



Skills

Electrical: Soldering (SMD/TH), PCB design (Altium Designer, EAGLE), LTSpice/PSpice, FPGA - Xilinx Vivado/Microsemi Libero (VHDL & Verilog), Electronics & RF lab equipment (eg. Oscilloscope, VNA, Spectrum Analyzer). RF Simulation Tools: HFSS, ADS Keysight, FEKO. Familiarity with RF systems for Communications & Remote Sensing applications

Software: C/C++, Python: NumPy, Matplotlib, Data analysis, Data visualization, UNIX/Linux CLI, Version Control: Git, SVN, Java, LabVIEW, HTML/CSS/JS, OpenCV, ROS.

Misc: Project/Team Management, Model Rocketry (NAR L1), HAM Radio General Class License (KC1KKR), Autodesk Inventor (CAD), 3D printing, Mechanical fabrication (basic machine shop tools, lathe/mill)

Experiences

Associate Electrical Engineer | Atomos Nuclear and Space | May 24 - present

Spacecraft Communications Architecture

- Designed fault-tolerant S-band RF comms system architecture for a GTO to GEO servicing spacecraft, enabling both TT&C and high-bandwidth downlink use-cases.
- Collaborated with spacecraft systems engineering team and external RF consultant group to select S-band architecture over other candidate options (Ka, X-band, various combinations).
- Conducted trade studies on space-qualified RF switches and transceivers to support this design. Identified front-end components necessary for different configurations.
- Supported trade on ground station service providers, with focus on RF test and validation.
- Put together materials for PDR of RF communication system design.

FPGA & Firmware

- Responsible for all firmware for modular, in-house spacecraft battery and electrical power system (EPS).
- Developed fault-tolerant intra-board architecture that supports 5 types of modules, some which may be duplicated in the stack.
- Wrote C++ drivers for hardware peripherals including SPI and I2C, wrappers to interface with external ICs based on datasheets.
- Developed code organization through gitlab using multiple repos and submodules.
- Wrote support software in python as prototype user interface for testing and data visualization.
- Onboarded and lead 3 additional firmware engineers to mature codebase in preparation of productization of EPS.

Temporary Research Assistant: BurroX | Center for Environmental Technology | May 23 - May 24

- Continue development of Capstone project, a passive radiometer for aerial measurement of soil moisture.
- Responsible for PCB schematic & layout in Altium, sourcing parts, manufacturing and validating completed boards.
- Write and perform tests to collect data to validate design iterations, using VNA, Spectrum Analyzer.
- Analyze and visualize results to demonstrate viability and limitations of the system.
- Develop thermistor subsystem for high-accuracy thermal measurements required for inversion algorithm.

Learning Assistant: ECEN 2420 Electronics for Wireless Systems | CU Boulder | January 23 - May 23

- Support class of 36 students for sophomore level RF systems laboratory course.
- Organize and maintain course materials and prepare kits for each week's lab.
- Provide hands-on technical explanation and debugging support for student RF circuits during labs and office hours.

Project Manager: Project BURRO | ECEE Senior Capstone | May 22 - May 23

- Lead team of 6 to validate novel architecture for P-Band (450-750 MHz) radiometer for soil moisture remote sensing.
- Responsible for leading weekly meetings and monthly milestone presentations with faculty sponsor and research group at CU's Center for Environmental Technology (CET)
- Lead fabrication and testing of prototype RF front-end, resulting in acquisition of publication-quality data showing the architecture's increased tolerance to RFI.
- Conducted trade study to select FPGA-based back-end platform for development of real-time data processing necessary for radiometer to be feasibly integrated on mobile platforms.

Undergrad Electrical Engineer: [Integral Field Ultraviolet Spectroscopic Experiment \(INFUSE\)](#) | LASP | Aug 22 - Feb 23

- Supporting electrical system for UV sounding rocket experiment.
- Re-designed Command and Power PCB in Altium based on legacy design from DEUCE mission. Responsible for sourcing compatible parts, assembly and test of flight-suitable board.

Electrical Engineering Intern: Downlink Signal Generator Prototyping | NASA JPL | June - Aug 22

- Develop test equipment to evaluate receiver functionality for the Deep Space Network by generating communication symbols expected from spacecraft and passing them to a Vector Signal Generator to modulate in RF.
- Port existing telemetry generation software from 32-bit to 64-bit. Developing network-based symbol stream delivery system to transfer symbols between rhel8 server and embedded linux host hardware.



Electrical Lead: [Optical Spectrometer](#) | ASTR 3560 - Astronomical Instrumentation | January 22 - May 22

- Worked in a team of 4 students to become first team in history of the class to complete optical spectrometer build and obtain spectral emission measurements of various gas discharge lamps as well as absorption spectrum of the sun.
- Responsible for design & manufacture of all electrical systems, integration with mechanical and optical components.
- Designed photodiode circuit with transimpedance amplifier and active LPF second gain stage, tested candidate photodiodes for suitability, designed and populated PCB with detector circuit, integrated circuit into instrument.
- Developed embedded software for the Arduino UNO to control the entire instrument using stepper motor, optical switch, and onboard ADC for measurements.

Undergrad Electrical Engineer: [Electrostatic Dust Analyzer \(EDA\)](#) | LASP | Jan 2021 - June 22

- Supporting TRL advancement of instrument to characterize electrostatic transport of lunar dust particles
- Developed VHDL modules to interface between ADCs, FTDI device and Microsemi FPGAs to establish 10Mb/s data link between instrument and computer.
- Wrote parameterized C++ program to perform data collects of specified length, parse received data frames, and create output files of specified file type and format.
- Developed python scripts to parse output files and plot graphs by channel. Validated link speed and robustness with predictable data source. Used scripts to debug ADC circuits and VHDL modules.

Electrical Engineering Intern: [Brooke Owens Fellowship](#) | HawkEye 360 | May - Aug 21

- Supported hardware and signal processing teams for RF geospatial analytics satellite constellation.
- Used Vivado and Analog Devices resources to set up FMCOMMS eval board on Xilinx development platform and validate with iio-oscilloscope tool. Worked on modifying demo projects, deploying custom bitstream & device tree overlay, and debugging issues in the boot process.
- Analyzed simulated RF data sample using ground-based test replica of on-orbit satellite hardware. Used USRP to generate input signals and GNU Radio to perform signal processing to investigate multi-channel collection behavior.
- Designed and built GSE test module that allows automated RF channel switching in order to streamline TVAC testing of LNA and other multi-channel RF boards.

Electrical Engineering Intern: [FPGA Design for Cognitive Communications](#) | NASA Glenn | Aug - Dec 20

- Worked remotely for Power and Avionics Branch to support cognitive communications CubeSat project.
- Used Vivado Design Suite to design and develop modular AXI4 register interface for transceiver status and telemetry data and configuration of application-specific signal processing IP.

Electrical Engineering Intern: [Embedded SW and FPGA design for Radio Applications](#) | NASA Goddard | Jun - Aug 20

- Worked remotely for the Science Data Processing Branch to perform literature review for GPS receiver implementation on platforms similar to GSFC's SpaceCube with FMCOMMS3 RF front-end.
- Developed methods to deploy Yocto image and cross-compile GNSS-SDR Open-Source software on ZedBoard. Investigated potential hardware acceleration implementations for GPS acquisition and tracking algorithms.

Team Lead: [Avionics Payload](#) | ECEN 2440 - Embedded Systems Final Project | Fall 19

- Led team of 3 to design datalogging and RF recovery system for model rockets.
- Conducted trade studies based on LTSpice simulations and analysis, designed modular PCBs including RF transmitter. Utilized hardware UART, I2C on MSP432 to communicate with peripherals.

RocketSat-13 | Colorado Space Grant Consortium | Sept 19 - May 20

- Develop avionics system and test procedures for sounding rocket experiment to test passive solar panel deployment system.

Research Assistant | [Astronaut AR Visualization Tool](#), CCSU/CT Space Grant Consortium | Jun - Aug 19

- Created model satellite used for demo of augmented reality EVA servicing tool using CAD/3D printing, sensors and bluetooth.

Engineer: Candlefinder | [Trinity Fire Fighting Robot Competition](#) | Dec 16 - May 18

- Designed and built autonomous robot to navigate a maze and locate and extinguish a randomly placed candle
- Utilized Robot Operating System (ROS), SLAM algorithm using LIDAR data, OpenCV and IR sensor to locate flame
- Awarded Outstanding Robots in Connecticut by IEEE CT '17, '18

CT Space Grant Intern | [Discovery Museum](#), Bridgeport CT | Jun - Aug 18

- Created custom PCBs, designed mechanical integration for telemetry downlink for high-power model sounding rocket platform.

Computer Lab Assistant | Silas Deane Middle School, Wethersfield CT | Full-Time | Aug 14 - Jul 16

Alumni Engineering Mentor | FIRST Robotics Team 178, Farmington CT | Jun 14 - Aug 19

- Mentored high school students in electrical, software, project management, rapid prototyping, esp. inspiring female students.

Education

BS Electrical Engineering | Minor: Astronomy | University of Colorado - Boulder | Graduated w/ honors, Class of 2023 | GPA: 3.7

AS Engineering Science | Graduated with honors, Class of 2019 | Tunxis Community College | GPA: 3.54