KHYBER SEN

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LANGUAGES

Kotlin 1.3 (ADVANCED)
TypeScript 3.2 (ADVANCED)
Java 13 (ADVANCED)
JS (ES2019) (ADVANCED)
Rust Ed. 2018
C++17
C11
Haskell
Python 2.7, 3.8
Cuda C/C++

SOFTWARE

LLVM
- optimization passes
- ADTs

WebAssembly
- Emscripten for C/C++
- wasm-pack for Rust

Linux
JVM, Graal
Node.js
React 16.9 (with hooks)
ReactiveX (RxJS, RxKotlin)
CMake
Webpack
Express
Flask
MongoDB
Sqlite
d3
IntelliJ
Eclipse

HONORS

U.S. Presidential Scholar Nominee

1st Place in Two Sigma Data Science Competition

1st Place in PClassic Programming Competition at UPenn

National Merit Scholarship Finalist

Stuyvesant representative for PSAL Baseball Showcase

National Chinese Honor Society

Chosen Male Scholar Athlete of 850 person high school class

High School Academic Awards in Physics, Compugter Science, Chemistry

EDUCATION

Columbia College, Columbia University 2018 - 2022
Rabi Scholar. CS Major (GPA 3.94, CS GPA 4.33, Math GPA 3.84)
Relevant Courses: Parallel Functional Programming - in Haskell
Analysis of Algorithms - CLRS taught by the "S" in CLRS (Stein)
Advanced Programming - UNIX systems programming in C and C++
CS Theory - models of computation, computability, complexity
Modern Algebra
Honors Math - proof-based real analysis and linear algebra

Stuyvesant High School 2014 - 2018
97.5 GPA Unweighted. Captain, Varsity Baseball Team

EXPERIENCE

TA for Columbia College's Analysis of Algorithms (taught by Prof. Clifford Stein) FALL 2019
Acting as liaison between professor and students. Grading exams and problem sets for class of 140 students. Teaching students during office hours and answering email questions throughout the week.

Smart Neural Fuzzer Internship at Columbia University SPRING & SUMMER 2019
Developed a code coverage tool that records all the decisions (branches) a potentially multi-threaded, multi-process program makes, which allows for time travel and record-replay debugging of control flow. Collaborated with Ph.D. student Kexin Pei and Prof. Junfeng Yang to integrate this decision data into a neural net that can intelligently guide fuzzing, taint analysis, and profile-guided optimizations, helping to uncover hidden data dependencies and elusive bugs. Written in modern C++ 17 as an LLVM optimization pass.

https://github.com/kkysen/SmartNeuralFuzzer

Fruit Fly Brain Observatory Internship at Columbia University SUMMER 2017
Collaborated with a research team and independently used parallel programming to model the fruit fly brain and built a robot to model the fruit fly vision system and its motion detection capabilities with one other high school student (under direction of Prof. Aurel Lazar and Dr. Yiyin Zhou).

Microbiology Internship at Columbia University SUMMER 2015
Studied the effect of oxygen deprivation on biofilm formation in *Pseudomonas aeruginosa* and *Bacillus subtilis* with 3 other undergrad students (under direction of Prof. Lars Dietrich).

ACTIVITIES

Fruit Fly Hackathon
Joined a Columbia University sponsored hackathon with other programmers and scientists from around the world. Goal was to explore innovative ways of extending and improving the Fruit Fly Brain Observatory. My 4-person team created a Twitter Bot that automatically replied to tweets querying data about the fruit fly brain to make that data more accessible.

Two Sigma Workshop
Accepted into a pilot program to study data science and machine learning at Two Sigma. Won 1st place in Two Sigma Data Science Competition for an analysis of UFO sightings.

Stuy Hacks
Led 4-person team in 24 hours, ~200 person Major League Hackathon. My team created a website that overlaid maps and weather to help travel planning.

PClassic
Won 1st place in PClassic Programming Competition at University of Pennsylvania

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INTERESTS

Baseball
Tennis
Squash
Crepe Making
String Theory
Quantum Mechanics

PROJECTS

N Queens (Java)
Developed a novel, extremely efficient bitwise solution to the classic N Queens problem faster than any other known software solutions.

Silicon Scratch (C++17, LLVM, WebAssembly, TypeScript) - in progress
Compile Scratch 2.0 projects to LLVM IR and to WebAssembly for running in the browser.

Project Schedule Viewer (TypeScript, React, SSR, d3, Express)
View staffing projections from modifiable Excel files as a stacked area graph in the browser, which is filterable, viewable, and scalable at multiple levels. Designed for Handel Architects.

Flight Delay Visualizer (TypeScript, WebAssembly (C++17), d3)
Designed an interactive website to visualize all 6 million flights over the US in the past year, watching how certain airlines and airports are chronically delayed, and applying complex filters to the flights. Used C++ compiled to WebAssembly to make feasible performance & memory wise.

TexDBook (TypeScript, React, Python, Flask)
Developed a tracking and borrowing system for textbooks and other books for my high school.

UFO Tracker (Python)
Analyzed UFO sightings in the US in the last century in relation to overhead airplane traffic.

Weather or Not (JS)
Developed a website that overlays maps, traffic, weather, and more to better plan your trip.

Quick Trip (Java, JavaFX)
Designed an automated trip planner that finds the optimal vacation and books the cheapest hotels, flights, and car rentals.

Scramble (Java, libGdx, rewritten in TypeScript, React)
Invented a simple but fun word unscrambling game made to challenge puzzle-lovers.

Polybius (TypeScript, React)
Pioneered a Chrome extension that allows the user to define route handlers that will re-route downloads to specific directories or invoke actions based on user-defined filters.