

Nicholas Rathfelder

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Professional Summary

Adaptable and dependable engineering student interesting in digital and analog IC design. Eager to learn and explore all of the different aspects of the engineering design process.

Technical Skills

Practical	Soldering, Wiring, Circuit Simulation, Waveform Analysis, Scope Capture, Impedance Matching, 3D Printing
Tools	Oscilloscope, Logic Analyzer, Digital Multimeter, Vector Network Analyzer, LCR meter, Waveform Generator, Reflow Oven
Programming	Verilog, VHDL, TCL, Perl, ARM, Embedded C, C++, Python, MATLAB
Software	Vivado, Quartus Prime, ModelSim, Altium Designer, STM32 Cube, LTSpice, Cadence AWR, Solidworks, Proteus 8

Work Experience

Curtiss-Wright Defense Solutions

Kanata, ON

FPGA Engineering Intern

Sept. 2025 - Dec. 2025

- Developed RTL and integrated 3rd party IP to support the design, simulation and testing of mission-critical aerospace and defense systems
- Implemented a UART-based debug interface to provide visibility into internal hardware states during restricted-access environmental testing

Musashi AI

Waterloo, ON

Controls and Electrical Engineering Intern

Jan. 2025 - Apr. 2025

- Updated electrical drawings and developed PLC/robot programs for AI automotive inspection machines
- Upgraded the Automate 2025 tradeshow inspection cell to allow for onboard chatter inspection of automotive camshafts

Martinrea International

Tillsonburg, ON

Electrical Engineering Intern

Sept. 2023 - Dec. 2023

- Provided support for the engineering team in the maintenance and improvement of the line
- Integrated GPIO-triggered serial messaging into the in-house weld inspection system to improve system response time

Stelco - Lake Erie Works

Nanticoke, ON

Process Engineering Intern

Jan. 2023 - Apr. 2023

- Provided the operating team at the Hot Strip Mill insight into daily operations through the creation of Microsoft Power BI reports
- Started the development of a MATLAB and PLC based image analysis program to monitor slag build up on the walls of the BOF

Projects

FFT Core

Designed and simulated custom 1024-point decimation-in-time FFT core

- Designed iterative, 10-stage FFT core for computing complex coefficients using on-chip BRAM
- Simulated DC, nyquist, and custom sinusoidal input signals using custom testbench

Electromagnetic Projectile Accelerator

Designed, assembled, and tested 5 stage coilgun

- Designed and printed custom PCB for microcontroller power and interfacing with Altium Designer
- Programmed coil control logic on STM32 Black Pill in embedded C via STM32Cube

RF Reflectometer

Designed and simulated dual output port RF reflectometer integrated on a full microstrip PCB

- Designed and laid out using a custom wilkinson divider, directional coupler and amplifier, utilizing standard 50 Ω microstrip technology
- Simulated s-parameters with a 5% bandwidth centered at 3.5 GHz using Cadence AWR

Education

University of Waterloo, Term 4A

Waterloo

BASc in Electrical Engineering - 3.82 GPA

Sept. 2022 - Jun. 2027

Relevant Coursework: Digital Computers, Electronic Circuits, Electromagnetic Fields and Wave

Awards and Honours

Apr. 2024 **Honour:** Term Distinction in 2A, 2B, 3A

Aug. 2022 **Scholarship:** WatPD Engineering Entrance Scholarship