

## EDUCATION

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### **Massachusetts Institute of Technology (MIT) – Cambridge, MA**

#### ***Doctor of Philosophy in Electrical Engineering***

*Thesis: High Angular Resolution THz Beam Steering Antenna Arrays for Imaging Applications*

*December 2021*

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

*Thesis: Broadband Acoustic Energy Harvesting via Synthesized Electrical Loading*

*June 2017*

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

*June 2013*

## 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

### **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

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### **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

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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, G. C. Dogiamis, R. Stingel, P. Myers, X. Chen and R. Han. “Electronic THz Pencil Beam Forming and 2D Steering for High Angular-Resolution Operation: A 98×98 Unit, 265GHz CMOS Reflectarray with In-Unit Digital Beam Shaping and Squint Correction”, *IEEE Intl. Solid-State Circuit Conf. (ISSCC)*, San Francisco, CA, Feb. 2022.
- Q. Yu, S. Rami, V. Neeli, J. Garret, J. Koo, M. Marulanda, S. Ravikumar, S. Moraka, Y. Ma, J. Waldemer, G. Liu, S. Joglekar, M. Armstrong, D. Ali, N. Monroe, R. Han, B. Sell and E. Karl, “mmWave and Sub-THz Technology Development in Intel 22nm Low-Power FinFET Process,” *IEEE Intl. Electron Device Meetings (IEDM)*, Dec. 2020.
- 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

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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>• 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>• Embedded system development</li><li>• Design for EMC</li><li>• RF IC Design</li><li>• Cadence Virtuoso</li><li>• Ansys HFSS</li></ul> | <ul style="list-style-type: none"><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><li>• RF Systems</li><li>• FinFET Circuit Design</li></ul> |
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## TEACHING

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- Graduate Teaching Assistant  
*MIT 6.152 – Microelectronics Processing Technology* *Fall 2015*
  - 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

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- FAA Commercial Pilot | Multi Engine | High Performance | Complex
- Instrument Rated
- FAA Second Class Medical
- 400 Flight Hours | 340 Hours Pilot in Command

## PERSONAL

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

## Languages

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Spanish (Intermediate), Mandarin Chinese (Intermediate)