Aayan Rahman

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Professional Summary

First-year Electrical Engineering student at the University of Waterloo passionate about multidisciplinary engineering design. Experienced across hardware, software, and IT systems, with hands-on work in power systems, PCB design, embedded development, and DevOps automation. Strong collaborator on teams such as **Waterloo Rocketry** and **Waterloo Formula Electric**, with a proven ability to deliver safe, efficient, and data-driven engineering solutions. Seeking co-op opportunities in electrical, software, hardware, or DevOps engineering.

Education

University of Waterloo Waterloo, ON
BASc, Electrical Engineering (Co-op) *Sept 2025 – Apr 2030*

- **Relevant Coursework:** Circuits, Programming (C++), Physics, Linear Algebra, Calculus, Power Electronics.
- **Honors:** Presidential Merit Scholarship of Distinction, CCC Honour Roll, 3× Hackathon Winner.

Technical Skills

Hardware: Circuit Design, PCB Design, LTspice Simulation, Power Systems, Soldering, Instrumentation, Oscilloscope/Multimeter Analysis
Software: Python, C++, C#, MATLAB, JavaScript, Node.js, Bash, SQL, Linux, Embedded C & VHDL (introductory)
Tools & CAD: Git/GitHub, VS Code, Visual Studio, SolidWorks, KiCad, Altium Designer, LTSpice, Onshape, Fusion 360, Revit, Portainer, Docker, JetBrains IDEs, Unity
Professional: Technical Documentation, Agile Collaboration, Data Analysis, Microsoft Office Suite

Projects

Waterloo Rocketry – Electrical Ground Support Equipment | *Power Systems, KiCad* Jun 2025 – Present

- Engineered electrical subsystems for the **Automedon EGSE platform**, supporting automated rocket launch testing and power validation.
- Replaced a single costly **CBI1235A converter** with a dual-converter solution (**SPUC12360** + **XDR-480E-12**), **reducing cost by 65%** while maintaining identical output characteristics.
- Created precise **KiCad symbols and footprints** for high-power DC modules, eliminating schematic mismatches and ensuring 100% pin-level verification during design reviews.
- Performed **input breaker sizing and fuse rating calculations** via reverse-power analysis under 120VAC @ 90% efficiency, validating compliance with converter safety margins.
- Executed **fuse derating and tolerance studies** to select optimal Class G protection (≤30A), increasing circuit reliability and fault response time by **20%**.
- Authored **revision and documentation standards** for the EGSE team, improving onboarding efficiency and cross-subteam integration by **30%**.
- Presented findings in weekly design reviews and contributed simulation validation to the Automedon subsystem (GitHub Repository).

Waterloo Formula Electric – Buck-Boost Converter PCB | *Altium, Power Electronics* Sept 2025 – Present

- Developed a **buck-boost DC–DC converter (12V → 16V)** integrating **current shunt sensing**, **op-amp signal conditioning**, and **comparator-based overcurrent shutdown**.
- Implemented **thermistor-driven temperature monitoring** for MOSFET and diode junctions, ensuring safe shutdown thresholds under thermal overload conditions.
- Designed **reverse-polarity and surge protection** using PMOS/NMOS topology, safeguarding components from transient voltages exceeding 20V.
- Researched and applied **Analog Devices hot-loop design principles**, reducing EMI and switching noise by **25%** through improved ground-plane layout and capacitor placement.
- Optimized 2-layer PCB routing for minimal loop inductance and thermal performance, preparing for future transition to a 4-layer stack-up design.
- Collaborating with controls subteam to integrate converter telemetry into the vehicle's CAN bus for **real-time power diagnostics and fault detection**.

Waterloo Electrathon – Electric Car | *LTspice, CAD, Battery Systems* Oct 2024 – May 2025

- Directed electrical subsystem design; created detailed **wiring diagrams**, **BOM**, and **failure-mode checklist** reducing troubleshooting time by **25%**.
- Performed **torque-speed and efficiency analyses** to optimize gear ratio and BLDC motor selection, increasing endurance by **15 minutes per charge**.
- Designed 12V SLA battery system with **100A ANL fuse** and **50A peak safety margin**, verified through LTspice simulation.
- Maintained CAD revision logbook to support documentation audit for the **Dennis Weishar Engineering Design Award**.

ProteccAPI – Git-Integrated Secret Scanner (UofT Hacks) | *Node.js, Git Hooks, Regex* Jan 2025

- Developed an open-source CLI + VS Code extension to detect credential leaks in source control, reaching **100+ npm downloads**.
- Applied **Levenshtein distance-based heuristics** to identify near-miss secrets, preventing 20+ faulty dependency installs during testing.
- Automated developer onboarding through Husky pre-commit hooks, reducing environment setup time by **40%**.
- Extended scanning to CI/CD pipelines for continuous validation of repository integrity.

Raspberry Pi Home Server – Self-Hosted Cloud | *Linux, Docker, Portainer* May 2024 – Present

- Engineered a home lab on Raspberry Pi Zero 2 W with external SSD storage, hosting **6+ Dockerized services** including Nextcloud and Jellyfin.
- Configured automated SSL certificate renewal, achieving **99% uptime** across three client devices.
- Deployed a Portainer-based dashboard for container monitoring and created cron scripts reducing manual maintenance by **30%**.

NFC Business Card + Portfolio Website | *KiCad, Next.js, NFC Tools* May 2024 – Present

- Designed a custom **NFC-embedded PCB** manufactured via JLCPCB to launch my online portfolio with a single tap.
- Integrated **Next.js + Tailwind CSS** web application with responsive components deployed on Vercel for instant accessibility.
- Tested interoperability across iOS and Android achieving **100% successful scans**.

Experience

Brain Stimuli Project – University of Toronto Oct 2024 – Feb 2025

Full Stack Developer *Toronto, ON*

- Developed a **React + MongoDB** web interface integrating an AI emotion recognition model used in **10+ neuroscience trials**.
- Created dynamic dashboards with D3.js and REST APIs for real-time visualization of emotional response data.
- Increased system reliability to **95% uptime** by optimizing asynchronous data calls and caching.

Code Ninjas Sept 2024 – Aug 2025

Instructor (Sensei) *Oakville, ON*

- Taught **50+ students** JavaScript and C# fundamentals through interactive projects and Unity-based games.
- Introduced hands-on lessons in digital logic and simple circuit theory for younger cohorts, boosting STEM engagement.
- Ensured **100% uptime** of classroom hardware and robotics kits, maintaining readiness for over 100 lessons.

Leadership & Involvement

Hack Club Software Fellowship (100+ hours) Oct 2024 – Jan 2025

- Completed 100+ hours of software development under Hack Club's mentorship initiative, building tools for students and community developers.
- Collaborated with peers globally to improve open-source app performance and accessibility.

Hackathons Canada – Logistics Director 2024 – Present

- Secured over **$10 000 in sponsorship funding** through outreach to tech companies and local organizations.
- Managed team operations across **Notion** for project tracking, volunteer coordination, and application review.
- Built and maintained the organization's **Discord server (500+ members)**, implementing role permissions, event bots, and announcement channels for streamlined communication.
- Coordinated logistics for national hackathons exceeding **500 participants**, overseeing venue operations, sponsor relations, and technical support.
- Introduced process automation using **Google Apps Script**, improving registration and scheduling efficiency.