

Ethan MacDonald

Portfolio: <https://ethanm.ca>

GitHub: <https://github.com/emd22>

LinkedIn: <https://linkedin.com/in/emd22>

Phone: (902) 304-4201

Email: e@ethanm.ca

Summary

I am proficient in C, C++, C#, Python and web languages, and have many open-source projects that show my work. I work on a variety of projects with a **focus on games**, from Just-In-Time (JIT) compilers, game engines, SSE and ARM Neon optimized math libraries, and scripting languages.

I am in Sydney, Nova Scotia, and I am **open to relocation** to work in-person as well as remote work.

Education

Bachelor of Computer Science, 2022 – 2026

- Bachelor of Computer Science completed at Dalhousie University
- Received Future Tech Leaders award

Work Experience

InteGolf, *Full-Stack Developer*, Summer 2024 and Summer 2025

- Worked on all facets of the services provided by InteGolf including the booking software, tournament software, and unreleased services
- Developed a data collection tool in Python that reduced data collection time from a full day to 10 minutes. Collected, sanitized and collated 10,000+ images and data entries while utilizing multiple worker processes.
- Built a fully featured automated testing framework in TypeScript in a week. Ran multiple tests asynchronously and reported back any issues encountered before shipping to customers. This framework also provided client-side injection that could record user input and play it back on different versions of the app.

Chido Inc., *Full-Stack Developer*, April 2023 – October 2023

- Frontend and backend development for virtual real estate walkthroughs and sales
- Built plugins and tools to improve 3D artist workflow with Unreal Engine 5
- Created a dynamic order time estimation system that factored in size, complexity and number of artists delegated to a project to provide accurate time estimates.
- Developed an object placement editor in Three.js and WebGL with a progressive lightmapping solution to have good visuals on less powerful hardware. This editor imported scenes from UE5, allowing non-technical users to modify existing scenes.

Projects

Raptor Engine, March 2025 – Present

- Forward+ renderer with GPU light culling. Previously used deferred rendering and still employ a depth and normal prepass for screen-space effects
- Light probe based global illumination, PBR lighting pipeline with ambient occlusion
- Level prototyping editor written with hot-reloadable scripts
- Custom math library optimized with SSE, AVX and ARM Neon
- Scripts are written in Strata language and are Just-In-Time compiled

Strata Language, July 2026 – Present

Strata is a scripting language designed for games with Ahead-Of-Time (AOT) and Just-In-Time (JIT) compilation with LLVM.

- Built in C with two other programmers who work in the AAA game space
- I added first class SIMD accelerated vectors (similar to HLSL's float3/floatX), and frequently work on the compiler to add new language features, fix compilation bugs, and optimize both the emitted source and the compilation process

Satellite Visualization, February 2026 – April 2026

For a final project in my visualization course in university, we were given the task of building an interactable visualization from publicly accessible datasets. I decided to go with using real satellite data and build a renderer in C++ using Raylib and OpenGL. Satellite positions are calculated ahead of time with an SGP4 estimation library and cached in keyframes that are interpolated between.

- Renders 40,000+ interactive satellites in real-time. I needed to replace a lot of the existing rendering routines in Raylib for performance reasons. This brought me from ~10fps to over 200fps at ~1000 instanced draw calls.
- I built tools into the visualization to combine positional data with a satellite catalog to be able to filter, pair and retrieve information about each satellite
- Added stylistic atmospheric scattering and other eye candy
- Precalculates, caches and interpolates a lot of existing data to reduce CPU and memory load
- Professor is using my project as an example for future teaching years

Skills

- **Languages:** C++, C#, C, Zig, Python, JavaScript, TypeScript, Dart, HLSL, GLSL, Slang
- **Graphics:** Vulkan, OpenGL, Unreal Engine, Unity, Godot, Forward+, Deferred Rendering, Global Illumination, PBR
- **Systems:** Physics, Animation, Multithreading, SSE, ARM Neon, AVX, Compilers, Scripting languages, Memory allocators