

## Education

### The University of Chicago '18 BS/MS in Computer Science

#### Courses

Self-Driving Vehicles  
Advanced Data Analytics  
Computational Linguistics  
Statistical Machine Learning  
Speech Technologies  
Scientific Visualization  
Computer Graphics  
Game Construction  
Distributed Systems  
Parallel Computing  
Advanced C++

#### Activities

ICPC Regional top 10%  
Voices in Your Head  
semi-pro a cappella group  
3x top 3 nationally in ICCA

### Stuyvesant High School '14

#### Activities

USAJMO // top 250 nationally  
USAPhO // top 400 nationally  
Codeday NYC Co-organizer  
promotes teen CS education  
coordinated venues and events  
mentored teens in programming  
grew event 20 to 150 people



## Experience

### Magic Leap Graphics System Engineer July 2018 - now

- Enhanced blend functions of compositing systems to improve text clarity.
- Resolved bugs in C and C++ based systems, architecture, and algorithms.
- Gave a team-wide presentation on C++ Templates and its applications.
- Worked on researching and designing future features.

### Facebook Software Engineering Intern Summer 2017

- Created a new data pipeline for storing features within Facebook's payment fraud detection system.
- Designed, researched, and coded novel data compression algorithms.
- Created a new feature generation system on top of the existing system, reducing the required feature count by an order of magnitude.

### Google Software Engineering Intern Summer 2016

- Implemented the first 3D shadow mapping algorithms for Skia, Google's 2D graphics engine
- Designed novel modifications to conventional shadow mapping to allow several types of lighting
- Wrote comprehensive unit tests to analyze performance over a variety of rendering contexts.

## Skills

C++, C, GLSL, Python, Haskell, Bash, Javascript  
SDL2, OpenGL, NumPy, scikit-learn, MPI, MapReduce  
Git, Linux, gdb, valgrind, gprof

## Projects

### Terrain Generation C++ | SDL2 2017 - now

- Built a flexible and powerful framework for supporting procedural terrain generation.
- Models climate, erosion, moisture, ray-casted shadows
- Runs with an efficient implementation of a ECS design pattern written with C++ templates.

### Shape Defense C++ | OpenGL | SDL2 2018 - now

- Creating a tower-defense game, along with the game engine that it runs on.
- Implemented an efficient quadtree collision system for physics; optimized with CPU profiling tools.

### Terrain Rendering C++ | OpenGL | Computer Graphics

- Rendered GBs of heightmap data using a LOD algorithm
- Grass, water, and rain animations; fog; and detail mapping

### Ray-Tracer C | pthreads | Scientific Visualization

- 3D CPU ray-tracing engine for data, with field convolution, rendering, Marching Squares, alpha blending, line integrals
- analyzed and minimized float arithmetic error

### Author Identification Python | scikit-learn | NumPy 2017

- 80th percentile in Kaggle's Spooky Identification challenge
- identify author (out of 3) of short 100-character snippets
- Used Naive Bayes, n-grams, TF-IDF, SVMs to analyze data
- using statistical methods provided human-readable results

### Weather Modeling Python | scikit-learn | NumPy 2017

- mined and cleaned public weather records from airports
- applied hidden markov models and data transformations to create a weather predictor; it self-learned pressure systems

### Multi-Paxos Python | Distributed Systems

- Implemented multi-paxos, a distributed algorithm for consistent and fault-tolerant key-value storage.
- more efficient variant of the classic Paxos algorithm.

### Parallel Work Queues C | pthreads | Parallel Computing

- designed and implemented a system to handle balancing work loads over multiple threads
- tested it against different types of data imbalances using slurm, and bash scripts