

Michelle Pirrone

Email: michelle.pirrone@colorado.edu | Phone: 845-863-9434

Website: <https://mpirrone1.github.io/> | LinkedIn: www.linkedin.com/in/michelle-pirrone

Research Interests

Communication systems, interference testing, machine learning, intelligent RF control systems.

Education

University of Colorado Boulder

June 2020 – May 2025

Ph.D. in Electrical Engineering | GPA: 3.856

MS in Electrical Engineering | May 2023

Funding: DoD NDSEG Fellowship

Advisor: [Adam Wunderlich](#) (NIST)

State University of New York at New Paltz

Aug. 2016 – May 2020

B.S. in Electrical Engineering, Minor in Biology | GPA: 3.92

Funding: Presidential Scholarship, NY Regents Scholarship

Outstanding Graduate Award, Summa Cum Laude

Research Experience

Research Associate (NIST/CU Boulder)

Jan. 2023 – Present

Applied Systems Metrology Group | National Institute of Standards and Technology (NIST)

Explore interference impacts and proxy test waveforms for communication systems. Implement new, best practice test setup and experimentation procedures. Analyze vulnerabilities in communication systems, including impacts from time and frequency structure in signals. Develop new methodologies to analyze closed-box behaviors in devices.

Graduate Research Assistant (CU Boulder)

July 2020 – Jan. 2023

RF Power and Analog Lab | Dall'Anese Group

Integrate RF circuits and systems in real-time feedback loops with optimization and machine learning techniques to compensate for varying conditions and behaviors. Explore new amplifier and transceiver architectures such as load modulated balanced amplifiers (LMBAs) and quadrature balanced power amplifiers (QBPA's). Research new methods of optimization and develop hardware systems with MATLAB and Python control algorithms.

Undergraduate Research Assistant (SUNY New Paltz)

Jan. 2018 – May 2020

Dahle Research Lab | Mass Biology Lab

Develop methods for characterizing 3-D printing parameters on RF devices, specifically patch antennas. Combine 3-D printing with dielectric loading in antennas to simulate and measure RF performance. Further investigate dielectric resonator antennas with antenna in package designs; integrating electronics into the antenna and examining EMI solutions. Additional research performed in the biology department characterizing locomotion in mutated amphibians to understand developmental differences.

Team leader for a 1-year capstone project to investigate new techniques for integrating electronics and software into a wearable virtual reality controller. Examined haptic feedback, force sensing measurements in the forearm, motion tracking in TensorFlow, and virtual demonstrations in Unity. Additionally considered mechanical robustness and microprocessor integration.

Publications

J1. **M. Pirrone**, J. Bernhardt, A. Wunderlich, “Assessing Directional Time-Dependent Interference Vulnerabilities in Closed-Box Wireless Systems,” *IEEE Transactions on Electromagnetic Compatibility*, 2024, accepted.

J2. **M. Pirrone**, E. Dall’Anese, T. Barton, “Data-Driven Optimization Strategies for Tunable RF Systems,” *IEEE Transactions on Microwave Theory and Techniques*, 2024.

C1. **M. Pirrone**, J. Bernhardt, A. Wunderlich, “Assessing Time-Scale-Dependent Interference Vulnerabilities in Wireless Communications,” *2024 IEEE International Symposium on Electromagnetic Compatibility, Signal and Power Integrity (EMC/SIPI)*, 2024, accepted.

C2. **M. Pirrone**, G. Giesbrecht, E. Dall’Anese, T. Barton, “Zeroth-Order Optimization for Self-Interference Cancellation in STAR Front-End,” *2024 IEEE Wireless and Microwave Technology Conference (WAMICON)*, 2024.

C3. **M. Pirrone**, *et al.*, “ATIC: Automated Testbed for Interference Testing in Communication Systems,” *IEEE Military Communication Conference (Milcom)*, 2023.

C4. **M. Pirrone**, E. Dall’Anese and T. Barton, "Autonomous STAR Front-End with Intelligent Interference Correction," *GomacTECH 2023*, 2023.

C5. **M. Pirrone**, E. Dall’Anese and T. Barton, "Zeroth-Order Optimization for Varactor-Tuned Matching Network," *2022 IEEE/MTT-S International Microwave Symposium - IMS 2022*, 2022.

C6. W. Sear, D. T. Donahue, **M. Pirrone** and T. W. Barton, "Bias and Bias Line Effects on Wideband RF Power Amplifier Performance," *2022 IEEE 22nd Annual Wireless and Microwave Technology Conference (WAMICON)*, 2022, pp. 1-4.

I1. R. Dahle, I. Nesheiwat, R. Murillo, and **M. Pirrone**, “EMI Shielding Effectiveness Study of a 3D Printed Antenna in Package (AiP)”. 2022. *Industry white paper publication for Sono-Tek*.

P1. **M. Pirrone**, V. Narici, D. Barnhart, S. Mass, “Comparing the Kinematics of Metamorphosed Axolotls and Tiger Salamanders,” *2019 Society for Integrative and Comparative Biology*, P2-253.

P2. V. Narici, **M. Pirrone**, D. Barnhart, S. Mass, “Using Force to Characterize the Efficiency of Ambystomoid Locomotion,” *2019 Society for Integrative and Comparative Biology*, P2-254.

Distinctions

DoD NDSEG Fellowship (CU Boulder / DoD)	Sept. 2022 – Sept. 2025
Engineering Graduate Fellowship (CU Boulder)	July 2020 – Dec. 2020
Dean's Excellence Scholarship (CU Boulder)	Aug. 2020
IMS Project Connect Recipient (CU Boulder / IMS)	July 2020
Outstanding Graduate Award (SUNY New Paltz)	May 2020
AYURE/SURE Research Grants (SUNY New Paltz)	Jan. 2018 – Aug. 2018
Honor's Program (SUNY New Paltz)	Aug. 2016 – May 2020
Dean's List (SUNY New Paltz)	Aug. 2016 – May 2020
Presidential Scholarship (SUNY New Paltz)	Aug. 2016 – May 2020
New York State Regents Scholarship (SUNY New Paltz / NYS)	Aug. 2016 – May 2020

Skills

- Simulation: *AWR, ADS, HFSS, SPICE*
- Coding: *MATLAB, Python, C, Linux*
- 3D Modeling: *Solidworks*
- Electrical Design: *PCB, MMIC, RF*
- Automation: *SCPY, GNU Companion*
- Test Equipment: *VNA, SA, SDRs, radiation measurements*
- Technical and Proposal Writing

Teaching Experience

Teaching Assistant, Department of Electrical Engineering (CU Boulder)

ECEN 3300: Linear Systems

Spring 2022

Topics include the use of differential equations and Fourier and Laplace transforms applied to continuous time systems and the application of these systems in communications and control systems. Responsible for holding recitation sessions with practice problems and grading of homework and exams.

Teaching Assistant, Department of Electrical Engineering (CU Boulder)

ECEN 5634: Microwave and RF Lab

Spring 2021

Topics include S-parameters, power measurements, antenna characterization, RADAR, and transmitter operation. Hands-on experience with VNAs, SAs, and antenna measurements. Responsible for organizing the experimental setup, providing and grading pre-labs, and grading lab reports.

Teaching Assistant, Department of Electrical Engineering (SUNY New Paltz)

EGE 201: Circuits Lab

Aug. 2019 – May 2020

Topics include nodal and mesh approaches, maximum power transfer, Thevenin theorem, and first and second order circuits. Both theory and hands-on experiments were performed. Responsibilities included lecturing, experimental troubleshooting, grading, and office hours.

Work Experience

IT Technician (SUNY New Paltz)

Aug. 2019 – May 2020

Perform diagnostics and repairs on devices including classroom technology, laptops, cell phones, and tablets. Assist both in software and hardware restoration and provide recommendations for external support. Additionally provide over the phone support for software and write service tickets for upper-level IT installation and repair.

Research and Development Intern (Fair-Rite Corp.)

May 2019 – Aug. 2019

Wallkill, New York

Lead researcher in supporting new internal research on ferrite material characterization and breakdown behavior. Investigate different ferrite compositions, shapes, and configurations for behavioral responses along with examine distortion at high frequencies and breakdown behavior at high power. Contribute to internal production standards.

Organizations

Women in Microwaves (WiM)

Oct. 2021 – Present

Order of the Engineer

May 2020 – Present

IEEE Eta Kappa Nu (HKN)

March 2019 – Present

McNair Scholar's Program – Mentor

Sept. 2020 – May 2022

Graduate Mentor Program – Mentor

Sept. 2021 – May 2022

Select Classes

- ECEN 5024 – RF Power Amplifiers
- ECEN 5014 – Special Topics: Active Microwave Circuits
- ECEN 5797 – Intro to Power Electronics
- ECEN 5014 – Special Topics: MMIC Design
- ECEN 5407 – Renewable Energy and the Power Grid
- EGE 593 – Microelectronic Reliability