Patricia Suriana

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Education	**Stanford University** PhD Candidate in Computer Science	**Palo Alto, CA** *September 2018 — Present*
	Massachusetts Institute of Technology (MIT) Master of Engineering in Electrical Engineering and Computer Science Thesis: *Fourier-Motzkin with Non-Linear Symbolic Constant Coefficients*	**Cambridge, MA** *February 2016*
	Bachelor of Science in Electrical Engineering and Computer Science	*June 2014* **GPA: 5.0/5.0**

Skills

Programming: Python, Java, C/C++, Go, MATLAB, Mathematica, Halide
Languages: Bahasa Indonesia (Native), English (Fluent), Japanese (Advanced), Chinese (Basic)
Other: Experience with Instron, FTIR, SMD soldering, PCB layout

Research Interests

Application of machine learning to structural biology, programming languages (domain specific languages), distributed systems, search and path planning, high-performance computing.

Research/ Internship Experience

Stanford University – Dror Lab
Graduate Student
- Work on application of machine learning to molecular structural prediction.

Advisor: Ron Dror

Palo Alto, CA
January 2019 — Present

Google Research – Machine Intelligence
Halide Compiler — Software Engineer
- Worked on the core of the Halide compiler to make the Halide programming language faster, more expressive, and more robust.

Manager: Andrew Adams

Mountain View, CA
February 2016 — September 2018

MIT CSAIL – Commit Group
Fourier-Motzkin with Non-Linear Symbolic Constant Coefficients — Master's Student
- Extended Fourier-Motzkin elimination (FME) method to handle nonlinear symbolic constant coefficients during code generation.
- Integrated the extended FME to the existing Halide library.

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

Cambridge, MA
February 2015 — January 2016

Square Enix – Advanced Technological Division
Artificial Intelligence — Software Engineer 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
September 2014 — January 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.

Menlo Park, CA
June 2014 — August 2014

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 for 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
- Developed an embedded signal processing, to enable medical imaging for heart-rate monitoring on portable multimedia devices.
- Responsible for 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
June 2012 —
August 2012

- Investigated and prototyped 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
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
Wireless Power Transfer System — Research Intern

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

Cambridge, MA
October 2011 —
December 2011

- Responsible for 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
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
Detection of Absorption into Rabbit Urothelium of Drugs Released from an Intravesical Drug Delivery Device — UROP

Cambridge, MA
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 and Awards	NSF Graduate Research Fellowship, 2020 Stanford Engineering Fellowship, 2018 Member of Tau Beta Pi Honor Society Invitation to Eta Kappa Nu Honor Society 11th Asian Physics Olympiad, Taiwan: First rank of Bronze medal (April 2010)
Publications	Raphael Townshend, Rishi Bedi, **Patricia Suriana**, Ron Dror. *End-to-End Learning on 3D Protein Structure for Interface Prediction*. NeurIPS 2019. Riyadh Baghdadi, Jessica Ray, Malek Ben Romdhane, Emanuele Del Sozzo, Abdurrahman Akkas, Yunming Zhang, **Patricia Suriana**, Shoaib Kamil, and Saman Amarasinghe. *Tiramisu: a polyhedral compiler for expressing fast and portable code*. International Symposium on Code Generation and Optimization (CGO'19). Washington DC, USA. February, 2019. Riyadh Baghdadi, Jessica Ray, Malek Ben Romdhane, Emanuele Del Sozzo, **Patricia Suriana**, Shoaib Kamil, Saman Amarasinghe. *Tiramisu: a Three-Layered Abstraction for Hiding Hardware Complexity from DSL Compilers*. ArXiv e-prints. February, 2018. **Patricia Suriana**, Andrew Adams, Shoaib Kamil. *Associative Reductions in Halide*. International Symposium on Code Generation and Optimization (CGO), February, 2017, Austin, USA. **Patricia A. Suriana**. *Fourier-Motzkin with Non-Linear Symbolic Constant Coefficients*. MEng Thesis, Massachusetts Institute of Technology. Cambridge, MA. February, 2016.
References	Assoc. Prof. Ron Dror Department of Computer Science 353 Serra Mall Stanford, CA 94305 650-497-8586 ron.dror@stanford.edu Prof. Saman Amarasinghe Department of Electrical Engineering and Computer Science 32-G744 The Stata Center, 32 Vassar Street Cambridge, MA 02139 617-253-8879 saman@csail.mit.edu Andrew Adams Senior Research Scientist, Adobe 345 Park Ave San Jose, CA 95110 anadams@adobe.com