

EDUCATION

Massachusetts Institute of Technology (MIT) – Cambridge, MA

Bachelor of Science in Electrical Engineering – GPA: 4.4/5.0

June 2013

Master of Engineering in Electrical Engineering – GPA: 5.0/5.0

June 2017

Thesis: Broadband Acoustic Energy Harvesting via Synthesized Electrical Loading

Doctor of Philosophy in Electrical Engineering

June 2021 (expected)

Thesis: Heavily Quantized Terahertz Phased Array Systems

EXPERIENCE

Playground Global – Palo Alto, CA

May 2018 – August 2018

- Electrical Engineering consultant for venture capital firm portfolio companies
- Defined product requirements, drove cross-functional product development

Microsoft Corporation Xbox Sensor Development – Redmond, WA

- Focus on high performance and mobile audio system design, characterization
- Architecture, schematic, board design for sensor-based systems
- High-speed and high layer count board design
- Electrical engineering project lead (unannounced project)
- DFM, on-site factory build support
- Focus on low-noise audio electronics and rapid prototyping
- Optimized cost for high-volume production

August 2013 – April 2015

Microsoft Corporation Xbox Silicon Development – Mountain View, CA

- Contributed to test bench and developed test cases in SystemVerilog and C++ for verification and validation of mixed-signal ASIC design
- improved test coverage for digital and analog verification and validation

May 2012 – August 2012

Bar-Ilan University Molecular Photonics Lab – Ramat Gan, Israel

- Developed first ever photovoltaic cell based on ordered carbon nanotubes
- Studied UV-induced carbon nanotube functionalization

May 2011 – August 2011

MIT Laboratory of Organic and Nanostructured Electronics – Cambridge, MA

- Optimized organic solar cell efficiency
- Independently designed experimental processes for device optimization

May 2010 – August 2010

University of Florida Laboratory of Organic Optoelectronics – Gainesville, FL

September 2006 – February 2009

- Improved Polymer solar cell efficiency via optimization of device composition and morphology
- Developed procedure to precisely tune spin-casted thin film thickness and Zinc Oxide nanostructure morphology

LEADERSHIP

Co-founder, Co-President - MIT Live Music Connection

- Director, Open Source Music Project- expanding musical interest/skills on campus
- Taught and organized free guitar lessons for MIT community
- Designed course and taught guitar curriculum to 100+ students

January 2010 – June 2013

ACTIVITIES / ACCOLADES

Winning Team, MIT Kickstart Pitch Competition

2016

Intel International Science and Engineering Fair

2008, 2009

- Second Place Grand Award Winner, two-time

International Sustainable World Energy, Engineering, Environment Project Olympiad

2008

- Gold medalist

Armed Forces Communications and Electronics Association National Science Fair (AFCEA)

2008

- Grand prize winner

PUBLICATIONS / PATENTS / CONFERENCE PRESENTATIONS

- N.M. Monroe, J.H. Lang. Broadband, Large Scale Acoustic Energy Harvesting via Synthesized Electrical Load: Part I. Harvester Design and Model. *Smart Materials and Structures*. 2019. doi: 10.1088/1361-665X/ab114a
- N.M. Monroe, J.H. Lang. Broadband, Large Scale Acoustic Energy Harvesting via Synthesized Electrical Load Part II: Electrical Load. *Smart Materials and Structures*. 2019. doi: 10.1088/1361-665X/ab1158

- Monroe, N. (2010, August 25). Increasing the efficiency of a hybrid polymer photovoltaic cell with polymer nanofiber complexes of varied thickness. *Young Scientists Journal*, 3(8), 26-32.
- Presenter, AFCEA International Joint Warfighting Conference – Virginia Beach, VA June 2008

SKILLS

- Audio system design, modeling, optimization, test
- Audio Precision, anechoic audio system test
- Board-level system integration
- Design for manufacturing
- Cadence-based CAD toolchain
- Low power electronics
- Optoelectronics
- High performance digital system design
- Power Electronics design
- RF Integrated Circuit Design
- Analog Integrated Circuit Design
- System architecture
- High-speed PCB design
- FPGA development
- Computer Vision
- Embedded system development
- Design for EMC
- Thin-film device fabrication
- Semiconductor fabrication processes/equipment
- Kicad, Eagle, LTSPICE, Abaqus, Solidworks, MATLAB, Python, C++
- Mixed signal chip verification/validation
- Working Knowledge: Tensorflow, Mechanical design, machine shop fabrication

TEACHING

- Graduate Teaching Assistant *Fall 2015*
 - *MIT 6.152 – Microelectronics Processing Technology*
 - Instructor Rating: 6.3 / 7
- *MIT 2.678 – Electronics for Mechanical Systems* *Spring 2018*
 - Instructor Rating: 6.6 / 7
- *MIT 2.678 – Electronics for Mechanical Systems* *Fall 2018*
 - Instructor Rating: 6.8 / 7

AVIATION

- FAA Private Pilot | Multi Engine | High Performance | Complex *June 2015*
- Instrument Rating *February 2019*
- Commercial Rating *In Progress*
- FAA Third Class Medical
- 330 Flight Hours | 270 Hours Pilot in Command

PERSONAL

Classical / Spanish Flamenco Guitar | Audio Production | Rock Climbing | Hiking

Languages

Spanish (Intermediate), Mandarin Chinese (Basic)