Patricia A. Suriana

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https://psuriana.github.io/

Education	**Massachusetts Institute of Technology (MIT)** Bachelor of Science in Electrical Engineering and Computer Science Master of Engineering in Electrical Engineering and Computer Science	**Cambridge, MA** *June 2014* *February 2016* **GPA : 5.0/5.0**
Skills	**Programming Ability:** Python, Java, C/C++, Go, MATLAB, Mathematica **Language:** Bahasa Indonesia (Native), Chinese (Basic), Japanese (Advanced) **Other:** Experience with Oscilloscope, Instron, FTIR, SMD soldering, PCB layout	
Experience	**Google Research – Machine Intelligence (GCam)** *Halide Compiler — Software Engineer* • Working on the core of the Halide compiler (https://github.com/halide/Halide) to make the Halide programming language faster, more expressive, and more robust. *Manager: Andrew Adams*	**Mountain View, CA** *02/2016 — Present*
	MIT CSAIL – Commit Group *Fourier-Motzkin with Non-Linear Symbolic Constant Coefficients — MEng Student* • 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*	**Cambridge, MA** *02/2015 — 01/2016*
	Square Enix – Advanced Technological Division *Artificial Intelligence R&D — AI Research Intern* • 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*	**Tokyo, Japan** *09/2014 — 01/2015*
	Facebook – Infrastructure *Wormhole Publisher/Subscriber System — Software Engineer Intern* • 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*	**Menlo Park, CA** *06/2014 — 08/2014*
	MIT CSAIL – Learning and Intelligent Systems Group *CSP-Based Method for Solving Manipulation Problems — Senior Research Project* • 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. *Advisor: Prof. Tomás Lozano-Pérez*	**Cambridge, MA** *02/2014 — 05/2014*

MIT – Computational Fabrication Group

Interactive Stability Analysis for 3D Printed Design — Research Assistant

Cambridge, MA
09/2013 — 05/2014

- 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: Prof. Wojciech Matusik, David Levin

Microsoft – Windows Core Group

Storage and File System (ReFS) — Software Developer Intern

Redmond, WA
06/2013 — 08/2013

- 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

Linear Technology

Wireless Nickel-Metal Hydride (NiMH) Battery Charger — Research Intern

Chelmsford, MA
01/2013 — 02/2013

- 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

Low Power Computational Imaging for Portable Multimedia Devices — Research Assistant

Cambridge, MA
09/ 2012 — 05/2013

- 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

Hyper-V Virtual Machine — Software Developer Intern

Redmond, WA
06/2012 — 08/2012

- 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

Cover Tree for Fast Nearest-neighbor Search — Research Assistant

Cambridge, MA

02/2012 — 05/2012

- 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.

Advisors: Prof. Russ Tedrake, Andy Barry

Linear Technology

Wireless Power Transfer System — Research Intern

Chelmsford, MA

01/2012 — 02/2012

- 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

Phase and Frequency Control for a Spectrograph-Shutter Combination — Research Assistant

Cambridge, MA

10/2011 — 12/2011

- 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

Unique Permutation Hashing - Research Assistant

Beer Sheva, Israel

06/2011 — 08/2011

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

A*dvisor: Prof. Shlomi Dolev*

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

Patricia Suriana. 2016. Fourier-Motzkin with Non-Linear Symbolic Constant Coefficients. Master's Thesis, Massachusetts Institute of Technology, Cambridge, MA.

Patricia Suriana, Andrew Adams, Shoaib Kamil. Parallel Associative Reductions in Halide. *International Symposium on Code Generation and Optimization (CGO)*, February 4–8, 2017, Austin, USA.

Riyadh Baghdadi, Jessica Ray, **Patricia Suriana**, Emanuele Del Sozzo, Malek Ben Romdhane, Shoaib Kamil, Saman Amarasinghe. Tiramisu: A Polyhedral Three-Layered Abstraction for Hiding Hardware Complexity from DSL Compilers. *In submission to PLDI 2018*.