

Kelton OBrien

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Education

University Of Minnesota, Twin Cities *GPA:3.94 TGPA:3.92* Fall 2019-Spring 2024, *4 Degrees, see below.*

- Seeking a Computer Science B.S, a Linguistics B.A, a Philosophy B.A, and a Mathematics B.A.
- Attended the U of M full time throughout my senior year of high school through the PSEO program, largely taking computer science courses.
- Notable Coursework: Programming Languages, Algorithms and Data Structures, Formal Languages and Automata Theory, Introduction to Parallel Computing, and Functional Algorithm Design with Haskell.

Minneapolis College *GPA:4.00 TGPA:4.00* Fall 2018-Spring 2019

- Attended MC full time as a non-degree seeking student during junior year of high school through the PSEO program.

Experience

CMU Program Analysis, Software Testing, and Applications (PASTA) research group

Pittsburgh, Pennsylvania May 2022-August 2022 *Undergraduate Researcher*

- I worked on optimizing Mu2, a JVM Mutation-Testing based fuzzer.
- The project is an extension of the JQF+Zest fuzzing framework, which is a semantic fuzzing engine which takes a semantic approach to input generation, mutating a series of bits which is fed to a quickcheck-style structured input generator instead of the input directly.

Minnesota Extensible Language Tools (MELT) research group

Minneapolis, Minneapolis November 2020-Present *Undergraduate Researcher*

- I worked researching parsing theory and adding counterexamples for ambiguous or non-LALR grammars to the copper parser generator.
- I currently work on the silver attribute grammar programming language. I am currently adding support for polymorphic concrete syntax.

University of Minnesota Twin Cities Computer Science and Engineering Department

Minneapolis, Minnesota January 2021-Present *Teaching Assistant*

- I currently TA for CSCI 2041, a class that teaches functional programming in OCaml, and formal reasoning about functional programs.
- I Previously TA'd for CSCI 2021, a class that teaches low level machine architecture, including programming in C and x86_64 assembly.

University of Minnesota Twin Cities School of Mathematics

Minneapolis, Minnesota January 2021-April 2022 *Student Developer*

- I helped develop doenet, distributed open-source education software
- My work focused on the programming language parts of the project – I developed the text editor, parsing of the project's bespoke mark up language, doenetML, as well as working on the semantics.

Moonshake Ventures

Minneapolis, Minnesota May 2016-September 2018 *Systems Administrator*

- I managed a medium sized network of Linux and Windows machines, including maintaining and managing the company web and print servers, and the company website.

Skills

Programming Languages: Haskell, OCaml, Rust, Python, C, Java, Verilog, Typescript, Javascript, Coq

Tools/Frameworks: Linux and UNIX-like OSes, Flask, Git, Nix, React, Recoil, MTL, L^AT_EX, GDB, NGINX.

Human Languages: English (Native), Swedish (A2), German (A2-B1)

Personal Projects

Hasus

I created Hasus, which is a turing complete, statically typed functional programming language written in haskell. It is very similar to haskell, but with strict evaluation.

STSH

I created STSH, which is a structured shell written in rust (not dissimilar to nushell) with the key difference being that, instead of needing to write new programs that accept and output structured input, one can write parsers using parser combinators to parse the output of standard textual programs, providing a shim that prevents the need to rewrite most of unix userspace to get the benefits of structured data. The parser combinator facility is currently a work in progress.

Extracurriculars

ACM UMN (President)

2022-Present

I do almost all of the organization & management of the club, planning & running events, including MinneHack, the largest hackathon in minnesota. I host a paper reading group, classes to teach new students about unix, seminars on programming language implementation, and other various educational events. I also have ran the past few U of MN software design competitions. I also organize project meetings where the students work together on a programming project, such as display software for E-Ink displays. Lastly, I am the main organizer for the ACM UMN CTF (capture the flag), where I write most of the challenges.

ACM UMN (Vice-President)

2020-2022

ACM UMN (Treasurer)

2019-2020

Programming Languages Seminar

2019-Present

I am a member of the Programming Languages Seminar, a reading group consisting mostly of graduate students researching programming languages. We've covered several courses worth of material with the books and papers we've discussed.

Awards & Achievements

Deans List, University of Minnesota

2019, 2020, 2021, 2022

Deans List, Minneapolis College

2018, 2019

1st Place, U of M Software Design Competition

2019

I created a flask-based web application to answer a prompt relating to organizing a heist. 2019 was the last year that I was not the one organizing the competition.