Sean Purcell

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Summary of Qualifications

- Experience working with C, C++, Python, Java, ASM, JavaScript, HTML.
- Strong understanding of Linux internals, and server infrastructure management from work.
- Knowledge of concepts of and experience working with NoSQL and relational databases.
- Award-winning use and understanding of algorithms and data structures at the IPCP and the CCO.
- Adept at rapid prototyping and experimentation from hackathon experience.

Work Experience

2017 **Software Engineering Intern**, *Facebook, Inc.*, Menlo Park, CA.
Jan. – Apr. Worked on the Zstandard compression library development and intergration in C.

- Added support for Zstandard in Linux SquashFS, optimizing Facebook's static Python executables.
- Designed and implemented seekable compression format, for parallelization with big data.
- Created full-format custom fuzzer to verify implementations conform to the Zstandard specification.
- Designed continuous integration scheme to ensure continuing reliability of the library.

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 MongoDB load and improve efficiency.
- Built ORM black pipe testing framework to ensure correct network behaviour under stress.
- Developed exception monitoring platform, improving deployment safety and debugging efficacy.

2015 **Software Engineering Intern**, *Sunnybrook Research Institute*, Toronto, ON.
Jul. – Aug. Created, improved, and optimized software used in Medical Biophysics Research.

- Sped up differential equation-solving simulator by 50%, reducing research inefficiencies.
- Worked with C++, using OpenMP and MPI for parallelization.

Projects

2016 **GR Trace**, iburinoc/gr_trace
Created a real-time black hole ray-tracer using Rust and OpenGL.

- Traces photons in fragment shader using RK4 for stable integration of relativity metric.
- Uses Rust for window and context management, as well as dynamic GLSL creation based on options.

2015 **AnonymEyes**, *Winning Team, Hack the North*, devpost.com/software/anonymeyes
Built a location-based video streaming app for emergency response and evidence collection.

- Designed and implemented custom video stream from Android to receiving server over UDP.
- Built a web app showing streamed videos, interfacing the Google Maps API to show position.

2015 **Flightsim**, iburinoc/flightsim, iburinoc/flightsim-cardboard
Wrote a 3D flight simulator in C++, interfacing OpenGL directly for rendering.

- Ported to iOS for use as a VR app using Google Cardboard.
- Featured coherent random noise generation for varied infinite terrain.

Awards and Achievements

2015 **3rd Place Team, ACM-ICPC, ECNA Regional**, Windsor, ON.
International algorithm and data structure programming competition written by 130 collegiate teams.

2015 **Gold Medalist, Canadian Computing Olympiad**, *CEMC*, Waterloo, ON.
National algorithms programming contest written by over 3,500 secondary students.

Education

2015–2020 **Candidate for Bachelor of Software Engineering**, *University of Waterloo.*