# Shaun Loo

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## Technical Skills

**Languages**: C, C++, Rust, Python, OCaml, Haskell, Java, Typescript, `x86_64` Assembly (NASM)
**Frameworks**: Ember, Svelte, Flask, Zola
**Developer Tools**: Git, Nix, Docker / Podman, Bash, KVM, Ghidra, Xilinx Vivado, PostgreSQL, Bison, Flex, LaTeX
**Libraries**: pandas, NumPy, Matplotlib, D3, zlib, imgui

## Education

**University of Minnesota Twin Cities** — Minneapolis, MN
*Master of Science, Computer Science* — *Sep 2024 - May 2025*

**University of Minnesota Twin Cities** — Minneapolis, MN
*Bachleor of Science, Computer Science* — *Sep 2021 - May 2024*

## Experience

**Graduate Teaching Assistant** — Sep 2024 - May 2025
*University of Minnesota Twin Cities* — *Minneapolis, MN*

- Designed software projects in C and `x86_64` assembly to teach performance optimization techniques
- Delivered lectures with high audience retention on number representation, assembly control flow, and FP numbers
- Stimulated interest in low level programming by answering questions to over 100 students in office hours

**FFmpeg Code Contributor** — May 2023 - August 2023
*Google Summer of Code* — *Mountain View, CA*

- Implemented VVC (H.266) decoding in-loop filters using `x86_64` AVX2 SIMD instruction set
- Achieved a 3.6% speedup compared to compiler output, achieving smooth 4K playback on commodity hardware
- Prepared FFmpeg for next-generation video formats by optimizing the VVC (H.266) decoder

**Studio K Engineer** — May 2023 - August 2024
*Radio K* — *Minneapolis, MN*

- Operated a world-class recording studio, adapting to all genres from rock to jazz ensembles
- Overhauled a working studio by installing Audio over IP (Dante) hardware with 32 real-time I/O channels
- Collaborated with the Radio K video team to create YouTube music videos with over 30,000 culmulative views

## Projects

**Pico-386** | *C, `x86` Assembly, Flex, Bison, Embedded Programming* — June 2025 – Present

- A PICO-8 emulator for 386 IBM PC compatible systems, exploring interrupt-driven programming
- Implemented a PNG decoder capable of decoding 8bpp images in C
- Developed a Lua interpreter in C using the Flex lexer and the Bison parser-generator
- Implemented RS-232 UART-interfacing primitive functions and basic VGA draw calls in `x86` assembly for speed

**Raytracer** | *C* — Jan 2024 - Present

- Implemented a "classic" ray tracer capable of rendering `.obj` scenes
- Implemented SIMD vector and matrix math to achieve rendering of a complex Full HD scene within one second

**OPL3Duo! VGM player** | *C++, MPLAB X, AVR, SPI, I2C* — April 2024 - May 2024

- Ported the OPL3Duo! `.vgm` playback code to the AVR-BLE Development Board
- Implemented many Arduino routines in C++
- Managed multiple devices on the SPI and I2C bus for complex I/O handling

**Selfhosting and Networking** | *KVM, Docker, Debian, IP Networking, Nginx* — Jan 2019 - Present

- Hosting useful services like NextCloud, Immich, and VSCode Server
- Explored networking and computer safety by configuring reverse proxies and application containerization
- Collaborated with UMN CSE IT to overhaul ACM UMN infrastructure with a symmetric 10G uplink
- Maintained the ACM UMN server infrastructure and public /24 space, provisioning resources to student members