

Ryan A. Marsala

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EDUCATION

Colorado School of Mines, Golden, CO Aug 2023 - Aug 2025
Masters Thesis Computer Science Graduate GPA: 3.83

- **Thesis: End-to-end Simulation Framework for Hybrid SFQ/CMOS-Memory Compute Systems**
- **Advisor:** Dr. Mehmet Belviranli

Colorado School of Mines, Golden, CO Aug 2016–Aug 2020
B.S. Double Major: Electrical Engineering & Computer Science Undergraduate GPA: 3.3

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 specific to cryogenic environments
- Implemented cache simulation, RISCv instruction decoding, and synthesized RISCv traces

WORK EXPERIENCE

Research Intern, Lawrence Berkeley National Lab June 2025 - Sept 2025

- Conducting noise analysis on superconducting ADCs by developing MATLAB models to validate their performance and pinpoint critical error sources
- Exploring mitigation methods for noise sensitive areas to improve design robustness

Previous Experience: Assistant Manager, Hammer & Nails Grooming Shop (2020-2023); Parts Clerk, Transmission Clinic of Colorado (2017)

PUBLICATIONS - IN PREPARATION

Marsala, R. A., et al. "End-to-end Architectural Simulation Framework for Hybrid SFQ/CMOS-Memory Compute Systems". In preparation for IEEE ISPASS (derived from M.S. thesis)

Marsala, R. A., et al. "Noise Analysis on Superconducting ADCs". In preparation for IEEE ISCAS

PROJECTS

Canary X Sensor

- Awarded 1st in technical presentation by class vote
- Developed a microcontroller solution for periodically communicating encrypted sensor information in JSON payloads
- Implemented a networking protocol to communicate data collected, adaptive to the connected network channel

Autonomously Navigating Robot

- Developed a robot capable of traversing a path through a set of markers using image recognition
- Utilized H-bridge and motor encoders in a feedback controller to determine desired PWM on Arduino

OpenGL Game

- Developed a 3D game using OpenGL in C and C++
- Implemented the OpenGL graphics pipeline with GLFW and GLSL
- Implemented custom texturing, illumination, animations, collisions, and particle systems

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: Microcomputers, Motors and Generators, PCB design, Soldering

Software: Git, Autodesk EAGLE, Linux, Microsoft Office, SolidWorks, VSCode, Docker, Simulink, Traces, WRspice

Professional Skills: Documentation, Collaboration, Communication, Adaptability, Problem Solving, Teamwork