

Ihsan Salari

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Education

BASc Electrical Engineering *University of Waterloo* Grade: 89% **Waterloo, ON** *present*

Qualifications

- **Programming:** C, C++, Python, Rust, Git, NVIDIA CUDA, ROS 2, LaTeX, MATLAB, SPICE
- **FPGA:** AMD/Xilinx Vivado & Vitis - Verilog & VHDL - Zynq SoC
- **Tools:** STM32, PIC18, AMD/Xilinx, Intel/Altera, Jira, Confluence, Slack
- **Lab:** Oscilloscope, SMD reflow/iron rework, function generator, electronic load, digital multimeter, power supply
- **eCAD:** LTspice, Altium Designer, KiCAD, COMSOL, Fusion 360, OpenSCAD
- **Languages:** French (Native), German (Native), English (Native), Spanish (Beginner)

Experience

Power Electronics Co-Op and then Electronics Contractor *aiRadar Inc.* 01/2025 - 05/2025

- Spearheaded end-to-end redesign of **3.5MHz GaN**, wide input/output multi-stage dc-to-dc converter for advanced multi-beam sonar, including research, topology selection, simulation, firmware development and testing.
- Implemented robust **STM32** firmware with voltage-fed **PID control**, live telemetry, and extensive **UART** command interface.
- Designed and built breadboard prototypes using GaN FET eval kits and STM32 dev boards for initial testing and PID tuning.
- Proposed and validated converter topologies using **LTspice** simulations that accounted for parasitics at MHz frequencies.
- Authored extensive technical documentation in **LaTeX** detailing power electronics theory, designs tradeoffs, simulation, custom mathematical models, component selection, and embedded firmware architecture.
- Developed and executed board bring-up and test plan; rapidly iterated on testing methodology based on real-time results.
- Collaborated with a fast-paced engineering team and provided regular updates on design, timeline and executive decisions.

Electronics designer *Waterloo Rocketry Design Team* 09/2024 - present

- PCB design and review for rocket and ground-side electronics, including power distribution systems and embedded **PIC18**-based boards with custom **MPLAB X** firmware development.
- Electronics and firmware/**DSP pipeline** design and implementation of **Xilinx FPGA** based **GNSS** receiver from scratch.
- Collaborate with team of students to coordinate electrical design of rocket and make effective executive decisions on projects.

U14/U16 Assistant Ski Racing Coach *Cypress Ski Club* 01/2025 - 04/2025

- Drew on decade of ski racing experience to coach, mentor and inspire under-14 and under-16 age groups.
- Developed and executed training plans in various training and racing environments while ensuring safety of ski racing group.

Technical Projects

STM32-Powered Business Card  04/2025

- Designed a low-power business card PCB using STM32L0 with UART and SW interfaces, and 8-bit binary number LED display.
- Implemented firmware to support UART command parsing, LED animations, and ASCII message rendering on an 8-bit display.
- Soldered and reflowed select SMD components and 28AWG programming wires using solder flux, paste, hot plate and iron.

Xilinx Zynq-7000 FPGA Music Player 04/2025 - present

- Created custom DAC controller and class D amplifier PWM drive signal generation **IP block** with **AXI4 Lite** interface in Verilog.
- Implemented **SPI** interface and testbenches in Verilog to debug DAC peripheral communication in Vivado simulation.
- Programmed bare-metal SD card music playback application for **Zynq-7000** Arm processor using **Xilinx Vivado and Vitis**.
- Designed and constructed impedance matched class D power amplifier circuit to drive mid-range and woofer speakers.

Lorentz Solver  11/2024 - present

- Computes and subsequently animates particle paths in 3D through complex user-defined electromagnetic spaces which include current carrying coils, uniform E and B fields, charged particles and more for **nuclear fusion reactor simulations**.
- **C++ simulation engine** computes Lorentz force on particles and applies 4th order Runge-Kutta method to compute position.
- **Python** script plots computed particle paths and vector fields using **Manim** mathematical library, enabling dynamic visualizations.
- Developing parallelized **NVIDIA CUDA** implementation to accelerate computation of magnetic and electric vector fields.