

Personal Info

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(613)-794-9322
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Education

Joint Honors in Computer
Science and Mathematics
University of Ottawa

Extracurriculars

Head of uocsclub:
helped organize and field
teams for various CTFs,
held events, competitions

CS Accomplishments

CPTC 2020 Global Finalist

Languages

C, Common Lisp, Python,
x86-64 assembly, Java,
bash

Natural Languages

English, French

Interests

Currently singing with the
Capital Chamber Choir
(capitalchamberchoir.ca)
9th grade RCM Voice,
over 9 years of singing in
choirs,
over 13 years of music
Can ski and snowboard at
a high level

Experience

Google SWE Intern (Summer 2021) | *Compilers, Lisp*

- Worked on SBCL (Common Lisp compiler) to improve its block compilation feature, an optimization to improve code generation
- Built and committed upstream a tool to graph SBCL's IR with Graphviz (github:seanptmaher/ir1-grapher, github:sbcl/sbcl:contrib/sb-graph)
- (Still in progress)

Google SWE Intern (Summer 2020) | *C, Wasm, SIMD*

- Worked on the WebAssembly Standards team to port ARM Neon SIMD code to Wasm using a header-swap library in portable C
- Contributed over 50 classes of intrinsic, each comprising 5-20 intrinsic functions, for a total of over 70k LoC and 52 merged PRs
- Built a disassembler into radare2 for Wasm SIMD instructions

Bank of Canada Monitoring SOC (Summer 2019)

- Developed an application from the ground up in Python and VB to analyze email and automate tedious parts of the team's workflow
- Built detections in Splunk for various TTPs, notably privilege escalation, lateral movement, and defense evasion

Teaching

Python Workshop | *Python, Teaching, Compilers, Metaprogramming*

I wrote a series of workshops on advanced Python programming, covering meta-object facilities, a scheme interpreter, functional programming

Erlang Book Club | *Erlang, Teaching* | gh:uocsclub/erlang-book-club

During the school year I lead a weekly book club on writing functional code, distributed computing, and resilient, extensible, performant systems.

Projects

spack | *Common Lisp, serialization* | github.com:mahirvaylooj/spack

Structured data serializer. Can serialize integers, arrays, bytes, strings

stalk | *Common Lisp, networking* | github.com:mahirvaylooj/stalk

Encrypted and authenticated protocol implemented over spack

discfs | *Common Lisp, Discord* | github.com:mahirvaylooj/discfs

A content-addressable filesystem, with Discord as its backend

Text Editor (Sug) | *C, font rendering, graphics pipeline*

Graphical text editor for X11, the only library used was XCB to talk to X

spkr | *Python, Flask, Hackathon, Spotify*

Regular Expression Engine | *C, simple compiler internals*

Flow (Won MLH Local Hack Day) | *Python, Bash [in team of 3]*

Used a RasPi to monitor density of people via network traffic

Malware Reverse Engineering | *C, Asm, OS Components*

Know x86-64 assembly, operating system internals, and built crackmes.