

# Alexander Shah

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## SKILLS

C/C++ • Python • Scala • Java • JavaScript • HTML/CSS • SQL • MATLAB • React • Flask • OpenGL • PostgreSQL

## EXPERIENCE

### GOOGLE | SOFTWARE DEVELOPER INTERN | C++, Python | Fall 2018

- Added flow-tracing events to the Chrome Event Targeting Pipeline, allowing for the profiling of tasks communicating between different processes
- Designed hit-test visualization and logging tools for Chrome Viz DevTools to allow for developers to see the arrangement, hierarchy, and status of frames

### SIDEFX | 3D SOFTWARE DEVELOPER | C++, MATLAB | Winter 2018

- Extended the Convex Ridge Separation algorithm for approximate 3D convex decomposition to improve the performance of collision simulations
- Trained an SVM on results from graph cuts over 3D meshes to obtain temporally coherent segments, allowing for the decomposition of animated models
- Traced geodesic paths by following the heat gradient returned from the Geodesics in Heat algorithm
- Optimized convex hull merging algorithm by initially pruning with an R-tree, resulting in a 2x speed increase

### PAVEAI (YC W16) | SOFTWARE ENGINEER | Python, Javascript, SQL | Summer 2017

- Designed a job queue with Celery and Redis to distribute tasks across servers
- Replaced Elasticsearch key-value store with PostgreSQL resulting in a 10x speed increase and improved reliability
- Worked with PostgreSQL, using Alembic for migrations and SQLAlchemy for ORM

## PROJECTS

### RAYTRACER | C++

- Wrote a photorealistic graphical renderer based on simulating light rays
- Implemented reflections, refractions, and translucency for spheres and planes

### SCALA COMPILER | Scala, Assembly

- Compiled a subset of the Scala language into MIPS Assembly using an Earley Parser
- Implemented closures, nested functions, first class functions, type checking, and tail recursion
- Automated garbage collection using Cheney's algorithm

### SLIME FARMING SIMULATOR | Java

- Developed a multithreaded server and client for a rogue-like dungeon crawler
- Incorporated collision detection and double-buffering to reduce screen tearing
- Designed a procedural map generation algorithm and a pathfinding AI

## EDUCATION

### UNIVERSITY OF WATERLOO | BACHELOR OF SOFTWARE ENGINEERING | 2016 - 2021

- Dean's Honour List
- Cumulative GPA: 3.95/4.0

### COURSERA | STANFORD UNIVERSITY MACHINE LEARNING | MATLAB | 2016

## AWARDS

- Top 30 Canadian Computing Olympiad Qualifying Round
- Platinum Division USA Computing Olympiad