

# Sam (Likun) Xi

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## CONTACT INFORMATION

**Harvard University**  
School of Engineering and Applied Sciences  
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## RESEARCH INTERESTS

**Ccomputer architecture**, machine learning, deep neural networks, hardware accelerators, SoC design and integration, power and performance modeling, datacenter workloads.

## EDUCATION

Harvard University, Cambridge, MA 02138

S.M., Ph.D., *Computer Science*, August 2013 - Present

- Advisors: David Brooks, Gu-Yeon Wei

Duke University, Durham, NC 27708

B.S.E, *Electrical and Computer Engineering*, May 2013

B.S., *Physics*, May 2013

- *Summa Cum Laude*, with Departmental Distinction
- Final GPA: 3.937

## AWARDS

### Harvard University

- Gordon McKay Graduate Research Fellowship, 2013.
- James Mills Peirce Fellowship, 2013

### National Science Foundation

- Graduate Research Fellowship, 2013 - 2016.

### Duke University

- Charles Ernest Seager Memorial Award, 2013
- ECE Department, Best Poster Award, 2013.
- Top 5% of 2013 Engineering Class.
- Dean's List with Distinction 2009-2013.

### Honors Societies

- Phi Beta Kappa Honors Society.
- Sigma Pi Sigma Physics Society.
- Tau Beta Pi Engineering Society.

### Other Scholarships

- Xerox Technical Minority Scholarship Recipient, 2010.

## CONFERENCE PUBLICATIONS

Svilen Kanev, Sam (Likun) Xi, Gu-Yeon Wei, and David Brooks.

“Mallacc: Accelerating Memory Allocation”,

*Proc. International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, April 2017.

Yakun Sophia Shao, Sam (Likun) Xi, Viji Srinivasan, Gu-Yeon Wei, and David Brooks.

“Co-Designing Accelerators and SoC Interfaces Using gem5-Aladdin”,

*Proc. International Symposium on Microarchitecture (MICRO)*, October 2016.

Sam (Likun) Xi, Oreoluwa Babarinsa, Manos Athanassoulis, and Stratos Idreos.  
“Beyond the Wall: Near-Data Processing for Databases”,  
*SIGMOD Workshop on Data Management on New Hardware (DaMoN)*, June 2015.

Sam (Likun) Xi, Hans Jacobson, Pradip Bose, Gu-Yeon Wei, and David Brooks.  
“Quantifying Sources of Error in McPAT and Potential Impacts on Architectural Studies”,  
*Proc. International Symposium on High Performance Computer Architecture (HPCA)*,  
February 2015.

Yakun Sophia Shao, Sam Xi, Viji Srinivasan, Gu-Yeon Wei, and David Brooks.  
“Towards Cache-Friendly Hardware Accelerators”, *In Sensors and Cloud Architectures Work-  
shop, High Performance Computer Architecture (HPCA)*, February 2015.

Sam Xi, Marisabel Guevara, Jared Nelson, Patrick Pensabene, and Benjamin C. Lee.  
“Understanding the Critical Path in Power State Transition Latencies”, *Proc. International  
Symposium on Low Power Electronics and Design (ISLPED)*, September 2013.

PROFESSIONAL  
EXPERIENCE

**NVIDIA Corporation**, Architecture Research Group

*Research Intern*

**May 2017 to August 2017**

- Supervisor: Joel Emer, Steve Keckler
- Evaluated the tradeoffs of building flexible machine learning hardware accelerators.
- Implemented sparse convolution on a prototype DNN accelerator in synthesizable SystemC to evaluate its performance on a new workload.
- Implemented various dense convolutional dataflows on this prototype to compare its performance against fixed-function accelerators.

**NVIDIA Corporation**, ASIC/VLSI Research Group

*Research Intern*

**May 2015 to August 2015**

- Supervisor: Brucek Khailany
- Investigated using high-level synthesis tools to supplant hand-written RTL for hardware prototyping and design in a commercial setting.
- Implemented various parameterizable floating-point units in C++ using HLS tools.
- Implemented the texture filtering stage from Pascal GPU using HLS and obtained comparable quality-of-result compared to hand-written RTL.
- Implemented synthesizable cache simulator in SystemC for use in rapid prototyping of new hardware designs.

**Google Inc.**, Ads Backend.

*Software Engineering Intern*

**May 2013 to August 2013**

- Supervisor: Jojo Dijamco
- Implemented components of a new frontend for a big data analytics platform.
- Implemented a new tool to parse source code comments for presentation to end users.
- Investigated a new backend server architecture to speed up development and push cycles and improve collaboration among different teams working on the same product.

**Google Inc.**, YouTube Data Analytics

*Software Engineering Intern*

**May 2012 to August 2012**

- Supervisor: Neil McKay
- Rebuilt internal dashboards for monitoring of logs analysis jobs from ground up, without any reliance on an intermediary presentation layer.
- Integrated multiple internal dashboards into a unified user interface.

**Cisco Systems**, Policy Mangement Business Unit

*Software Intern I*

**May 2011 to August 2011**

- Collaborated on a software solution, Identity Services Engine (ISE), for identity and policy based authentication and authorization of users on a network.
- Developed an object model for a deployment tool.
- Deployed a small network using ISE as a debugging platform and test bed.
- Learned web development programming and related paradigms.

**SKILLS**

**Programming**

- Languages: C, C++, Python, Java, MATLAB, Javascript, HTML, CSS, Verilog, VHDL

**Research Tools**

- CPU models: gem5, XIOSim, McPAT
- CAD tools: CatapultC HLS, Vivado Design Suite

**RELEVANT  
COURSEWORK**

**Electrical and Computer Engineering**

- Machine Learning, Computer Vision, Advanced Topics in Databases, Emerging Devices and Circuits, Introduction to Electronics and Photonic Devices, Analysis and Design of Digital Integrated Circuits, Computer Architecture, Digital Signal Processing, Operating Systems, Nanocomputing, Microelectronic Devices

**Mathematics**

- Multivariate Calculus, Linear Algebra, Ordinary/Partial Differential Equations, Probability and Statistics

**Physics**

- Quantum Mechanics, Solid-State Physics, Thermal Physics, Newtonian and Lagrangian Mechanics, Electromagnetic Fields

**REFERENCES**

**Dr. David Brooks** (dbrooks@eecs.harvard.edu; (617) 495-3989)

- Haley Family Professor of Computer Science
- School of Engineering and Applied Sciences, Harvard University.

**Dr. Gu-Yeon Wei** (guyeon@eecs.harvard.edu; (617) 495-3989)

- Gordon McKay Professor of Electrical Engineering
- School of Engineering and Applied Sciences, Harvard University.

**Dr. Christopher Dwyer** (c.dwyer@duke.edu; (919)-660-5275)

- Associate Professor of Electrical and Computer Engineering
- Pratt School of Engineering, Duke University.

**Dr. Benjamin C. Lee** (benjamin.c.lee@duke.edu; (919) 660-5043)

- Assistant Professor of Electrical and Computer Engineering
- Pratt School of Engineering, Duke University.

**Jojo Dijamco** (joj@google.com)

- Staff Software Engineer
- Ads Backend, Google Inc.