

# Sasha Krassovsky

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I'm an engineer passionate in designing and applying novel approaches to make programs run faster. I am interested in any of low-level optimization, heterogeneous computing, compilers, and distributed systems.

## SingleStore

Software Engineer: Query Execution

Seattle, WA

June 2020 - Present

- **AVX-512 Prototype:** Partnered with Intel to migrate a portion of SingleStore's vectorized query execution to AVX-512 and profiled the results on the new-generation IceLake architecture. Details can be found in my blog post.
- **Selective Decoding:** Optimized point lookups in columnar tables by seeking and decoding only the necessary rows, as opposed to large chunks of rows. Increased efficiency of queries with selective filters.

## Facebook

Software Engineering Intern: Oculus Application Platform Team

Menlo Park, CA

June 2019 - September 2019

- **Swift Playgrounds on Windows:** Implemented Swift Playgrounds on Windows, using GDI32 for UI, Apple's Swift compiler for frontend, and LLVM's ORC to JIT and execute the code. Involved modifications at both the AST level and the IR level, and submitting patches to both the compiler and LLVM. Source Code at [github.com/save-buffer/swift-repl](https://github.com/save-buffer/swift-repl)

## Bespoke Silicon Group

Undergraduate Researcher

Seattle, WA

March 2019 - June 2020

- **Hammerblade Manycore:** Created APIs for and tested a RISC-V Manycore CPU. Further, created highly optimized kernels for machine learning on the Manycore. Worked on compiler optimization to issue remote loads earlier.
- **Thesis: Exploring Single-Core Optimizations for Manycore Architectures:** Explored how I optimized kernels and details regarding my compiler optimization.

## MemSQL

Software Engineering Intern: Query Execution

Seattle, WA

June 2018 - September 2018

- **Vectorized Aggregation:** Worked on MemSQL columnstore: Implemented low-level optimizations for summation in query execution engine with AVX2. Achieved up to 20x speedup of internal components, resulting in up to 1.8x speedup of total query execution time of customer workloads.

## Husky Robotics

Software Team Lead

Seattle, WA

June 2018 - October 2019

- **Husky Robotics Software Team Lead:** Helped design and implement the software for a mars rover. Implemented a wide range of software from sensors to networking to inverse kinematics to computer vision. The team won 2nd place at the 2019 Canadian Rover Challenge.

## MemSQL

Software Engineering Intern

Seattle, WA

August 2017 - September 2017

- **Hash Join Optimization:** Worked on MemSQL in-memory distributed DBMS, optimizing Hash Join when joining on Integer Keys. Achieved 2x speedup on Hash Join
- **Graphical Explain Plan:** Created graphical explain plan visualizer for viewing a breakdown of queries.

## Microsoft

High School Intern

Redmond, WA

June 2016 - August 2016

- **Cyberattack Analytics Dashboard:** Developed a Web Application which visualized statistics on cyberattacks. On display in the CDOC (Cyber-Defense Operations Center)
- **HoloFlight:** Participated in the OneWeek hackathon, where I worked on HoloFlight, an application for the Hololens that directs a drone to fly to waypoints selected on a holographic map. Won 2nd place in the HoloHack division.

## University of Washington

BS Computer Science with Honors

BS Discrete Mathematics

Overall GPA: 3.70

In-Major GPA: 3.76

In-Major GPA: 3.62

Seattle, WA

June 2020

June 2020

## Coursework

- **Algorithms:** Proof-based class focusing on using existing techniques to create and prove new algorithms.
- **Digital Circuit Design:** Project-based class focusing on introducing the basics of Verilog and FPGAs. Created a clone of Dance Dance Revolution on an FPGA using an LED matrix and four pushbuttons.
- **Deep Learning on Coursera:** Introductory online machine learning course taught by Andrew Ng. Homework done in Python, with a combination of hand-written and premade machine learning software.
- **Embedded Systems:** Project-based class focusing on the creation of an embedded operating system. Created a medical device using Arduino running a custom scheduler and task queue system.
- **Stanford Compilers on Coursera:** Introductory online compilers course taught by Prof. Alex Aiken. Implemented a compiler for COOL (Classroom Object-Oriented Language) targeting MIPS.
- **3D Graphics at DigiPen Institute of Technology:** Summer class introducing 3D Graphics, first algebraically and then using linear algebra. Implemented a 3D Graphics pipeline from scratch in C (starting only with a SetPixel function) which draws colorful cubes, and allows the user to rotate the camera.

## Accomplishments

- **2017 ACM ICPC Regionals Qualifier:** Won 6th place at the UW ACM ICPC competition on team MATLAB Indexers, qualifying for regionals.
- **Hunt the Wumpus Alumni Challenge 2016 Winner:** Programmed a game in C# from scratch and was selected by a panel of judges as the winner for having the most polished and most entertaining game. Available at [github.com/save-buffer/ShooterGame](https://github.com/save-buffer/ShooterGame)

## Projects

- **Robotics Algorithms:** Computer vision and inverse kinematics algorithms written for use by the Husky Robotics team. Computer vision can locate tennis balls in an image and segment a keyboard into keys. The inverse kinematics algorithm was created by myself and another member of the team and implemented by me. Available at [github.com/save-buffer/robot\\_cv](https://github.com/save-buffer/robot_cv), [github.com/save-buffer/UseArm](https://github.com/save-buffer/UseArm)
- **Slang:** Compiler for a low-level functional declarative language (like Erlang) written in C. Available at [github.com/save-buffer/slang](https://github.com/save-buffer/slang)
- **SashCopter:** An attempt at controlling a drone using an EEG Headset. Main drone control software is written. Mind-controlled aspect deemed unsuccessful due to the lack of resolution on the headset. [github.com/save-buffer/SashCopter](https://github.com/save-buffer/SashCopter)