacturing: 3D Printing (FDM), Laser Cutting, CNC Machining, Rapid Prototyping, Design for Manufacturing (DFM), GD&T
Certifications: Google Project Management Certificate, Lean Six Sigma Yellow Belt

Selected Projects

Algorithm Powered 4-Axis Robotic Arm, *Unbeatable Game Opponent*
- Designed a cost-constrained 4-axis robotic arm optimized for FDM printing using Fusion 360; created 10+ custom components and C++ firmware to coordinate 5 servos with ±5 mm positioning accuracy.
- Built a Python minimax engine to compute optimal moves and transmit decisions over serial to the arm's controller, enabling responsive, interactive matches.

Automated Culinary Robot, *Full-Stack Team Leadership*
- Coordinated efforts of a 4-member team to deliver a fully integrated pudding-preparation robot, guiding task division and system integration across dispensing, mixing, and cup handling; recognized by professors as the most intricate project in the cohort.
- Designed powder and water dispensing mechanisms and programmed DC motor control with LCD interface in C++, applying timing-based logic for smooth and reliable operation.

Award-Winning Water Filtration System, *>100L/Day Output*
- Led a 5-member team to design a high-performing water filtration system for northern communities, exceeding the 100L/day goal and earning top cohort recognition for reliability and output quality.
- Designed, programmed, and wired Arduino-based chlorination and agitation subsystems, sourcing components and ensuring reliable end-to-end automation.
- Modeled and 3D-printed a custom water pump in Fusion 360, reducing projected costs compared to off-the-shelf alternatives.

Spring-Loaded Net Launcher, *Sub-500g Drone Capture System*
- Designed 8 custom Fusion 360 components optimized for FDM printing, reducing system weight to <0.5kg for portable drone defense applications.
- Iterated trigger mechanism design through 20+ CAD revisions to improve actuation smoothness and mechanical reliability.

200lb Trebuchet, *250ft Range Siege Engine*
- Built a 12-ft trebuchet capable of handling 150 lb dynamic loads and launching projectiles over 250 ft, using only recycled materials.

Work Experience

CAD Electrical Technologist, *MBLL - Provincial Crown Corporation* 2025
- Independently updated large-scale AutoCAD electrical and fire alarm drawings for 2 multi-floor casinos and over 60 retail stores, improving drawing accuracy for internal maintenance and external renovation firms.
- Interpreted and incorporated handwritten electrician markups, resolving layout and circuiting discrepancies between outdated plans and current machine locations using layers and Xrefs.
- Compiled and organized 21 data points across 60+ store locations, producing a tool that streamlined project prioritization for senior management.
- Collaborated with cross-disciplinary teams of electricians and architects to confirm drawing accuracy and maintain standardization.

Web Scheduling Application Developer, *PolySense Solutions - Mechatronics Startup* 2024
- Developed a web-based scheduling tool (HTML, CSS, JavaScript, FullCalendar.js) that allowed clients to book equipment and track usage directly through PolySense's site.
- Improved equipment coordination by enabling clients to visualize usage trends and manage bookings, optimizing lab space and machine availability.

E-Commerce Founder, *3D Printed Product Design & Manufacturing* 2023
- Designed, iterated, and manufactured custom products using Fusion 360 and FDM 3D printing, delivering tailored solutions through small-batch production.
- Performed preventive maintenance and mechanical troubleshooting on printers to reduce downtime and maintain consistent quality.
- Ran all aspects of a small-scale e-commerce business, from product design to client communication and shipping, delivering customized solutions with efficiency.

Education

University of Waterloo, *Mechatronics Engineering* Current
- Varsity Men's Volleyball Team member balancing 30+ hours/week of high-performance training with engineering coursework. Built strong teamwork and communication skills through strategy meetings focused on meeting KPIs and driving team performance.