Patrik Buhring

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Education

University of Waterloo Sept. 2022 - Jun. 2027

- Double Majoring in **Computer Science** and **Pure Mathematics**.
- Candidate for a **Bachelors in Mathematics**. (GPA: 3.69)
- 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, LaTeX, C, Bash, Dart, Python, Racket, HLSL, GLSL

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

Projects

Hypersphere: A Game On The Surface Of A 4D Sphere Dec. 2022 - Present
Rust, **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.

Hydraulic Erosion Simulation on Spherical Terrain May 2023 - Present
Rust

- Adapts an existing hydraulic erosion simulation for spherical terrain: demo video.
- Presented a talk explaining the implementation 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 **1.1 Million** downloads.
- Maintains and updates the project, ensuring quality, maintainable, and well-documented code.
- Leverages a portable **SIMD** vector library to process vertices.
- 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, **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.