

## EDUCATION

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### **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 2020 (expected)*

## EXPERIENCE

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### **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
- Developed cost-reduced force-sensing platform for biometric analysis

### **Microsoft Corporation Xbox Sensor Development – Redmond, WA**

*August 2013 – April 2015*

- 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

### **Microsoft Corporation Xbox Silicon Development – Mountain View, CA**

*May 2012 – August 2012*

- 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

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

*May 2011 – August 2011*

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

### **MIT Laboratory of Organic and Nanostructured Electronics – Cambridge, MA**

*May 2010 – August 2010*

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

### **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

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

- Director, Open Source Music Project- expanding musical interest/skills on campus *January 2010 – June 2013*
- Taught and organized free guitar lessons for MIT community
- Designed course and taught guitar curriculum to 100+ students

## ACTIVITIES / ACCOLADES

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### **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

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- N.M. Monroe, J.H. Lang. Design and model of scalable, low-cost acoustic energy harvester. 2018. (*in progress*)
- N.M. Monroe, J.H. Lang. Broadband acoustic energy harvesting via synthesized negative impedance. 2018. (*in progress*)

- 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

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| <ul style="list-style-type: none"> <li>• Audio system design, modeling, optimization, test</li> <li>• Audio Precision, anechoic audio system test</li> <li>• Board-level system integration</li> <li>• Design for manufacturing</li> <li>• Cadence-based CAD toolchain</li> <li>• Low power electronics</li> <li>• Optoelectronics</li> <li>• High performance digital system design</li> </ul> | <ul style="list-style-type: none"> <li>• Power Electronics design</li> <li>• RF Integrated Circuit Design</li> <li>• Analog Integrated Circuit Design</li> <li>• System architecture</li> <li>• High-speed PCB design</li> <li>• FPGA development</li> <li>• Computer Vision</li> <li>• Embedded system development</li> <li>• Design for EMC</li> </ul> | <ul style="list-style-type: none"> <li>• Thin-film device fabrication</li> <li>• Semiconductor fabrication processes/equipment</li> <li>• Kicad, Eagle, LTSPICE, Abaqus, Solidworks, MATLAB, Python, C++</li> <li>• Mixed signal chip verification/validation</li> <li>• Working Knowledge: Tensorflow, Mechanical design, machine shop fabrication</li> </ul> |
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## TEACHING

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- Graduate Teaching Assistant  
*MIT 6.152 – Microelectronics Processing Technology* *Fall 2015*
- Graduate Teaching Assistant  
*MIT 2.678 – Electronics for Mechanical Systems* *Spring 2018*

## AVIATION

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- FAA Private Pilot | Multi Engine | High Performance | Complex *June 2015*
- Instrument Rating *In progress*
- FAA Third Class Medical
- 225 Flight Hours | 150 Hours Pilot in Command

## PERSONAL

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