

David Balan

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Objective

I am a motivated 3rd year computer science student at Queen's University with practical experience in programming, robotics, embedded systems, and applied AI. I am seeking a general computer science internship where I can contribute across the stack from embedded firmware and system-level programming to higher-level software, AI, or DevOps while building towards a career creating innovative technical solutions.

Skills

- Python
- Java
- C/C++
- Bash
- YOLOv11-based Object Detection
- Machine Learning — scikit-learn, pandas
- Rust (beginner)
- Languages: English, Romanian (fluent); Russian (learning)
- Frontend: HTML, CSS, JavaScript, Typescript
- Databases: MySQL
- Git/GitHub, CMake
- Data Analytics & Visualization
- Debugging Skills: GDB
- Container-based tech (Docker, basic Kubernetes)
- Basic CI/CD and automation

Education

- Queen's University**, Bachelor of Computing (Honours) – Specialization in AI Sept 2023 – May 2027
- GPA: 3.72/4.30
- University of Manchester**, Semester Abroad Jan 2026 – June 2026

Relevant Experience

- Teacher's Assistant**, Queen's University – Kingston, ON (CISC 204 – Logic For Computer Science) Sept 2025 – Present
- Led office hours to clarify course concepts and provide targeted assignment feedback, improving student understanding and performance
 - Supported 50+ students bi-weekly, improving assignment scores by 10% on average
 - Collaborated with instructors and fellow TAs to standardize grading, uphold academic integrity, and ensure accessible learning support
- Firmware Developer Intern**, Neuronicsworks Inc. – Toronto, ON May 2025 – July 2025
- Implemented firmware features enabling reliable comms between displays, sensors, and embedded controllers.
 - Conducted QA testing across projects, documenting integration issues and collaborating with developers to resolve them according to SOPs
 - Created detailed test cases and validation reports to support QA processes and reduce debugging turnaround time
- Strategist Lead & Computer Vision/AI Integration**, Queen's VEX Robotics Team – Kingston, ON Sept 2023 – Present
- Built and iterated climbing mechanisms as part of the Mechanical Climb Team, improving reliability through rapid test-refine cycles
 - Trained and integrated object detection models, supporting the software team with perception and automation capabilities
 - Led the Strategy team and collaborated with the Drive team to develop match-winning strategies by analyzing competitors and match data
 - Competed at the 2024 & 2025 VEX Robotics World Championship in Dallas, Texas, won a Build Award for the 2025 season for robot construction quality
 - Acted as liaison between the robotics team and School of Computing faculty

Awards & Achievements

- **Build Award**, VEX Robotics World Championship Season 2024–2025 – Recognized for best-constructed robot among qualifying teams at a Worlds-level event
- **Dean's List**, Queen's University 2024–2025 – Academic recognition for high GPA performance
- **Mayor's Award**, KingHacks 2026 - Top civic-impact prize awarded by the Mayor's Innovation Track.

Relevant Coursework

- CISC 203 – Discrete Structures II (logic, proof techniques, discrete math for computing)
- CISC 220 – System-Level Programming (C, pointers, memory, low-level I/O)
- CISC 221 – Computer Architecture (instruction sets, memory hierarchy, performance)
- CISC 235 – Data Structures (lists, trees, graphs, complexity)
- CISC 320 – Fundamentals of Software Development (C++, design, testing, maintainability)
- CISC 327 – Software Quality Assurance & Testing (test strategies, automation, QA)
- CISC 324 – Operating Systems (processes & threads, IPC & synchronization, CPU scheduling, resource management, protection & security)

Projects

Kingston CareMap — Backend Developer, KingHacks (React, FastAPI) 2026

- Built a low-data, mobile app for Kingston that helps users quickly find essential services and food resources under tight constraints (limited connectivity, low battery, time pressure)
- Implemented a dual navigation experience (interactive map + list fallback) with real-time status cues (e.g., *Open now / Closing soon*) and need-based filtering (showers, laundry, youth/women's services, pets, accessibility)
- Designed a friction-reduction flow to minimize dead ends from stale information by prioritizing verified listings, displaying last-updated timestamps, and adding explicit *call ahead* warnings when details are uncertain
- Added a lightweight *Watch List* feature to let users save and revisit critical locations quickly, improving repeat access and reducing search time
- Recognized with the **Mayor's Award** for building an AI-enabled civic tool that improves community life and public service accessibility in Kingston

CleanShare — Lead Developer (Qt/C++, Computer Vision) 2025

- Built a desktop application that detects and selectively blurs sensitive content (e.g., alcohol, license plates) from images using YOLOv11 and ONNX Runtime, with a Qt/C++ and OpenCV-based UI pipeline
- Trained models on ~1,000 annotated images across a variety of alcohol containers (bottles, cans, etc.), achieving roughly 80% detection on internal test data
- Optimized the pipeline to process 1080p images in around 5 seconds on CPU-only consumer hardware, balancing accuracy with responsiveness
- Discovered inconsistencies in exporting PyTorch .pt models to ONNX; implemented a hybrid architecture that pipes images from C++ to a Python script and returns bounding boxes via a temporary JSON file, restoring reliable detections while keeping the main app in C++
- Packaged the application for end users using CMake and Inno Setup, making it straightforward to deploy on Windows machines

CoffeeBot Firmware — Embedded Sensing & Display (ESP32, C++) 2025

- Developed firmware in C++ for an ESP32 microcontroller to monitor coffee machine usage via an amp sensor, using I²C for sensor communication
- Sampled sensor data every second and transmitted aggregated state updates roughly every 5 seconds over Wi-Fi to the company's WLAN server, where networked displays picked up and rendered the information
- Implemented a simple state machine that detected increases in the running average of current draw and switched system states accordingly (e.g., brewing vs idle), enabling meaningful usage insights
- Managed tight memory constraints on the ESP32 due to the display footprint by optimizing buffer usage and avoiding unnecessary dynamic allocations, resulting in a stable system that very rarely showed incorrect information and could be corrected with a simple power cycle if needed

FaceCrypt — Local Biometric Encryption Tool (Python, OpenCV) 2024

- Built *FaceCrypt*, a locally running biometric encryption tool that uses face detection as a gate to protect sensitive information on a device
- Implemented face detection with Python and OpenCV, and built a simple Tkinter-based GUI to manage encrypted files and the unlock flow
- Completed a working prototype within a 36-hour hackathon window, from idea to demo, and presented the project to judges and other participants

Additional Experience

Line Cook, The Caesar Company – Kingston, ON Sept 2025 – Dec 2025

- Executed station prep and service to spec under high volume; maintained ticket times, plating standards, and cross-station communication
- Enforced food safety, reduced waste during prep, and kept a clean, audit-ready line throughout service

Ski Instructor (Seasonal), Dagmar Snow School – Uxbridge, ON Jan 2020 – Mar 2023

- Delivered engaging and supportive lessons to build students' confidence and enjoyment in skiing
- Monitored student progress, assessed weather and slope conditions, and enforced safety guidelines to prevent accidents

Volunteer Experience

IT Volunteer, LSRS – Liga Studenților Români din Străinătate, Canadian Chapter Oct 2025 – Present

- LSRS (League of Romanian Students Abroad) - Supported IT needs for the Canadian chapter, including tools and systems used for communication and coordination of activities
- Contributed to CeX, a monthly worldwide cross-chapter meeting, by helping prepare and share updates on upcoming events and initiatives
- Collaborated with other volunteers and chapter leads to plan and promote events for Romanian students and recent graduates in Canada

Logistics Volunteer, Untold & Neversea Music Festival – Cluj-Napoca, Romania July 2022 – Aug 2024

- Managed and maintained payment systems, including setup, debugging, and post-event teardown, ensuring seamless transactions for attendees
- Collaborated with a contracted telecommunications company to maintain communication infrastructure, ensuring reliable walkie-talkie operations linking organizers, emergency personnel, and volunteers
- Supported critical festival coordination, contributing to the smooth execution of large-scale events attended by tens of thousands of participants