

# Eric Ponce

☎ (786) 564-2028 | ✉ eaponce@pm.me | 🔗 linkedin.com/in/ericponce

## Education

### Massachusetts Institute of Technology

PhD in Electrical Engineering and Computer Science

GPA: 5.0/5.0

Cambridge, MA  
June 2019 - September 2023

MEng in Electrical Engineering and Computer Science

GPA: 4.8/5.0

June 2017 - June 2019

BS in Electrical Science and Engineering

GPA: 4.9/5.0

August 2013 - June 2017

## Skills

**Hardware** Analog, digital, embedded, low-power, and power electronic circuit design, KiCad, Altium, Cadence, SPICE, SolidWorks

**Firmware** Communications (UART, SPI, I2C, CAN, Wi-Fi, BT, NB-IoT, etc.), signal processing, multiple architectures (8051, AVR, ARM Cortex-M), RTOS

**Software** C, C++, Python (NumPy, SciPy, Matplotlib), shell scripting (bash), Git, build system (GNU), HTML, CSS, JavaScript

**Other** Numerical and analytical modeling/optimization, 3D printing, laser Cutting, solder rework, Spanish

## Experience

### MIT – Electromechanical Systems Group (Professor Steven Leeb)

Cambridge, MA

Graduate Researcher

June 2017 - September 2023

- Developed physical models and low-power mixed-signal embedded circuitry (Infineon PSOC), firmware, and software for nonintrusively measuring the state and operation of mechanical systems, such as water meters, to cheaply retrofit for smart resource tracking and diagnostic capability
- Developed electrical models, low-power embedded circuitry (Infineon PSOC, Microchip SAML10), and firmware for harvesting ambient energy from magnetic fields to enable low-maintenance sensing of systems
- Developed methods for analyzing the stability of grid-connected constant-power-loads which may cause serious instabilities
- Redesigned firmware and developed a new web software UI to drastically reduce power consumption and demonstrate newly available sensing capabilities for research group's wireless sensing platform centered around a TI Tiva C Series microcontroller and CC3100 Wi-Fi network processor
- Mentored/managed several undergraduate- and graduate-level researchers on development for research group topics and electrical engineering courses for students across a range of levels (middle-school through university)

### Caribbean Science Foundation – SPISE

Bridgetown, Barbados

Electronics Instructor

July 2023 - August 2023

- Developed and taught a five-week hands-on introduction to electronic circuit design for Caribbean high-school students who are gifted in STEM

### Waterbit, Inc. – Hardware Engineering

San Jose, CA

Electrical Engineering Intern

June 2020 - August 2020

- Developed real-time embedded signal processing methods to nonintrusively detect disastrous valve failure in harsh agricultural environments
- Restructured and rewrote ultra-low-power RTOS to enable development of new features (such as higher time granularity) and reduce technical debt
- Customized the firmware build system for our Infineon PSOC target to improve version control and continuous integration efforts
- Reviewed designs of high-efficiency ultra-low-power switching converters for sensors and suggested improvements

### MIT – 6.131 Power Electronics Laboratory & 6.115 Microcomputer Project Laboratory

Cambridge, MA

Teaching Assistant

January 2017 - June 2019

- Managed staff hours, laboratory resources, and safety, maintained lab equipment, and helped students learn the material and debug their work
- Received average TA rating of 6.96/7.0 and 2022 Grainger Foundation Teaching Award for rapidly transitioning labs to remote learning format

### Apple Inc. – iPad Systems

Cupertino, CA

Electrical Engineering Intern

June 2016 - August 2016

- Validated power distribution and high-speed communication networks and interfaces using a network analyzer
- Developed software and tooling and interfaced with vendor to validate, debug, and improve early-stage USB power-delivery
- Owned design and production of mixed-signal high-speed multi-layer PCB to enabled testing of high pixel density LED displays
- Provided engineering support in Shenzhen during bring up of large-scale design verification build

## Publications

- Monagle, D. & **Ponce, E.** & Leeb, S. "Resonant Circuits for Split-Core Magnetic Energy Harvesters" In Review: *IEEE Trans. Industrial Elec.*
- **Ponce, E.** "Measurement and Modeling for Resource Monitoring." PhD Thesis. In: *DSpace@MIT*, 2023.
- Monagle, D. & **Ponce, E.** & Leeb, S. "Generalized Analysis Method for Magnetic Energy Harvesters." In: *IEEE Transactions on Power Electronics*, 2022.
- Gutierrez, M. & Saathoff, E. & **Ponce, E.** & Leeb, S. "Sub Line-Frequency Stability Analysis of Single-Phase Constant Power Loads Using Envelope Impedance." In: *IEEE Transactions on Power Electronics*, 2022.
- **Ponce, E.** & Leeb, S. "Passive Probe: Mechanically-Modulated Field Sensing for Motion Tracking and Flow Estimation." In: *IEEE Sensors Journal*, 2022.
- **Ponce, E.** & Leeb, S. & Lindahl, P. "Know the Flow: Non-Contact Magnetic Flow Rate Sensing for Water Meters." In: *IEEE Sensors Journal*, 2021.
- **Ponce, E.** & Leeb, S. "A 3-D Field Solution for Axially Polarized Multi-Pole Ring Permanent Magnets and its Application in Position Measurement." In: *IEEE Transactions on Magnetics*, 2020.
- **Ponce, E.** "Non-intrusive load monitoring for existing water and natural gas metering infrastructure." M. Eng. Thesis. In: *DSpace@MIT*, 2019.