Sam (Likun) Xi

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

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. Best Paper Candidate.

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 Workshop, 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, Westford, MA 01886

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, Santa Clara, CA 95050

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, Mountain View, CA 94043

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, Mountain View, CA 94043

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.

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.

SKILLS

Programming
· Languages: C, C++, Python, Java, SystemC
· OS: Experience with the Linux kernel on both x86 and ARM
· CAD tools: Catapult HLS, Vivado Design Suite

I am the primary maintainer of:

- gem5-Aladdin, an SoC simulator
  https://github.com/harvard-acc/gem5-aladdin
- Aladdin, an accelerator power/performance/area simulator
  https://github.com/ysshao/Aladdin
- LLVM-Tracer, an LLVM optimization pass used by Aladdin
  https://github.com/ysshao/LLVM-Tracer

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. Michael Pellauer (mpellauer@nvidia.com)

- Senior Research Scientist.
- Architecture Research Group, NVIDIA.