# Patricia Adriana Suriana

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## Education

**Massachusetts Institute of Technology (MIT)** — **Cambridge, MA**
Bachelor of Science in Electrical Engineering and Computer Sciences — *June 2014*
Master of Engineering in Electrical Engineering and Computer Sciences — *February 2016*

**GPA : 5.0/5.0**

*Relevant Courses Taken:* Electronics, Signals, and Measurement; Circuit and Electronics; Signals and Systems; Computation Structures; Element of Software Construction; Microelectronic Devices and Circuits; Electromagnetics and Applications; Nanomaker; Artificial Intelligence; Computer Graphics; Computer Architecture; Linear Algebra; Introduction to Machine Learning; Robotics Science and Systems Laboratory; Feedback Systems; Building Mobile Applications (Android), Performance Engineering of Software System; Machine Learning; Digital and Computational Photography; Principle of Autonomy and Decision Making; Planning Algorithms; Multicore Programming; Distributed Systems; Introduction to Inference; Computer System Architecture; Intelligent Multimodal User Interface

## Skills

**Programming Ability:** Python, Java, C/C++, Go, MATLAB, Mathematica
**Language:** Bahasa Indonesia (Native), Chinese (Intermediate), Japanese (Advanced), German (Basic)
**Other:** Experience with Oscilloscope, Instron, FTIR, SMD soldering, PCB layout

## Experience

**Google Inc. – Machine Intelligence** — **Mountain View, CA**
*Halide Compiler — Software Engineer* — February 2016 — Present
- Working on the core of the Halide compiler to make the Halide programming language faster, more expressive, and more robust.

*Manager: Andrew Adams*

**MIT CSAIL – Commit Group** — **Cambridge, MA**
*Fourier-Motzkin with Non-Linear Symbolic Constant Coefficients — Graduate Student* — February 2015 — January 2016
- Extend Fourier-Motzkin elimination (FME) method to handle non-linear symbolic constant coefficients during code generation..
- Integrate the extended FME to the existing Halide library.

*Advisors: Prof. Saman Amarasinghe, Shoaib Kamil, Riyadh Baghdadi*

**Square Enix – Advanced Technological Division** — **Tokyo, Japan**
*Artificial Intelligence — Software Engineer Intern* — *September 2014 — January 2015*
- Responsible for creating tools that analyze and extract various spatial features given the navigation meshes of the game levels.
- All codes were written in C++.

*Manager: Ingimar Gudmundsson*

**Facebook – Infrastructure** — **Menlo Park, CA**
*Wormhole Publisher/Subscriber System — Software Engineer Intern* — *June 2014 — August 2014*
- Responsible for improving the performance and adding new functionality to Wormhole, a publish-subscribe platform that allows different Facebook apps to receive an ordered and reliable stream of data changes.
- All codes were written in C++11.

*Manager: Petchean Ang*

**MIT CSAIL – Learning and Intelligent Systems Group** — **Cambridge, MA**
*CSP-Based Method for Solving Manipulation Problems — MIT 6.UAP Research Project* — *February 2014 — May 2014*
- Transformed hierarchical task and motion planning approach for solving robot manipulation problem as constraint satisfaction problem (CSP).
- Constructed the CSP formulation (variables, domain, and constraints) for a simplified manipulation problem in 2D and integrated the problem formulation into a generic CSP-solver, CPlan, by Van Beek and Chen.
- Analyzed the performance of the CSP-based solver, in term of running time, on slightly modified Sokoban puzzles.

- All codes were written in C.

*Advisors: Prof. Tomás Lozano-Pérez*

**MIT – Computational Fabrication Group** **Cambridge, MA**

*Interactive Stability Analysis for 3D Printed Design — Research Assistant* *September 2013 — May 2014*

- Integrated rigid body simulation framework into the user interface of data-driven system for helping non-expert users produce fabricable design.
- Used state-of-the-art numerical methods for the simulation of rigid bodies to perform virtual product testing (object stability testing), thus ensuring the integrity of user-created designs.
- All codes were written in C++.

*Advisors: Assoc. Prof. Wojciech Matusik, David Levin*

**Microsoft – Windows Core Group** **Redmond, WA**

*Storage and File System (ReFS) — Software Developer Intern* *June 2013 — August 2013*

- Augmented ReFS to efficiently answer the query of which files own some block of the disk.
- Designed and implemented additional global tables embedded in checkpoint upon volume initialization to track block allocation information using B+ tree data structure. Coalesce adjacent rows when possible to save spaces.
- Incorporated the allocation information into the data scrub phase to speed up the process.
- All codes were written in C/C++.

*Manager: J.R. Tipton, Malcolm Smith*

**MIT 6.S063 – Building Mobile Applications** **Cambridge, MA**

*App Inventor Internationalization — MIT Final Class Project* *March 2013 — May 2013*

- Designed and implemented the framework necessary for the internationalization of App Inventor.
- Implementation involves using language translation maps/files and Google GwtLocale.
- Modified the existing user interface to incorporate the internationalization framework to allow users to switch between different languages.
- All codes were written in Java and JavaScript.

*Advisors: Paul Medlock-Walton, Andrew McKinney, Prof. Hal Abelson*

**Linear Technology** **Chelmsford, MA**

*Wireless Nickel-Metal Hydride (NiMH) Battery Charger — Research Intern* *January 2013 — February 2013*

- Built compact circuit boards for battery charging and discharging.
- Designed circuit schematics of hysteresis wireless battery charger.
- Responsible of NiMH and Lithium-Ion (Li-ion) battery discharge/charge curve profile characterization
- Project included laying out PCBs using Proteus ISIS/ARES, soldering SMD using microscope.

*Manager: Thilani Bogoda, Eko Lisuwandi*

**MIT – Digital Integrated Circuit and Systems Group** **Cambridge, MA**

*Low Power Computational Imaging for Portable Multimedia Devices — Research Assistant* *September 2012 — May 2013*

- Develop an embedded signal processing, to enable medical imaging for heart-rate monitoring on portable multimedia devices.
- Responsible of algorithmic optimization for hardware implementation to reduce computational complexity and memory requirements (MATLAB). The algorithm used is based on the work of Prof. Fredo Durand, et al: Eulerian-Video Magnification.
- Some optimizations involve dividing data into several pieces to allow parallel processing of data and using Fast Fourier Transform filtering technique to decrease the runtime.

*Advisor: Prof. Anantha Chandrakasan, Rahul Rithe*

**Microsoft – Windows Core Group** **Redmond, WA**

*Hyper-V Virtual Machine — Software Developer Intern* *June 2012 — August 2012*

- Investigate and prototype a system for opportunistically improving the physical memory characteristics of running virtual machines.
- Built a mechanism for defragmenting non-contiguous memory blocks and swapping remote pages with local pages.
- Using this mechanism, implemented the ability to defrag a virtual machine with fragmented memory and to migrate a virtual machine between NUMA nodes.

- Integration with smart external controller for balancer driven defrag controls and node migration.
- All codes were written in C/C++.

*Manager: Lars Reuther, Kevin Broas*

**MIT CSAIL – Robot Locomotion Group** — **Cambridge, MA**
*Cover Tree for Fast Nearest-neighbor Search — Research Assistant* — *February 2012 — May 2012*

- Implemented cover tree algorithm for fast nearest-neighbor search (Codes were written in Java).
- Original algorithm was modified to allow search on points with semi-definite positive matrices as distance metric.
- Point insertion and search algorithm were implemented using ellipsoidal containment to accommodate non-symmetric distances between points.

*Advisor: Russ Tedrake, Andy Barry*

**Linear Technology** — **Chelmsford, MA**
*Wireless Power Transfer System — Research Intern* — *January 2012 — February 2012*

- Built compact receiver boards demonstrating novel wireless power transfer technology.
- PCB components: Buck converter, Alphanumeric LED display, LC Tank, Priority Encoder, 7-Segment Driver.
- Project included laying out PCBs using Proteus ISIS/ARES, soldering SMD using microscope.

*Manager: Eko Lisuwandi*

**MIT Plasma Science and Fusion Center, Alcator C-Mod** — **Cambridge, MA**
*Phase and Frequency Control for a Spectrograph-Shutter Combination — Research Assistant* — *October 2011 — December 2011*

- Responsible of implementing code (for Galil motion controller) which control the relative phase of a spectrograph and CCD shutter.
- The spectrograph and the CCD shutter must be in-phase within four-second time window starting from when the camera is triggered to allow maximum exposure to the spectrum discharged by the plasma injected with Boron particles.
- Built a simulation model of the PID controller for the CCD shutter in Simulink to facilitate PID tuning.

*Advisor: Dr. Bruce Lipschultz, Roza Tesfaye*

**The Frankel Center, Ben-Gurion University of the Negev** — **Beer Sheva, Israel**
*Unique Permutation Hashing - Research Assistant* — *June 2011 — August 2011*

- Responsible for the implementation and performance analysis of Unique Permutation Hashing algorithm
- All codes were written in Python.

A*dvisor: Prof. Shlomi Dolev*

**The David H. Koch Institute for Integrative Cancer Research at MIT** — **Cambridge, MA**
*Detection of Absorption into Rabbit Urothelium of Drugs Released from an Intravesical Drug Delivery Device — UROP* — *January — May 2011*

- Responsible for material characterization of biodegradable materials (PLGA and PGS) for potential drug delivery device, specifically for urological applications.
- Conducted material imaging, mechanical testing, and mass measurements using Instron and FTIR.

*Advisors: Prof. Michael J. Cima, Jennifer Shepherd, Ph.D.*

## Honors

**11th Asian Physics Olympiad, Taiwan:** First rank of Bronze medal (April 2010)
**Member of Tau Beta Pi Honor Society**
**Invitation to Eta Kappa Nu Honor Society**

## Publications

***Associative Reductions in Halide***, accepted to The International Symposium on Code Generation and Optimization (CGO) 2017