Patricia A. Suriana

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https://psuriana.github.io/

Education

Massachusetts Institute of Technology (MIT) — **Cambridge, MA**
Bachelor of Science in Electrical Engineering and Computer Science — *June 2014*
Master of Engineering in Electrical Engineering and Computer Science — *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) — **Mountain View, CA**
Halide Compiler — Software Engineer — *02/2016 — Present*
- 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

MIT CSAIL – Commit Group — **Cambridge, MA**
Fourier-Motzkin with Non-Linear Symbolic Constant Coefficients — MEng Student — *02/2015 — 01/2016*
- 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 R&D — AI Research Intern — *09/2014 — 01/2015*
- 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 — *06/2014 — 08/2014*
- 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 — Senior Research Project — *02/2014 — 05/2014*
- 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 — *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: Assoc. Prof. Wojciech Matusik, David Levin

Microsoft – Windows Core Group — **Redmond, WA**
Storage and File System (ReFS) — Software Developer Intern — *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 — **Chelmsford, MA**
Wireless Nickel-Metal Hydride (NiMH) Battery Charger — Research Intern — *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 — **Cambridge, MA**
Low Power Computational Imaging for Portable Multimedia Devices — Research Assistant — *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 — **Redmond, WA**
Hyper-V Virtual Machine — Software Developer Intern — *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 — **Cambridge, MA** — *02/2012 — 05/2012*

Cover Tree for Fast Nearest-neighbor Search — Research Assistant

- 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** — *01/2012 — 02/2012*

Wireless Power Transfer System — Research Intern

- 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** — *01/2011 — 11/2011*

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

- 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** — *06/2011 — 08/2011*

Unique Permutation Hashing - Research Assistant

- 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, Andrew Adams, Shoaib Kamil. 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*.