

Patrik Buhring

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Education

University of Waterloo

Sept. 2022 - Aug. 2027

- Double Majoring in **Computer Science** and **Pure Mathematics**.
- Candidate for a **Bachelors in Mathematics**. (GPA: 3.75)
- Advanced Computer Science 2 (**98%**): Parsing, Interpreting, and Compiling languages.
- Programming for Performance (**98%**): Concurrent and efficient computation on modern hardware.

Skills

Languages Rust, C#, Java, C, Bash, Dart, Python, Racket, HLSL, GLSL, LaTeX

Frameworks & Libraries WebGPU, DirectX 11, Android, .NET, Linux, CUDA

Projects

[Hypersphere: An Exploration of 3D and 4D Spherical Geometry](#)

Dec. 2022 - Present

Rust, WGSL, WebGPU, WASM, JavaScript, HTML, and CSS

- Develops math and libraries as needed to support development and serve as a tech demonstration.
- Publishes updates to [a live WASM demonstration](#) in a custom-written HTML website.
- Integrates a custom flat shading water shader for enhanced visual appeal.
- Developed an open source [4D math utilities](#) library and [separate tech demo](#).

[Hydraulic Erosion Simulation on Spherical Terrain](#)

May 2023 - Present

Rust

- Adapts an existing [hydraulic erosion simulation](#) for spherical terrain: [demo video](#).
- Presented a talk demonstrating the project at the Summer 2023 SASMS at UWaterloo.
- Leverages a **SIMD** implementation of simplex noise and multithreading to efficiently use resources.

[Hexasphere: Open Source Sphere Generation](#)

Aug. 2020 - Present

Rust

- Implements an efficient sphere subdivision algorithm with the aim of reducing distortion.
- More than [1.2 Million downloads](#).
- Maintains and updates the project, ensuring quality and well-documented code.
- Optimized to produce cache-friendly meshes for efficiency when rendering very detailed spheres.

[JamHacks Hackathon 1st Place Overall](#)

Jun. 2022

Rust, WebGL, and WASM

- Designed, tested, implemented, and deployed a **WASM** compatible **3D** Golfing Game.
- Rapidly prototyped in **Rust** with a hand written implementation of physics over two days.
- First attendance of team GalactiGolf to a **Hackathon** with excellent teamwork and communication.

[Animated Low Poly Water Graphics Example](#)

Jun. 2020

Rust, GLSL, WebGPU, and WebGL

- Contributed to the **open source** library WGPU for multiple backends (**Vulkan**, **DirectX 12**, etc.).
- Demonstrates nontrivial **computer graphics** techniques such as read-only depth-stencil.
- Clean, performant, modular code with **well written documentation** meant as a tutorial.