



Sean Purcell

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github.com/iburinoc 

Skills

- Interest Areas: Server and Network Infrastructure, Graphics, Concurrency, Algorithms
- Technologies: C++, Go, Rust, C, Python, Java, Vulkan, OpenGL

Experience

- 2019 **Software Engineering Intern**, *Jane Street Group*, New York, NY
Sep. – Dec. Improving redundancy and reliability for infrastructure core systems
- 2019 **Software Engineering Intern**, *Facebook*, Seattle, WA
Jan. – Apr. Added request execution reliability features for 40k QPS ads caching service in C++
 - Added weighted request prioritization to ensure that during overload important clients aren't impacted
 - Designed custom queue data structure to efficiently select safe requests to execute
 - Capped request latency at 20ms by returning partial results when full results would be too slow
- 2018 **Software Engineering Intern**, *Google*, Waterloo, ON
May – Aug. Added various statistics and metrics to open-source GAPID Vulkan graphics API debugger in Go
 - Created overdraw visualization feature that shows the number of fragment shader executions per pixel
 - Analyzed Vulkan synchronization primitives to build GPU task dependency graph
 - Statically parsed shader module call trees to determine what resources were used by the GPU pipeline
- 2017 **3D Software Developer Intern**, *Side Effects Software, Inc.*, Toronto, ON.
Sep. – Dec. Worked on adding tools and features to Houdini, Side Effect's 3D visual FX software
 - Implemented FABRIK full-body inverse kinematics algorithm for large-scale crowd animation
 - Added support for 3D Optical Flow enabling visual effects to track motion in an existing video
- 2017 **Software Engineering Intern**, *Facebook, Inc.*, Menlo Park, CA
Jan. – Apr. Worked on the Zstandard compression library development and integration in C
 - Wrote Linux kernel patch adding support for Zstandard in SquashFS compressed filesystems
 - Used SquashFS Zstandard support to optimize Facebook's static Python executables' size and speed
- 2016 **Software Engineering Intern**, *Wish – ContextLogic*, San Francisco, CA
May – Aug. Worked on the Wish infrastructure in Python improving stability, monitoring, and efficiency
 - Optimized most frequent endpoints, cutting latency by 60% and heavily reducing network usage
 - Redesigned and migrated billion-row data collection to reduce database load and improve efficiency

Projects

- 2018 **gba-rs**, [🔗 iburinoc/gba-rs](#)
Emulator for Nintendo GBA device written in Rust
 - CPU module implements full ARM ISA as well as all functionality for GBA rendering unit
- 2016 **GR Trace**, [🔗 iburinoc/gr_trace](#)
Real-time black hole ray-tracer using Rust and OpenGL
 - Traces photons in fragment shader using RK4 for stable integration of relativity metric
- 2015 **Flightsim**, [🔗 iburinoc/flightsim](#), [🔗 iburinoc/flightsim-cardboard](#)
3D flight simulator in C++, using OpenGL for rendering
 - Ported to iOS for use as a Google Cardboard VR app

Education and Achievements

- 2015–2020 **Candidate for Bachelor of Software Engineering**, *University of Waterloo*
- 2019 **Finalist, 2019 ICPC World Finals**, *Porto, Portugal*
Competed on team of three in international collegiate algorithm and data structures competition