

# Fischer J. Moseley

✉ fischer.moseley@gmail.com

🌐 www.fischermoseley.com

🗣 FischerMoseley

📺 Fischer Moseley

📷 @fischerm

📶 KC1MRB

## Experience

### NASA Jet Propulsion Laboratory

June 2023 - Present

FPGA ENGINEER

Pasadena, CA

- Architecting, implementing, and testing FPGA designs for a low Earth orbit optical interferometer mission, GRACE-C.
- Developing prototype RF hardware from requirements, performing schematic capture and board layout in Altium/KiCad, and communicating with external vendors for PCBA.
- Programming Xilinx/Microsemi FPGAs with Verilog/Python, and using CI pipelines to automate regression and unit tests with Questa.
- Mentoring colleagues in digital design/FPGA development, writing specifications, and communicating best practices across sections.

### The Art and Science of PCB Design - MIT PCB Design Class

Nov 2022 - Feb 2023

LECTURER

Cambridge, MA

- Taught and created a brand-new, for-credit PCB design course at MIT, with over 100 students enrolled.
- Led students through the end-to-end design of a portable bluetooth speaker, from requirements to bringup. Each student performed schematic capture and board layout in Altium, and used SMD reflow to assemble a professionally-fabricated PCB. After debugging, students had a fully functional portable bluetooth speaker.
- Individually coached student projects, prepared and taught lectures, built relationships with faculty, and acquired sponsors.

### Electric Era Technologies

Jun 2021 - Aug 2021

ELECTRICAL ENGINEER

Seattle, WA

- Created the low-voltage control electronics for a grid-tied 125kW battery for EV charging.
- Designed production hardware in Altium using requirements derived from NEC, IEC, and UL standards.
- Modeled the chemical aging and discharge of individual lithium cells in LTSpice and MATLAB to derive system-level thermal requirements, and integrate with a unified thermal model.

### MIT Motorsports - Formula SAE

Mar 2020 - Jun 2021

ELECTRICAL TEAM LEAD

Cambridge, MA

- Served as the electrical team lead of MIT Motorsports, a student club that designs a Formula-style racecar for an annual competition.
- Architected the vehicle's electrical system, mentored team members, and maintained relationships with vendors and sponsors.
- Developed a custom 20kW three-phase tractive inverter, using LTSpice to model power and analog circuitry and Altium for PCB design. Implemented field oriented control in C++, to run on an embedded STM32 ARM Cortex-M7.

### MIT STAR Laboratory - BeaverCube CubeSat

Jun 2020 - Apr 2021

SPACECRAFT ENGINEER

Cambridge, MA

- Created and programmed a flight computer for the BeaverCube CubeSat mission, which provides data for hurricane prediction.
- Led firmware development for the embedded STM32 ARM Cortex-M4 housekeeping microcontroller in C++, and developed embedded Linux software for the redundant Raspberry Pi Compute Modules onboard.
- Designed a circuit from functional requirements, and designed a six-layer, impedance-controlled, ITAR-controlled PCB in Eagle.
- Currently in low Earth orbit, deployed from the ISS in June 2021 following delivery on a Falcon 9.

### SparkFun Electronics

Jun 2019 - Aug 2019

EXPERIMENTAL PRODUCT ENGINEER

Niwot, CO

- Created three new products for SparkFun's Qwiic product line, a set of I2C-enabled sensor modules.
- Designed circuits to specification, and used Eagle for schematic capture and board layout. Developed Arduino library in C++, and performed post-assembly hardware testing and quality assurance.

### MIT Applied Mathematics Laboratory

Aug 2018 - Aug 2021

EXPERIMENTAL PHYSICIST

Cambridge, MA

- Joint first author of *Active Topoelectrical Circuits*, published in PNAS.
- Designed a network of analog nonlinear oscillators to demonstrate topological behavior similar to the quantum hall effect.
- Simulated circuit dynamics in MATLAB, designed a circuit using analog multipliers in LTSpice, and fabricated circuit boards designed in Eagle. Characterized individual components with test equipment automated with PyVISA.

## Education

### Massachusetts Institute of Technology - Masters of Electrical Engineering and Computer Science

June 2023

GPA: 5.0/5.0

Cambridge, MA

- **Thesis Title:** *Manta: An In-Situ Debugging Tool for Programmable Hardware*. Done under the supervision of Dr. Joseph Steinmeyer.
- Created an open-source, platform-agnostic tool for debugging and rapid prototyping of FPGA designs.
- Used CI to automate functional simulation, formal verification, and hardware-in-the-loop testing on Xilinx and Lattice FPGAs.
- Teaching Assistant for MIT's FPGA design class, and rewrote portions of the course.
- **Coursework:** Power Electronics (Theory), Feedback and Control System Design, Underactuated Robotics, Robotic Manipulation, Quantum Measurement and Noise.

### Massachusetts Institute of Technology - Bachelor's Degree in Electrical Engineering and Physics

May 2022

GPA: 4.6/5.0

Cambridge, MA

- **EE Coursework:** Mobile Autonomous Systems Lab, Nanofabrication Project Lab, FPGA Project Lab, Power Electronics Lab, Signal Processing, Electromagnetics, Circuits and Electronics.
- **Physics Coursework:** Quantum Physics I & II, Quantum Computation, Quantum Measurement and Noise, Intro Fusion Reactor Design, Advanced Electricity and Magnetism, Statistical Mechanics, Classical Mechanics I & II.

## Skills

### Software

Altium, Eagle, KiCad, LTSpice, Vivado, OpenCV, QuTip, Drake, PyTorch, Docker, Kubernetes, Microsoft Azure, Fusion 360

### Languages

English (native), German (basic), Python, Verilog/SystemVerilog, MATLAB, C/C++, LaTeX