Ryan A. Marsala

Denver, CO | ramarsala@proton.me | 719-208-9249 | ramarsala.github.io | linkedin.com/in/ryan-marsala | github.com/ramarsala

EDUCATION

Colorado School of Mines, Golden, CO — Aug 2023 – Aug 2025
M.S. Computer Science — Graduate GPA: 3.83
Thesis: **End-to-end Simulation Framework for Hybrid SFQ/CMOS-Memory Compute Systems**

Colorado School of Mines, Golden, CO — Aug 2016 – Aug 2020
B.S. Double Major: Electrical Engineering & Computer Science

RESEARCH

Project: Modeling the Memory-Compute Gap in Large-scale Superconductive Systems — Aug 2023 – Aug 2025
Collaborative Project with Rochester and UVA professors and students

- **Objective:** To build a novel simulation framework for identifying performance bottlenecks in next-generation superconducting computer architectures
- Explored modeling and analyzing novel superconducting computers utilizing RSFQ logic
- Developed analytical models to characterize various physical characteristics of cryostats and their interconnects
- Integrated cache modeling and latency characterization specific to cryogenic environments
- Implemented cache simulation, RISCV instruction decoding, and synthesized RISCV traces
- Poster accepted and presented at Open Source Cluster Application Resources (OSCAR) 2025

WORK EXPERIENCE

Research Intern, **Lawrence Berkeley National Lab** — June 2025 – Sept 30, 2025
Collaborative Project involving AMCR, CAD, computer science, and physics division scientists

- **Objective:** Exploring noise modeling and analysis on superconducting ADCs by developing MATLAB and simulink models to validate their performance and pinpoint critical error sources
- Created noise models for characterizing superconducting specific intrinsic noise effects such as pulse jitter
- Improved on ADC simulink designs for better accuracy, performance, parallel simulation and runtime optimization
- Improved SNDR calculations for spectral analysis by adding Blackman-Harris windowing
- Exploring mitigation methods for noise sensitive areas to improve design robustness
- Presented methodology and results at CSASP summer intern poster session

Canary X Sensor, **Lunar Outpost** — May 2020 – July 2020
Field session project commissioned and managed by Lunar Outpost engineers

- **Objective:** Develop a micro controller solution for periodically communicating sensor information
- Designed a custom firmware for encryption and dynamic transmission through ethernet, wifi, and cellular networks
- Implemented various inter-device communications and logic using UART, SPI and I2C connections
- Made specialized data retention and state machines for robust logic and fault tolerance
- Awarded 1st in technical presentation of the final implementation by class vote

Previous Experience: Assistant Manager, Hammer & Nails Grooming Shop (2020 – 2023)

PUBLICATIONS

Marsala, R. A., et al. "End-to-end Architectural Simulation Framework for Hybrid SFQ/CMOS-Memory Compute Systems". Poster presented at OSCAR 2025. In preparation for IEEE ISPASS
Marsala, R. A., et al. "Noise Analysis on Superconducting ADCs". In preparation for IEEE ISCAS

INTERESTS AND PROJECTS

- Member of bowling club and rhythm game club, involved in hosting various events
- Various GPU, parallel, web, android and game programming projects including CUDA, OpenMP and OpenGL
- Various electrical projects including an autonomously navigating robot, PCB design, BPM detecter, and FPGA boards

SKILLS & STRENGTHS

Programming: C++, C, Java, Python, JavaScript, PHP, Kotlin, MATLAB, LabVIEW, SQL, Verilog, Lisp, HPC, PCB
API/ABIs: OpenGL, GLFW, GLSL, CUDA, OpenMP, OpenCV, RISCV, Android, Next.js, PyTorch
Electrical Experience: Microcontrollers, Motors and Generators, PCB design, Soldering, CAD
Software: Git, Autodesk EAGLE, Linux, Microsoft Office, SolidWorks, VSCode, Docker, Simulink, Traces, WRspice
Professional Skills: Documentation, Collaboration, Communication, Adaptability, Problem Solving, Teamwork