Shuyang Zhou

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TECHNICAL SKILLS

CAD and Design: SolidWorks, AutoCAD, MATLAB, Autodesk Fusion, Blender, Unity, GD&T, DFM, DFA
Manufacturing: Lathe, Mill, CNC, Bandsaw, Drill Press, Belt Sander, Scroll Saw, 3D Printer (FDM & Resin)
Programming: Python, C++, C#
Certifications: CSWA, WHMIS 2015

EXPERIENCE

Waterloo Aerial Robotics Group — Mechanical Subteam   Feb. 2026 – Present
University of Waterloo   *Waterloo, ON*

- Responsible for mechanical-electrical integration and aircraft wiring harness architecture for a modular fixed-wing VTOL platform with full electrical layout strategy.
- Designed and validated a 3D-printable ESC enclosure for a competition drone, integrating ventilation for passive cooling, wire-terminal protection, capacitor clearance, and M3 grid-compliant mounting (30mm modular spacing). Ensured full compliance with internal CAD standards including fully-defined sketches, Hole Wizard fastener implementation, and manufacturing-aware tolerances.
- Developed a modular landing gear subassembly for the 2025 competition drone, integrating with existing airframe
- Engineered a controlled breakaway joint to protect the frame during crash scenarios, as well as evaluating material densities (carbon fiber, PETG blend, 6061-T6 aluminum) to meet a 500g constraint.
- Produced manufacturing-ready technical drawings using WARG's drafting template, applying ordinate dimensioning, proper hole callouts, GD&T principles, and millimeter-primary standards for machining parts.

Electrium Mobility — Mechanical Subteam   Sep. 2025 – Jan. 2026
University of Waterloo   *Waterloo, ON*

- Led the full CAD design of a bicycle battery enclosure system in SolidWorks, housing the battery and VESC
- Took physical measurements of the bicycle frame through multiple iterations to resolve dimensional inaccuracies
- Iterated enclosure geometry under constraints including wall thickness, frame bends, mounting clearances, and printer size limitations
- Designed enclosure features including fastener hole patterns, battery slot, lid, and dovetail joint to enable multi-part 3D printing
- Manufactured the enclosure using PLA via 30-hour FDM print, followed by minor post-processing machining
- Integrated the final enclosure onto the bike platform, achieving a successful first-fit installation without redesign

PROJECTS

SpikeLift Arena | *Machining, CAD, 3D printing, Hydraulics*

- Collaborated in a team of 5 to design and build a mechanical toy arena featuring omnidirectional tilt and hydraulic spike ejection
- Designed and prototyped mechanical linkages and syringe-based hydraulic systems to enable player input
- Created various prototypes using SolidWorks, 3D printing and machining tools, including a custom made wooden frame and base, and custom printed PETG spike platform and spinning tops
- Authored a 20-page final design report detailing the design decisions and testing process, and presented the final product in a symposium

Hollow Clock | *Arduino, Motors, Power electronics, 3D printing*

- Designed and built a floating hand mechanism using magnets, a Stepper motor, gears and rotor assembly
- Modified and improved an existing CAD model using Blender to accommodate new components
- 3D printed and tested multiple design iterations to refine alignment, balance, and motion stability
- Experimented with Arduino-based control, wiring, and powered electronics to drive the motor-gear system
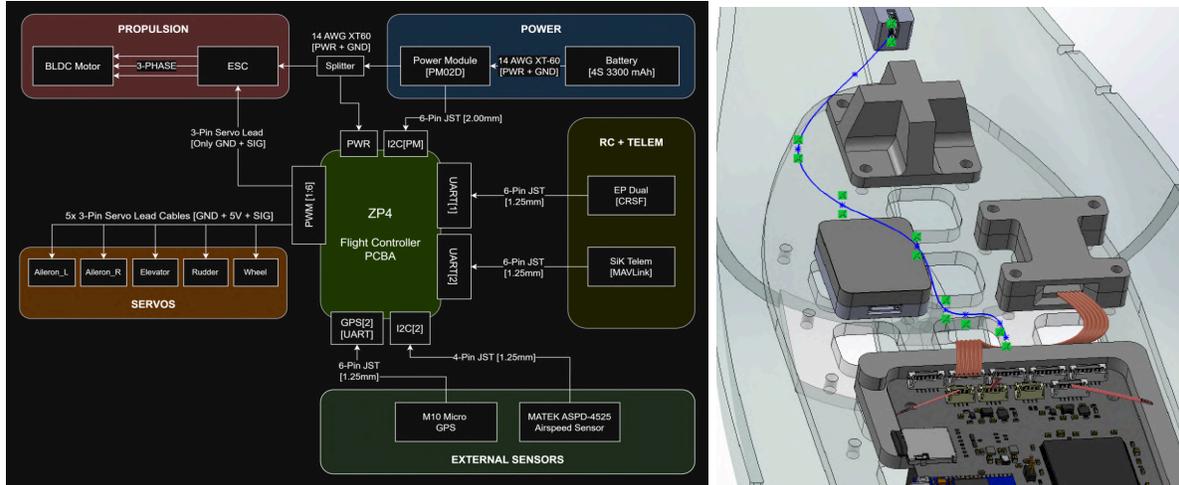
EDUCATION

University of Waterloo   Waterloo, ON
Honours Bachelor of Applied Science, Mechanical Engineering   *Sept. 2025 - May 2030*

- President's Scholarship of Distinction
- Term GPA: 3.85/4.00

Fixed-Wing VTOL Harness Architecture   Feb. 2026 - Mar. 2026

Complete wiring diagram for aircraft flight components (left). Wiring path for SiK Telem (right)

- Designed and implemented the **full wiring harness architecture** for a fixed-wing VTOL aircraft, integrating **propulsion, sensors, power distribution, telemetry, and servos** into a cohesive and serviceable electrical system.

- Worked with the electrical subteam to develop a complete **wiring diagram** detailing:
  - High-current power distribution (battery → power module → ESC)
  - PWM outputs to control surfaces
  - UART/I2C sensor interfaces
  - Telemetry and RC communication links

- Implemented the full harness layout in a **SolidWorks PDM** assembly model, routing all power and signal paths within the fuselage envelope.
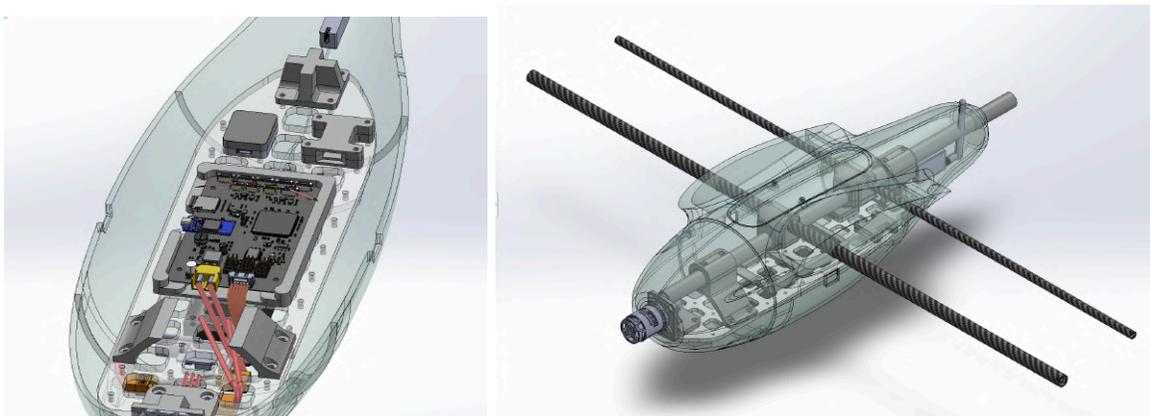
Final harness and model of Fixed-Wing VTOL Aircraft in SolidWorks PDM
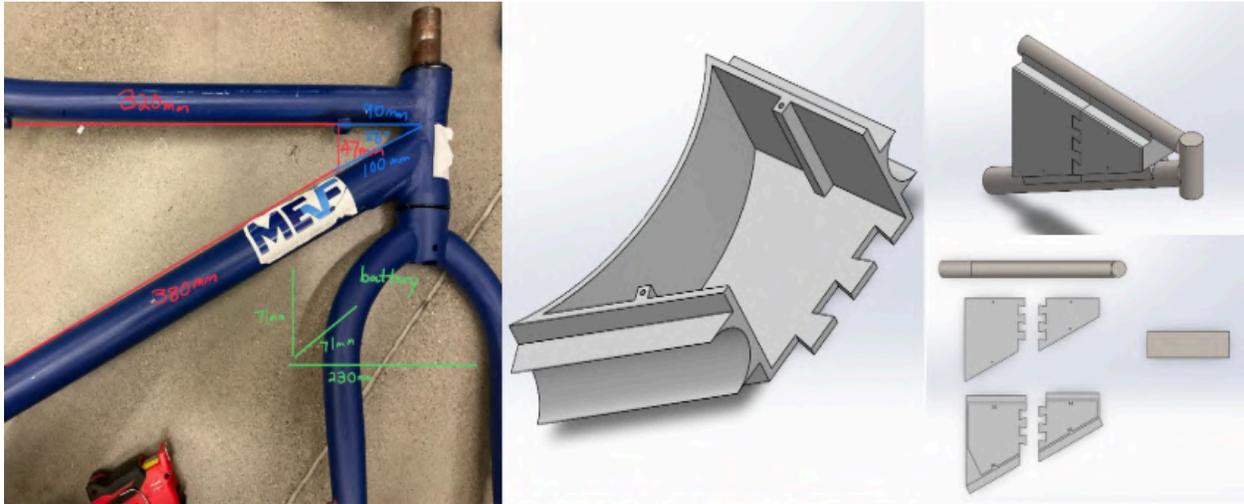
Bicycle Frame, SolidWorks Enclosure Half Section, SolidWorks Assembly of Enclosure

- Began by physically **measuring** the bicycle frame and mapping the internal triangular area. Due to tube curvature, early measurements contained inconsistencies.
- Performed multiple measurement iterations to resolve dimensional inaccuracies and created a **SolidWorks model** reflecting real-world geometry with the following features:
  - Dedicated battery slot with **wire clearance**
  - Internal mounting interface for **VESC**
  - Lid with integrated **fastener pattern**
- The enclosure was split into modular sections with **dovetail** joints to accommodate 3D printer **size constraints** while maintaining structural continuity.
- Achieved a successful **first-fit installation** without redesign

Integration of 3D printed Battery Enclosure Half Section with VESC and Bicycle Frame

Initial cardboard prototype (left). Final design of spike platform (right)

- Collaborated in a group of five to build a mechanical arena capable of **omnidirectional tilt** and controlled **hydraulic spike ejection**, translating real-time player input

- Designed and prototyped mechanical linkages and a syringe-based hydraulic actuation system, creating predictable motion. Iterated through multiple linkage designs to balance **mechanical advantage**, input parameters, and **structural stability**.

- Developed CAD models in SolidWorks and executed **rapid design sprints**

- Fabricated structural and components using **PETG FDM printing** and manual **machining**, integrating them into a **custom-built hardwood frame** for rigidity.

- Delivered a fully operational system demonstrated at a public design showcase, supported by a comprehensive **23-page technical report** documenting design decisions, failure modes, testing data, and final performance outcomes.
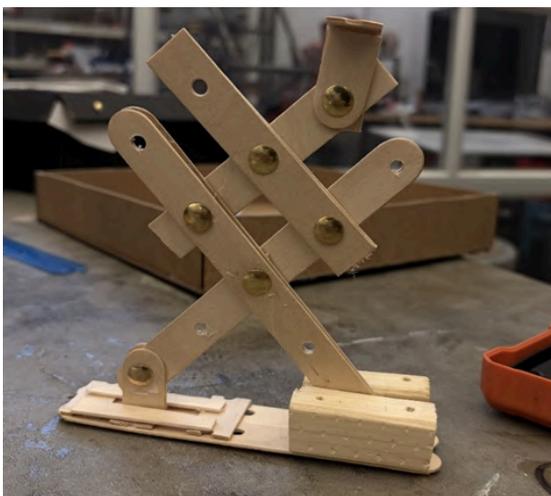

Mechanical linkage lift mechanism (left). Completed arena design (right)

LinkedInGames – Daily Puzzle Access Platform - linkedingames.lol

- Designed and built **LinkedInGames.lol**, a lightweight web platform that scrapes the web and provides streamlined access to LinkedIn's daily puzzle games in a single interface.
    - Implemented front-end structure and routing to create a clean, fast-loading (performance optimized) experience focused on usability.
    - Emphasized minimalism → fast interaction → simple navigation.
    - Deployed the site publicly, full-cycle development → live product.
- Result: transformed a casual daily activity into a polished, user-friendly micro-product by applying practical web development

UWME - Website for Graduating Class - uwme.ca
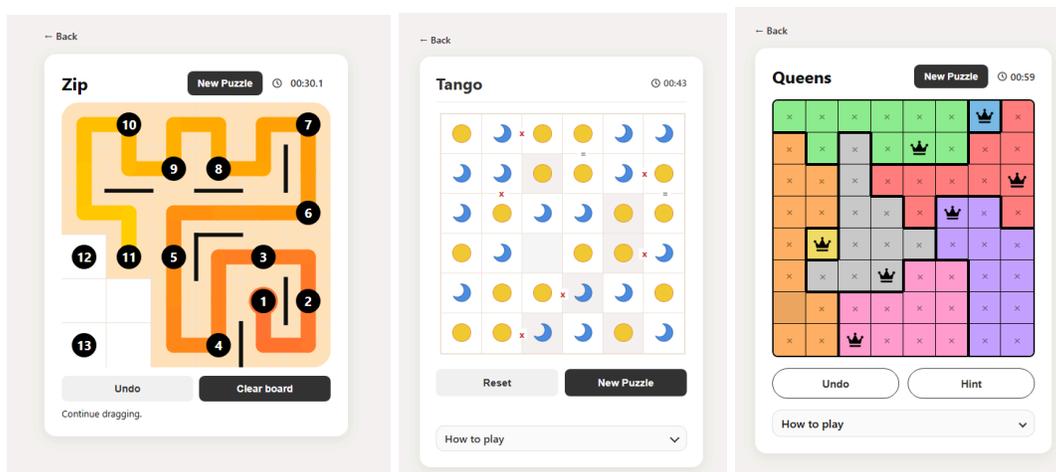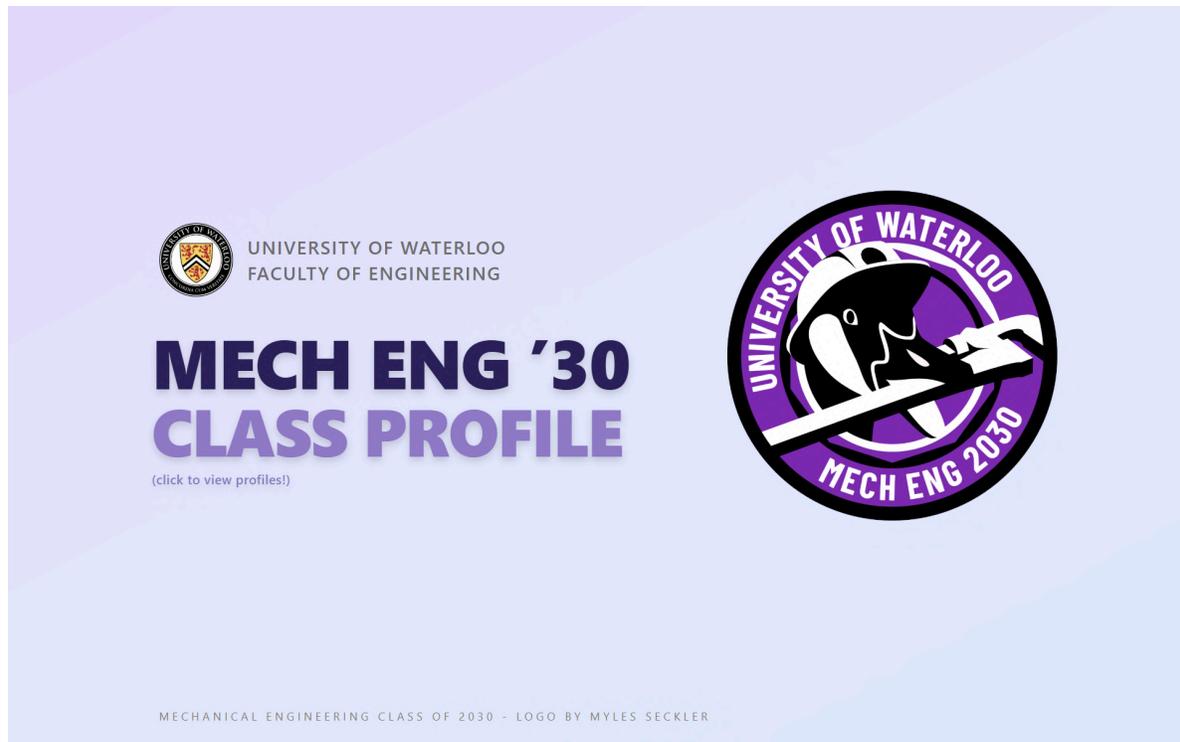
- Designed and developed the **official cohort website** for the University of Waterloo Mechanical Engineering Class of 2030

- Built a responsive, component-driven frontend using **Next.js, Tailwind CSS and React**

- Implemented a scalable, data-driven architecture using structured **JSON** to manage student profiles and content

- Designed a clean, modern UI with consistent typography, spacing, and layout systems to ensure readability and visual appeal

- Currently serves as the **primary and only** centralized website used by the Mechanical Engineering cohort at the **University of Waterloo**