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 — Seattle, WA

Software Engineer: Query Execution	June 2020 - Present
Software Engineering Intern	June 2018 - September 2018
Software Engineering Intern	August 2017 - September 2017

- **Performance Optimizations:** Implemented various performance optimizations in SingleStore, a natively-distributed database engine used for both transactions and analytics. These optimizations directly accelerate customer workloads. Such improvements include
    - 30% improvement on analytical queries by partnering with Intel and migrating a portion of SingleStore's vectorized query execution from AVX2 to AVX-512 on the Ice Lake architecture. Details regarding my experience can be found on my blog post.
    - 1.8x improvement on analytical queries involving summations by vectorizing summation using AVX2, improving runtime of internal components by up to 20x.
    - 2x improvement of hash joins involving integer keys.
- **Graphical Explain:** Created a browser-based visualizer of query plans generated by SingleStore.
- **Intern Co-mentor:** Co-mentored a summer intern who developed heuristics for various runtime decisions during query execution.
- **Interviewer:** Interviewed prospective intern and new-grad candidates in both English and Russian.

Facebook — Menlo Park, CA

Software Engineering Intern: Oculus Application Platform Team	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.

Bespoke Silicon Group — Seattle, WA

Undergraduate Researcher	March 2019 - June 2020

- **Hammberblade 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 optimziation.

Husky Robotics — Seattle, WA

Software Team Lead	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.

Microsoft — Redmond, WA

High School Intern	June 2016 - August 2016

- **Cyberattack Analytics Dashboard:** Developed a Web Application which visualized statistics on cyberattacks. On display in the Cyber-Defense Operations Center.

University of Washington — Seattle, WA

	Overall GPA: 3.70	
BS Computer Science with Honors	In-Major GPA: 3.76	June 2020
BS Discrete Mathematics	In-Major GPA: 3.62	June 2020

Coursework

- **Algorithms:** Proof-based class focusing on using existing techniques to create and prove new algorithms.
- **Digital Circuit Design:** Project-based clsas 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) targetting 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

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, 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
- **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