Aspen Erlandsson

aspen.erlandsson@mail.utoronto.ca theaspen.ca GitHub LinkedIn

EDUCATION

Bachelor of Applied Science in Engineering Science + PEY Co-op
Aerospace Engineering Major | University of Toronto | Toronto, ON — Sep. 2022 - Jun. 2027 (expected)

| Relevant Courses

- Fundamentals of Electric Circuits
- Digital & Computer Systems (FPGAs)
- Electromagnetism
- Control Systems

SKILLS

- **Electronics:** Altium PCB Design, Power Electronics, Mixed-Signal, RF Design & Testing (VNA/SA), EMI/EMC (E3), Oscilloscope Debugging, SMT Assembly & Soldering
- **Programming:** Python, C/C++ (Desktop & Embedded), CUDA, MATLAB, STM32 Firmware, Qt, OpenMP, FastAPI
- **Computer Aided Design:** Onshape, Fusion360, Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD)
- **Manufacturing:** Design for Manufacturing (3D Printing, CNC, PCB Fab & Assembly), Test Fixtures, PCB Rework (Flywires, Trace Repair, Reflow)
- **Professional:** Requirements Management (IBM DOORS), Technical Documentation, Cross-Team Collaboration, Time Management
- **Leadership:** Design Reviews, Mentoring Engineers, Establishing Standards, Prioritizing Critical Tasks, Anticipating and Resolving Task Blockers

WORK EXPERIENCE

Systems Design and Integration Intern
Safran Landing Systems | Ajax, ON — Jul. 2025 - Present

- Supporting interface management and requirement validation for Bell V-280 Valor landing gear systems using IBM DOORS and formal documentation practices
- Authored numerical analysis content for electric and magnetic field emissions across electronic landing gear components within an E3 (EMI/EMC) control plan
- Led development and maintenance of a qualification program plan (QPP) for built-to-spec components; managed signature and release cycles for assigned systems documents
- Updated hydraulic system diagrams and supported supplier coordination; developed Python scripts to accelerate reliability analysis and internal tool usage

Research Analyst (Quantum Computing and Machine Learning)
University of Saskatchewan (VIDO) | Saskatoon, SK, Remote — Aug. 2024 - Jul. 2025

- Developed and evaluated quantum and ML methods for biological regulatory networks and vaccine-related workflows using Python, Qiskit, and PyTorch
- Designed and ran experiments on real IBM quantum hardware; contributed to a 2025 IEEE QCE publication with results supported by large-scale simulation
- Utilized 75,000+ CPU-hours for simulation/training; reported weekly to supervisors and communicated results with clear figures, tables, and reproducible scripts

EXTRA-CURRICULAR EXPERIENCE

Avionics System Lead
University of Toronto Aerospace Team - Rocketry | Toronto, ON — Sept. 2024 - Present

- Leading avionics systems across propulsion, recovery, and airframe integration for a 15,000 ft liquid bipropellant rocket targeting launch in Aug. 2026
- Delivered 39 unique PCBs across the avionics program (26 personal designs); established Altium library standards, schematic/layout templates, and DFM/DFT review processes
- Mentored 60+ students through design reviews, workshops, and build campaigns; maintain high-signal documentation for interfaces and system bring-up
- Spearheaded bench validation and debugging for power, sensors, and RF (scope, thermal, VNA/SA), including rapid rework to support firmware integration

PROJECTS

Full project writeups with images and videos (and additional projects) are available at theaspen.ca.

CUDA / C++ Developer
GPU-Accelerated Electromagnetic Wave Solver (FDTD) | Toronto, ON — Sept. 2025 - Present

- Built a GPU-first FDTD solver for PCB and antenna structures, designed to stay bit-for-bit matched to a single-threaded CPU reference
- Validated accuracy against CST Microwave Studio, MATLAB RF PCB Toolbox examples, and analytical microstrip benchmarks using a dedicated validation suite
- Achieved 17 GCell/s (MUR) and 6.5 GCell/s (PML8) on an RTX 5070 Ti; reduced a 4x4 patch array simulation from 222 hours (OpenEMS) to 6.8 hours
- Profiled and optimized with Nvidia Nsight Compute; rendered fields in ParaView (VTK) for debugging and verification

RF PCB Designer
Frequency Modulated Continuous Wave Radar (FMCW) PCB | Toronto, ON — Oct. 2024 - Mar. 2025

- Designed, assembled, and tested an FMCW radar PCB operating over 2.0 - 2.4GHz with a full RF chain (VCO, PA/LNA, mixer, LPF) on an impedance-controlled stackup
- Employed RF design practices including impedance matching, passives selection, low-noise power, and GCPW routing techniques
- Manufactured and tuned paired Yagi-Uda antennas and validated matching and link assumptions using a Vector Network Analyzer (VNA)
- Verified system behavior using a spectrum analyzer, oscilloscope, and function generator sweep (wideband VCO drive and mixer IF behavior)

Solo Developer (C++ / Backend)
Published Steam Game (Coconut) | Toronto, ON — Jul. 2024 - Nov. 2025

- Solo-built and shipped a Steam game with a custom C++ engine (SFML) and a FastAPI backend on AWS for live operations and community features
- Achieved 59k lifetime users and 6M+ hours played; implemented Steam inventory, achievements, and a functional marketplace economy
- Designed core retention and monetization systems (rare drops, limited-time boosts, and trade-up mechanics) while keeping runtime performance stable
- Built and maintained a production pipeline for updates, announcements, and telemetry

C++ Developer
Custom High-Performance Fluid Simulation Software | Toronto, ON — Aug. 2024 - Oct. 2024

- Designed and optimized a real-time 2D incompressible fluid solver in C++ with interactive visualization modes for pressure, vorticity, and dye transport
- Implemented Red-Black Gauss-Seidel and OpenMP parallelism for the pressure solve, achieving a measured 10x speedup over baseline on a 12-core desktop
- Optimized rendering by operating on raw buffers to reduce a major hotspot from 25ms to 0.36ms while keeping the UI responsive
- Produced cross-platform source builds (Windows/macOS/Linux) and validated stability under high velocity gradients and obstacle interactions

System Designer & Developer
Custom 3D Printed Fixed-Wing UAV Drone | Toronto, ON — Feb. 2024 - Oct. 2024

- Designed and built a 1.1m wingspan fixed-wing UAV with a custom airframe, avionics, and communication protocol
- Developed a bi-directional communication system using LoRa modules on custom-designed and self-soldered PCBs (Altium Designer), achieving a verified 500m line-of-sight link with ongoing range improvements via RF validation and antenna tuning
- Validated airframe performance using CFD simulations, iterating designs to optimize for lift and drag characteristics at target flight conditions
- Designed and implemented real-time telemetry streaming with a custom C++ GUI, integrating a Teensy 4.0 for flight control and an MPU6050 gyroscope/accelerometer for real-time orientation tracking, debugging and optimizing the entire system using an oscilloscope