Karl Keshavarzi

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Education

University of Waterloo — Waterloo, ON
Bachelor of Applied Science, Computer Engineering — *Sep. 2025 – Present*
- Academic Class Representative, Richard and Elizabeth Madter Scholarship President's Scholarship of Distinction

Experience

Embedded Software Developer — Sep. 2025 – Present
Waterloo Aerial Robotics Group — Team Member — *Waterloo, ON*
- Configured **SPI** and **timer peripherals** in **C++** on an STM32 MCU to read 10-bit ADC input and generate **50Hz PWM signals** for motor control.
- Contributing to embedded flight software, working on real-time systems for autonomous drone operations.

Founder & Technical Lead — Apr. 2020 – Present
KesTech Systems — Self Employed — *Vancouver, BC*
- Generated **$40,000+** in revenue and **$10,000+** in profit by scaling a computer sales operation into a sustainable side business, building and selling 60+ custom systems through local marketplaces with near-100% satisfaction.
- Built a professional company website using HTML, CSS, and JavaScript, enhancing reach and visibility.

Projects

Electromagnetic Propulsion System | *C/C++, Python, Arduino, OpenCV*
- Engineering a multi-stage electromagnetic launcher; currently in the **R&D and hardware prototyping** phase.
- Actively researching **power electronics** (MOSFETs, IR sensors) and building the physical prototype
- Utilizing Altium to design the **custom PCB** for precise coil timing, with a **real-time OpenCV pipeline planned** as the final software phase.

Hospital-Induced Delirium Environmental Monitor | *C/C++, Arduino*
- Developing an Arduino-based environmental monitoring system to support prevention of hospital-induced delirium by alerting staff to suboptimal room conditions.
- Integrating temperature, humidity, noise, and light sensors, writing C/C++ firmware for **real-time data acquisition** and threshold-based alerting.
- **Collaborated with hospital staff** to define safe environmental parameters and validate prototype performance.

ExoDiscover | *Python, Flask, React, ThreeJS, HTML/CSS*
- Integrated team **XGBoost/CNN AI models** with **React/ThreeJS** frontend via a Flask API, delivering a full-stack, data-driven website in **48 hours** for NASA SpaceApps Hackahton.
- Developed a dynamic React and ThreeJS web interface to render 3D, interactive visualizations of exoplanet data pulled from a live AI-powered API.
- Leveraged **generative AI** as a co-pilot for **rapid prototyping** of the frontend, enabling our 4-person team to successfully integrate and pitch a functional demo that placed top 4/30 (150 participants).

UWTranscriptEngine | *C/C++*
- Engineering a C++ application from scratch using **Object-Oriented Programming**, designing a class hierarchy to model complex, hierarchical academic data.
- Implementing **dynamic data management** using std::vector to allow users to add, edit, and manage a limitless number of courses, weighted categories, and graded items.

IMMERSED | *Python, MediaPipe, HTML/CSS*
- Built an **AI-driven focus monitoring tool** in team of 4 using **MediaPipe** to track facial engagement and trigger automated break prompts when focus dropped below defined thresholds.
- Leveraged generative AI for rapid UI and logic prototyping; placed top 3 of 25 teams (150+ participants) at the Future Legends Hackathon after developing the solution in 4.5 hours.

Technical Skills

Languages: C/C++, Python, JavaScript, Java Processing, HTML/CSS
Frameworks: OpenCV, MediaPipe, Flask, React, ThreeJS
Tools: Git, VS Code, Altium, Arduino, STMCubeIDE