

# Sasha Krassovsky

+1 (425) 614-9499

@save-buffer

krassovskysasha@gmail.com

linkedin.com/in/sashka

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

## Projects

- **Gigagrad**: A deep learning compiler in C++. Performs autodifferentiation and compiles to various backends.
- **Steamed Hams**: A work-stealing, page-stealing, IO-completion stealing parallel runtime written in C. Will eventually have a SQL query engine on it.

## Achievements

- **AGI House Hackathon Winner**: Won the Hardcore Systems Hackathon by implementing a new backend for Gigagrad.

## Neon

Systems Software Engineer

Remote (Seattle, WA)

March 2023 - Present

- **Network Monitoring**: Implemented an eBPF-based ingress/egress network monitoring solution for Neon's VM infrastructure.
- **DiskANN**: Prototyped a high performance DiskANN implementation with the eventual goal of getting put into a Postgres extension. Outperformed libhns w's index build by over 2x
- **Role Management**: Implemented Neon's role management, from synchronization between compute and control plane to the relevant UI changes.

## Voltron Data

Software Engineer

Remote (Seattle, WA)

October 2021 - March 2023

- **Hash Join Spilling**: Designed and implemented a solution to joining larger-than-memory datasets by partitioning and writing the dataset to disk. Optimized for modern NVME SSDs, achieving maximum throughput.
- **Bloom Filter Pushdown**: Implemented a novel dynamic Bloom filter strategy, where the filter is pushed as early as possible in a tree of joins, resulting in orders-of-magnitude speedups in certain workloads.
- **Performance Investigations**: Investigated performance of various subcomponents of the query engine and prototyped solutions to performance issues.

## SingleStore

Software Engineer: Query Execution

Seattle, WA

June 2020 - October 2021

- **AVX-512 Prototype**: Designed and implemented a prototype of AVX-512-based query execution in SingleStore, a natively-distributed database engine used for both transactions and analytics. The prototype achieved up to 20% improvement on TPC-H benchmark queries. Details regarding my experience can be found on my [blog post](#).
- **GPU-based Query Execution**: Proposed and drafted a design for GPU-based query execution, winning an internal contest for so-called "moonshot ideas". Prototyped aggregation on GPUs in an internal hackathon achieving a 2.5x speedup over CPU execution, demonstrating the promise of this approach.
- **Compiler Upgrade**: Resolved performance regressions from upgrading the compiler. Compared assembly code between old and new compilers, and provided compiler hints to fix performance regressions.
- **Columnstore Query Execution**: Proposed, designed, and implemented a significant refactor of core columnstore code, exposing several inefficiencies leading to a 2x speedup on some TPC-H queries.

- **Reading Group Lead:** Led discussions of cutting-edge academic papers on a variety of topics including GPU-based query execution, learned indices, and E-graphs.
- **Intern Mentor:** Mentored a summer intern who developed heuristics for various runtime decisions during query execution.
- **Interviewer:** Interviewed intern and new-grad candidates.

## Facebook

Intern: Oculus Application Platform Team

Menlo Park, CA

June 2019 - September 2019

- **Swift Playgrounds on Windows:** Implemented an interactive programming environment on Windows mimicking Apple's Playgrounds. The program compiles and executes the input Swift code, and exposes an interface to develop UIs. Submitted patches to both the Swift 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.

## 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 (now known as SingleStore)

Software Engineering Intern

Seattle, WA

Summer 2017 and 2018

- **Graphical Explain:** Created a browser-based visualizer of query plans generated by MemSQL, aiding engineers in understanding query plans and its bottlenecks, ultimately allowing for more efficient query tuning.
- **Vectorized Aggregation:** Designed and implemented algorithms for vectorized summation using AVX2. Achieved 1.8x speedup of queries involving summations, improving runtime of internal components by up to 20x.
- **Hash Join Optimization:** Implemented an optimization to improve performance of hash joins involving integer keys by 2x, a key usecase for star-schema workloads.

## Microsoft

High School Intern

Redmond, WA

June 2016 - August 2016

## 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