Gaelan McMillan

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Education

Toronto Metropolitan University (formerly Ryerson University) *Toronto, Ontario* | **Sep 2021 – Expected May 2026**
B.Sc. Computer Science (Co-op)

Relevant Coursework: Data Structures, Algorithms, Operating Systems, Computer Graphics, Discrete Math, Linear Algebra

Experience

SOTI Research & Innovation Lab | *Software Developer Intern* *Waterloo, Ontario* | **May 2023 – Mar 2024**

- Demonstrated initiative as a frontend developer intern, fixing critical bugs, implementing key features, and seeking out opportunities to assist QA and backend teams for the IOT-device management application *Connect*.
- Spearheaded an initiative to enable strict-family flags in a mature TypeScript codebase; applied topological dependency analysis to **fix 800+ uncaught compile errors**, increasing code-quality and maintainability while minimizing disruption to team productivity.
- Enhanced CSV-import flows in *Connect* by creating reusable Angular components for **inline formatting hints and parse error diagnostics**, massively increasing the accessibility and usability of the product.
- Designed and prototyped a custom performance monitoring tool, authoring a Python module that uses the Chrome DevTools Protocol to collect Lighthouse performance metrics from existing Robot Framework automation tests, increasing visibility of frontend performance bottlenecks while eliminating the maintenance burden of a second test suite.
- Collaborated with cross-functional teams, applying knowledge of SQL, C#, .NET, and Angular to diagnose and resolve bugs, and develop features ahead of deadlines.
- Led features through all phases of the software development lifecycle, from mockup creation and stakeholder proposals to implementation and testing.
- Communicated with domain experts to understand complex features and write detailed acceptance criteria, streamlining development by reducing the likelihood a ticket would re-enter development after QA testing.

CPP North | *Conference Volunteer Coordinator* *Toronto, Ontario* | **Jun 2022 – Aug 2023**

- Managed a team of **20+ volunteers** to deliver a world-class conference experience for **200+ attendees**.
- Demonstrated leadership skills by carrying out all aspects of volunteer staffing for the 2023 conference, including recruitment, onboarding, training and scheduling.
- Implemented a dynamic scheduling scheme, assigning tasks such that volunteers were able to attend the talks they were most interested in while ensuring all posts were staffed during times of peak demand.

Projects

Tina Tuner – Chromatic Tuner for Terminal Lovers | *Rust, Digital Signal Processing* Git Repository

- Designed and built a cross-platform terminal app which performs **real-time autocorrelation-based pitch detection** to assist in the tuning of direct-input musical instruments, such as electric basses or guitars.
- Leveraged lock-free, wait-free concurrency to perform asynchronous UI rendering and audio analysis.
- Implemented an autocorrelation-based pitch detection algorithm from scratch in Rust.

Stop the Mole! – *Jackbox-style* Multiplayer Puzzle Game | *Websockets, TypeScript, p5.js, Rust* Video Demo

- Implemented a websocket client-server architecture in TypeScript using Node.js and Socket.IO to facilitate an enjoyable multiplayer experience.
- Conducted research into the solvability of this game, programming an AI agent in Rust that uses a backtracking search with heuristic pruning to tackle the immense combinatorial search space.

Jeopardy Clone – LLM-Hosted Quiz Show Game | *React, TypeScript, Cohere, BeautifulSoup, Python* Video Demo

- Created a playable *Jeopardy* clone, including three main components: a Python data harverster to scrape the web for question sets and generate translations with Google's Translate API; a Node.js backend to judge player guesses; and a React frontend.
- Utilized Cohere's *Command* API with a custom prompt to act as a judge for player answers, achieving a typo-tolerant, context-sensitive machine judge and alleviating the need for a player to act as a dedicated host.
- Implemented a randomized tie-breaking solution, reducing *"I buzzed first!"*-based arguments by **85%**.

Visit gaelanm.com/works for a full list of my published projects

Technical Skills

Languages: TypeScript, Rust, C++, Python, JavaScript, C#, SQL, C, Wasm, Elixir, Haskell, Common Lisp, Prolog, HTML, CSS
Frameworks: React, Next.js, Node.js, Express, Socket.IO, p5.js, wasm-bindgen, Macroquad, CPAL, Sass
Tools: Git, Jira, Agile, Vim, VS Code, GNU Utils, Cargo, Pandoc, DataGrip, SQL Server Management Studio