

Nathan Sochocki

natesoch.github.io | natesoch@umich.edu

Education

University of Michigan

Bachelor of Science in Computer Engineering

Master of Science in Electrical and Computer Engineering

Ann Arbor, MI

Expected Grad. May 2025

Expected Grad. May 2026

- GPA: **3.82/4.00**
- **Awards/Honors:** *Leinweber Software Scholarship, Lather Stefan Memorial Scholarship*
- **Course Highlights:** *Data Structures and Algorithms, Intro Logic Design, Computer Organization, Computer Security, Intro Electronic Circuits, Embedded System Design, Computer Vision.*

Relevant Experience

Garmin International

Embedded FPGA Design Engineer Intern

Olathe, KS

May 2024 - Current

- Developed a parameterized n-tap FIR filter in VHDL for use in a TCAS (Traffic Collision Avoidance System). Filtering out high frequency noise in RF data, the filter is designed to be adaptable based on the number of taps, ensuring flexibility for different system requirements. Sequenced the addition stages in the convolution process, making the number of stages parameterizable to meet timing constraints for different projects.
- Configured SPI interfaces for various devices on the FPGA hardware, utilizing ChipScope Logic Analyzer in Vivado to debug and verify functionality of simulations in Visualizer.

Advantage Computing Systems

Software Engineering Intern

Ann Arbor, MI

May 2023 - Aug. 2023

- Developed a user-centered ASP.NET MVC application integrated with Orchard Core CMS to create an Azure access request form, enabling Azure hosted clients to seamlessly request permissions for their users. Implemented dynamic content types to tailor the form's display of available permissions based on each client's specific support capabilities.
- Implemented robust security features, including limiting form access to designated administrators of Azure hosted clients. Incorporated automated email functionality using custom workflows and liquid syntax.

University of Michigan

Instructional Aide for ENGR 101 (Intro. To Computers and Programming)

Ann Arbor, MI

April 2023 - Current

- Responsible for teaching a weekly lab-based section of the course, providing comprehensive support to students by holding weekly office hours, offering guidance in problem-solving, debugging, and code optimization, resulting in improved student performance and comprehension in using C++ and MATLAB to solve engineering problems.
- Collaborate with course instructors and other IAs in developing and refining projects and labs, contributing to the enhancement of course content while following the design of being applicable to all engineering disciplines.

Projects

Automatic Guitar Tuner

- Developed an automatic guitar tuner in C on a STM32 microcontroller that uses a piezoelectric sensor to capture vibrations from the string with an ADC. Applied the Harmonic Product Spectrum technique using FFT and inverse FFT to filter out harmonics and determine the fundamental frequency of the played string.
- Designed a system using continuous servo motors attached to each tuning knob with 3D-printed components. The servos tune the string up or down based on the frequency offset. The motors are controlled using pulse width modulation to adjust their speed according to the frequency offset, with the amount of rotation determined by functions derived using linear regression on sampled data.
- Implemented a wireless LCD that communicates via Xbee and SPI to display the note played and frequency info.

Four Function Calculator

- Emulated a calculator using Verilog that performs addition, subtraction, multiplication, and division on a DE2-115 FPGA board. Utilized sequential logic and implemented a complex register transfer level (RTL) design, which includes a datapath to perform computation and a corresponding controller. The computational core of the project is an 11-bit adder/subtractor, which is utilized by an implementation of Booth's algorithm for multiplication.

Technical Skills

- **Languages/Frameworks:** *C, C++, Python, MATLAB, VHDL, Verilog, Julia, C#, ASP.NET*
- **Software:** *Visual Studio/VS Code, CubeIDE, Vivado Chipscope ILA, Questa Visualizer, Quartus, ModelSim, Git*