KHYBER SEN

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LANGUAGES

Rust
Kotlin
TypeScript
C++
C
Python
Java
Haskell
OCaml
x86 asm
Bash

SOFTWARE

rustc
Polonius
LLVM, Clang
gdb (Python API)
WebAssembly
Linux
JVM, Graal
Node, Deno, Bun
React
CMake
Webpack

HONORS

1st Place in Two Sigma Data Science Competition

1st Place in PClassic Programming Competition at UPenn

Scholar Athlete of 850 person high school class

INTERESTS

Programing Language Design
Tennis
Baseball
Quantum Mechanics
Endocrinology
Optimization
Trains

EDUCATION

Columbia College, Columbia University FALL 2018 - FALL 2022
(gap year 2020-2021)
Rabi Scholar, CS Major (GPA 3.79, CS GPA 3.98)

Stuyvesant High School 2014 - 2018
97.5 GPA unweighted, Captain of Varsity Baseball Team

EXPERIENCE

Junior Software Engineer at Immunant SEPTEMBER 2022 - PRESENT
Intern at Immunant MAY 2022 - AUGUST 2022
github.com/immunant/c2rust

Worked on c2rust, a C to Rust transpiler, helping to lift the unsafe Rust output to safe Rust through a combination of static and dynamic analysis.

Compiler Intern at MediaTek (Woburn, MA) MAY 2020 - DECEMBER 2021

If Conversion — Replaced monomorphic branch unswitching with polymorphic if conversion for significant code size savings with minimal performance impact.

Little Doctor — Built the Little Doctor, a framework for testing the compiler's debug info's quality using gdb's Python API, which already discovered hundreds of bugs in 2 months.

Louper — Helped optimize MediaTek's LLVM-based digital signal processing compiler by using deep learning to predict difficult optimization decisions. Developed the hyperheuristic framework Louper, which created a register pressure estimator 3x as accurate as the current human heuristic.

TA for Columbia's Analysis of Algorithms (taught by Prof. Clifford Stein, the S in CLRS) FALL 2019

Acted as liaison between professor and students. Graded exams and problem sets for class of 140 students. Taught students during office hours and answering email questions throughout the week.

Smart Neural Fuzzer Internship at Columbia University SPRING & SUMMER 2019
github.com/kkysen/SmartNeuralFuzzer

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 Kexin Pei and 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.

Fruit Fly Brain Observatory Internship at Columbia University SUMMER 2017

Built a robot to model the fruit fly vision system and its motion detection capabilities using massively parallel programming (under direction of Aurel Lazar).

PROJECTS

Change Journal at Codeprentice (Rust) | github.com/codeprentice-org/fanotify

Leading 5-person team at Codeprentice on the Change Journal project. We are developing a cross-platform change journal library in Rust, using the fanotify backend on Linux and the USN journal backend on Windows we're writing. Ultimately we plan to use the change journal to create an instantaneous and cross-platform file searcher application. I have also helped teach my teammates Rust.

N Queens (Java) | github.com/kkysen/MKS22X/blob/master/02NQueens/NQueens.java

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

Flight Delay Visualizer (TypeScript, WebAssembly (C++17), d3) | github.com/kkysen/r3d3

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.

Weather or Not at Stuy Hacks (JS) | github.com/wertylop5/WeatherOrNot

Led 4-person team in 24 hours, ~200 person Major League Hackathon. My team created a website that overlays maps, traffic, weather, and more to better plan your trip.