

# Curriculum Vitae

Abraham Gonzalez

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## Education

**Ph.D. — Electrical Engineering and Computer Science**  
University of California, Berkeley

Aug. 2018 - Now

**Bachelors of Science — Electrical Engineering**

The University of Texas at Austin

GPA — Overall: 3.98/4.00 Major: 3.98/4.00

Aug. 2014 - May 2018

## Relevant Coursework

**Graduate School** — Graduate Computer Architecture, Computer Architecture for Security, Hardware for Machine Learning, Machine Learning Systems, Topics in Circuit Design: Tapeouts, Topics in Computer Systems: OS.

**Undergraduate School** — Computer Architecture, Digital Systems Design Using HDL, Embedded Systems Design Lab, Real-time Operating Systems, Digital Logic Design, Software Design I & II, Algorithms, and Honors Engineering Design I & II, Electric Circuits Lab, Solid State Electronic Devices, Electromagnetic Engineering, Circuit Theory, Intro to Probability, and Engineering Communication.

## Experience

**ADEPT Lab Ph.D. Student**

ADEPT Lab — Berkeley, CA

Aug. 2018 - Now

- Research focus: Microarchitecture, Warehouse-scale computing, Architecture tooling.
- Main developer of the Chipyard SoC framework.
- Main developer of BOOM, a Linux booting open-source RISC-V out-of-order core.
- Developer of the FireSim FPGA-accelerated simulation platform.

**BEAGLE: Heterogeneous Multi-Core Multi-Accelerator Chip in Intel 22FFL**

ADEPT Lab — Berkeley, CA

May 2019 - Now

- Led tapeout as well as integrated core, accelerator, and uncore IP into new Chipyard SoC framework.
- Coordinated interaction between Berkeley and Intel during physical design process.
- Tested chip using newly created bringup collateral for BEAGLE-like designs.
- SoC Components: In-Order Rocket core with systolic array accelerator, Out-of-Order BOOM core with vector accelerator, shared L2, independent clock domains, multiple IOs (GPIO, SPI, I2C, UART, SerDes).

**CPU Design Intern**

Apple — Berkeley, CA

Jun. 2020 - Aug. 2020

- Performed research and development for CPU infrastructure team.

**Scalable Performance CPU Development Group Intern**

Intel — Austin, TX

May 2018 - Aug. 2018

- Worked on debugging tools for microcontroller integration team.
- Helped setup infrastructure between firmware team and microcontroller integration team to speed up work.

**Microsystems Technology Lab Intern**

Massachusetts Institute of Technology — Cambridge, MA

Jun. 2017 - Aug. 2017

- Researched variations in electroplating growth in redistribution layers under the supervision of Dr. Boning.
- Designed various neural networks and machine learning models for electroplating growth using Tensorflow.
- Presented final research poster summarizing work and participated in multiple MITSRP workshops.

**Printing Electronics Research Assistant**

The University of Texas at Austin — Austin, TX

Jan. 2017 - Jun. 2017

- Researched and fabricated printed antennas under the supervision of Dr. Chen.
- Printed and tested fixed PAA antennas on Kapton with various nano-particle inks.

**QCA Research Assistant**

The University of Texas at Austin — Austin, TX

May 2015 - Aug. 2016

- Researched and designed Quantum Cellular Automata (QCA) circuitry with Dr. Swartzlander.
- Optimized QCA implementations of the Carry-Lookahead and Conditional Sum adder through QCA Designer.
- Reported back to Dr. Swartzlander on results and improvements to QCA circuit designs and layouts.

**Office Shared Graphics Explore Intern**

May 2016 - Aug. 2016

Microsoft — Redmond, WA

- Created and added new features to the Office Ink suite using C++.
- Investigated new feature sets with other Microsoft Program Managers and customers.
- Created physical network of Arduino microcontrollers for OneWeek Hack-a-thon that once connected to each other sent a unique code to the main server (HTTP requests).
- Collaborated with senior engineers and engineers on software design and implementation.

**UIM Driver Intern**

May 2015 - Aug. 2015

Qualcomm — San Diego, CA

- Designed software framework for smartcard interaction in C++/CLI and C++.
- Integrated designed framework into .NET application managing smartcards via CCID by utilizing APDU transmission and logging; file system viewing; file data parsing and manipulation; and smartcard reader management.
- Communicated with engineers on software design and implementation.
- Created gesture controlled car with Particle Core for Hack-Mobile Hack-a-thon.

**Electronic Cooling Research Lab Assistant**

Jun. 2012

Villanova University — Villanova, PA

- Participated in constructing and remodeling a cooling test mechanism.
- Investigated techniques to cool spherical devices within a wind tunnel.
- Communicated with Ph.D. students and Masters students.

**Selected Conferences and Presentations****RISC-V Summit**

Dec. 2019

University of California, Berkeley — San Jose, CA

- Presented the Chipyard SoC framework and Berkeley Out-of-Order Machine (BOOM)

**52nd Symposium on Microarchitecture Conference**

Oct. 2019

University of California, Berkeley — Columbus, OH

- Presented the Chipyard SoC framework and Berkeley Out-of-Order Machine (BOOM)

**Latch-Up Conference**

May 2019

University of California, Berkeley — Portland, OR

- Presented the Chipyard SoC framework and Berkeley Out-of-Order Machine (BOOM)

**ACM Richard Tapia Celebration of Diversity in Computing Conference**

Sept. 2018

University of California, Berkeley — Orlando, FL

- Attended multiple workshops on open source software, ethics in AI, networking, and diversity.
- Participated as a UC Berkeley Scholar and FLIP Alliance student.

**Society of Hispanic Professional Engineers National Conference**

Nov. 2017

University of Texas at Austin — Kansas City, MO

- Research Presented: A Machine Learning Approach to Modeling Electroplating Process Variations in IC Redistribution Layers.
- Participated and won the 2nd place award in the Engineering Science Symposium (ESS) Poster Competition.
- Selected as 1 of about 40 students nationally for ESS Poster Competition.
- Attended Engineering Science Symposium Oral Presentations and workshops.

**Qualcomm DECA Conference**

Jan. 2015 - Feb. 2015

Qualcomm — San Diego, CA

- Developed professional and social skills through mock interviews and workshops.
- Participated and won Qualcomm QHack.
- Selected as 1 of 51 students nationally for DECA Conference.

**Selected Projects and Publications****Chipyard: Framework for Custom SoCs** — Special Issue Publication

- Full name: Chipyard: Integrated Design, Simulation, and Implementation Framework for Custom SoCs.
- Presented a new framework for custom SoCs made out of composable, open-source IP blocks.
- Published in Agile and Open-Source Hardware edition of MICRO 2020.

**Spectrum: Spectre Attacks on a Speculating RISC-V Microarchitecture** — Workshop Publication

- Full name: Spectrum: Classifying, Replicating, and Mitigating Spectre Attacks on a Speculating RISC-V Microarchitecture.
- Replicated and mitigated Spectre attacks on open-source BOOM core using a speculation buffer and MSHRs.
- Presented at CARRV 2019.

### ***Enhancing an Out-of-Order Processor Simulator for Cloud Applications*** — Capstone Project

- Designed and developed new software data-structures for emulating simultaneous multithreading on ZSim.
- Worked with an out-of-order processor pipeline to introduce new hardware scheduling schemes to ensure quality of service for latency critical tasks.
- Presented a poster of final results at The University of Texas Electrical Engineering Spring Open House.

### ***Bounce Music App for Android*** — Individual Project

- Designed and developed an app in which a user can stream music to multiple phones within the same vicinity.
- Used Spotify API to access and display a catalog of music and sockets for basic connection capabilities.

## **Skills**

### ***Programming Languages*** —

- Highly Proficient: RISC-V Assembly, Chisel, Verilog, Make, C, C++, C++/CLI, Python, Bash, TensorFlow/PyTorch, Git, and LC-3 Assembly.
- Proficient: VHDL, TCL, ARM Assembly, Android Java, C#, and Subversion.

***Embedded Systems*** — Tiva Launchpad, Arduino, SparkFun, and Particle Core microcontrollers.

***Electrical Equipment*** — Soldering, oscilloscopes, logic analyzers, and multimeters.

***Other*** — AWS EC2 (F1 platform), Xilinx Virtex FPGAs, and Cadence Physical Design tooling.

## **Professional Leadership and Membership**

<b><i>Member</i></b> — Latinx Association of Graduate Students in Engineering and Science	Fall 2018 - Present
<b><i>Vice President</i></b> — Eta Kappa Nu Electrical Engineering Honor Society	Fall 2017 - Spring 2018
<b><i>Corresponding Secretary</i></b> — Eta Kappa Nu Electrical Engineering Honor Society	Summer 2017 - Fall 2017
<b><i>Member</i></b> — Eta Kappa Nu Electrical Engineering Honor Society	Spring 2016 - Present
<b><i>Member</i></b> — Institute of Electrical and Electronic Engineers	Fall 2014 - Present
<b><i>Member</i></b> — Society of Hispanic Professional Engineers (SHPE)	Fall 2014 - Present
<b><i>Pi Tutor</i></b> — Equal Opportunity in Engineering (EOE)	Fall 2015, Fall 2017
<b><i>Academic Director</i></b> — Society of Hispanic Professional Engineers	Summer 2016 - Summer 2017
<b><i>Organizing Committee Member</i></b> — 3 Day Startup Austin	Fall 2014 - Fall 2015
<b><i>Participant</i></b> — 3 Day Startup Austin	Fall 2014

## **Honors and Awards**

<b><i>Analog Devices Outstanding Engineer Award</i></b> — University of California at Berkeley	Spring 2020
<b><i>EECS Excellence Award</i></b> — University of California at Berkeley	Fall 2018
<b><i>Berkeley Fellowship for Graduate Study</i></b> — University of California at Berkeley	Fall 2018
<b><i>GEM Fellowship Recipient</i></b> — GEM	Spring 2018
<b><i>Honorable Mention</i></b> — NSF GRFP	Spring 2018
<b><i>Highest Honors</i></b> — The University of Texas at Austin	Spring 2018
<b><i>Distinguished College Scholar</i></b> — The University of Texas at Austin	Spring 2018
<b><i>Academic Leader Hall of Fame Inductee</i></b> — Equal Opportunity in Engineering Program	Spring 2018
<b><i>Roberto Rocca Scholarship Recipient</i></b> — Tenaris	Fall 2017
<b><i>Second-Place Award Winner</i></b> — SHPE National Conference Poster Competition	Fall 2017
<b><i>Distinguished College Scholar</i></b> — The University of Texas at Austin	Spring 2017
<b><i>Victor L. Hand Scholarship Recipient</i></b> — Victor L. Hand Endowed Scholarship Fund	Fall 2016
<b><i>College Scholar</i></b> — The University of Texas at Austin	Spring 2016
<b><i>Diversity Scholarship Recipient</i></b> — Texas Instruments	Fall 2015
<b><i>Freshman Academic Excellence Award Winner</i></b> — EOE and SHPE	Spring 2015