




Sean Purcell

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Summary of Qualifications

- 5 years of experience with each of C, Python, C++, Java in projects and work experience.
- Familiar with ASM, JavaScript, HTML, CSS, MATLAB through school and self teaching.
- Award-winning use and understanding of algorithms and data structures at the IPCP and the CCO.
- Knowledge of concepts of and experience working with NoSQL and relational databases.
- Strong understanding of Linux internals, and server infrastructure management.
- Adept at rapid prototyping and experimentation from hackathon experience.

Work Experience

- 2016 **Software Engineering Intern**, *Wish – ContextLogic*, San Francisco, CA.
Worked on the Wish infrastructure improving stability, monitoring, and efficiency.
- Optimized highest QPS endpoints, heavily reducing load times and cutting network usage by 50%.
 - Redesigned and migrated critical data collection to reduce database load and improve efficiency.
 - Built framework for black pipe testing of ORM to ensure correct behaviour under stress.
 - Developed monitoring platform displaying recent errors, increasing production debugging efficacy.
- 2015 **Software Engineering Intern**, *Sunnybrook Research Institute*, Toronto, ON.
Created, improved, and optimized software used in Medical Biophysics Research.
- Optimized differential equation-solving simulator to operate twice as fast as original.
 - Worked with C++, using OpenMP and MPI for parallelization.

Projects

- 2014–2015 **ibchat/ibcrypt**, <https://ibchat.seanp.xyz>
Built a toy end-to-end encrypted messaging program from scratch in POSIX C.
- Implemented algorithms such as AES, RSA, Diffie-Hellman, SHA256, CHACHA, and scrypt.
 - Constructed custom network protocol for secure communication with perfect forward secrecy.
- 2016 **GR Trace**, https://github.com/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*, <https://anonymeyes.com>
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**, <https://github.com/iburinoc/flightsim>
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*.
- 2014 **Student in Compilers and Algorithms Courses**, *Stanford University*.