

eric schkufza

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Research

I am interested in programming languages and compilers as they apply to high-performance computing, most recently in the context of FPGAs. My work focuses on the optimization of machine code, often in the absence of its original source.

Education

- 2008–2015 **Ph.D., Computer Science**, *Stanford University*, Stanford CA.
Stochastic Program Optimization for x86_64 Binaries – Advised by Prof. Alex Aiken
- 2006–2008 **M.S., Computer Science**, *Stanford University*, Stanford CA.
Artificial Intelligence Concentration
- 2001–2005 **B.S.E., Computer Science**, *The University of Michigan*, Ann Arbor MI.
- 2001–2005 **B.S.E., Computer Engineering**, *The University of Michigan*, Ann Arbor MI.

Professional Experience

- 2020–Present **Principal Applied Scientist**, *Amazon*, Palo Alto CA.
Working on an AI-first initiative to reinvent the way Amazon does search through the use of extremely large scale next-generation deep learning techniques
- 2015–2019 **Senior Researcher**, *VMware Research Group*, Palo Alto CA.
Bringing innovation in computer science in core areas of importance to VMware
- 2012–2015 **Expert Code Review**, *Feinberg Day Alberti & Thompson LLP*, Palo Alto CA.
Litigating intellectual property law
- 2010–2011 **Research Intern**, *Microsoft Research*, Redmond WA.
Improving the throughput of the Bing search engine
- 2005 **Junior Software Developer**, *Bloomberg, L.P.*, New York NY.
Implementing search tools for financial news feeds

PhD Advising Experience

- 2019 **Joshua Landgraf**, *VMware Research Intern*.
Using Cascade as a mechanism for supporting FPGA virtualization
- 2018 **Ram Srivatsa Kannan**, *VMware Research Intern*.
Improving the performance of software-simulated Verilog programs
- 2016 **Berkeley R. Churchill**, *VMware Research Intern*.
Automatically identifying third-party components in x86_64 binaries

Teaching Experience

- 2012 **Course Assistant**, *CS243 Program Analysis and Optimizations*.
Taught by Prof. Monica Lam, Stanford University
- 2011 **Course Assistant**, *CS242 Programming Languages*.
Taught by Prof. John Mitchell, Stanford University
- 2008 **Course Assistant**, *CS227b General Game Playing*.
Taught by Prof. Michael Genesereth, Stanford University
- 2005 **Teaching Assistant**, *EECS270 Introduction to Logic Design*.
Taught by Prof. Igor Markov, The University of Michigan

Professional Service

- 2021 **Program Committee**, *USENIX Annual Technical Conference*.
ATC 2021
- 2021 **Program Committee**, *Networked Systems Design and Implementation*.
NSDI 2021
- 2020 **Program Committee**, *Symposium on Cloud Computing*.
SoCC 2020
- 2018 **Program Committee**, *Virtual Execution Environments*.
VEE 2018
- 2018 **Program Committee**, *Symposium on Cloud Computing*.
SoCC 2018
- 2017 **Program Committee**, *World Wide Web Conference*.
WWW 2017
- 2016 **Program Committee**, *Asia Pacific Workshop on Systems*.
ApSys 2016
- 2008 **Co-Chair**, *AAAI General Game Playing Competition*.
AAAI 2008
- 2007 **Co-Chair**, *AAAI General Game Playing Competition*.
AAAI 2007

Honors and Appointments

- 2013–2014 **Critic**, *Architecture Studio 4*.
Department of Art and Architecture, University of San Francisco
- 2013 **Recipient**, *Ole Agesen Graduate Fellowship*.
VMware
- 2011–2012 **DJ**, *90.1 FM KZSU Stanford*.
Stanford University
- 2008 **Recipient**, *Computer Science Graduate Fellowship*.
Stanford University
- 2004–2005 **Officer**, *Eta Kappa Nu, Electrical Engineering Honor Society*.
The University of Michigan
- 2004–2005 **Recipient**, *Angell Hall Academic Scholarship Award*.
The University of Michigan
- 2001–2005 **Recipient**, *Dean's List and University Honors*.
The University of Michigan

2001–2005 **Recipient**, *Richard Earhart Academic Scholarship*.
The University of Michigan

Granted US Patents

- 2019 **US 10515029B2**, *Conversion Tool for Moving from Block-based Persistence to Byte-based Persistence*.
Vijay Chidambaram, Irina Calciu, Himanshu Chauhan, Eric Schkufza, Onur Mutlu, Pratap Subrahmanyam
- 2019 **US 20190235892A1**, *Just-in-Time Hardware for Field Programmable Gate Arrays*.
Eric Schkufza, Michael Wei
- 2018 **US 10162629B1**, *Compiler Independent Identification of Application Components*.
Berkeley Churchill, Eric Schkufza
- 2018 **US 20180095610A1**, *Methods and Systems to Sample Event Messages*.
Udi Wieder, Dahlia Malkhi, Eric Schkufza, Mayank Agarwal, Nicholas Kushmerick, Ram-ses Morales
- 2016 **US 9355470B2**, *Method and System for Interactive Layout*.
Paul Merrell, Vladlen Koltun, Eric Schkufza, Maneesh Agrawala

Case Work

- 2013–2014 **Code Review**, *Case No. 1:13cv740-AJT/TRJ*.
Intellectual Ventures I LLC and Intellectual Ventures II LLC, Plaintiffs, v. Capital One Financial Corporation, Capital One Bank (USA), N.A., and Capital One, N.A., Defendants
- 2013–2014 **Code Review**, *Case No. 13-cv-61358-rosenbaum/hunt*.
Intellectual Ventures I LLC and Intellectual Ventures II LLC, Plaintiffs, v. Motorola Mobility LLC, Defendant
- 2012–2013 **Code Review**, *Case No. 1:11-cv-908-SLR*.
Intellectual Ventures I LLC and Intellectual Ventures II LLC, Plaintiffs v. Motorola Mobility, Inc., Defendant

Refereed Journal Publications

Eric Schkufza, Rahul Sharma, and Alex Aiken. Stochastic program optimization. *Communications of the ACM Research Highlights*, February 2016.

Refereed Conference Publications

Joshua Landgraf, Tiffany Yang, Will Lin, Christopher Rossbach, and Eric Schkufza. Compiler-driven fpga virtualization with synergy. *ASPLOS*, 2021.

Eric Schkufza, Michael Wei, and Christopher Rossbach. Just-in-time compilation for verilog — a new technique for improving the fpga programming experience. *ASPLOS*, 2019.

Ahmed Khawaja, Joshua Landgraf, Rohith Prakash, Michael Wei, Eric Schkufza, and Christopher Rossbach. Sharing, protection and compatibility for reconfigurable fabric with amorphos. *OSDI*, 2018.

Stefan Heule, Eric Schkufza, Rahul Sharma, and Alex Aiken. Stratified synthesis: Automatically learning the x86-64 instruction set. *PLDI*, 2016.

Rahul Sharma, Eric Schkufza, Berkeley R. Churchill, and Alex Aiken. Conditionally correct superoptimization. *OOPSLA*, 2015.

Eric Schkufza, Rahul Sharma, and Alex Aiken. Stochastic optimization of floating-point programs with tunable precision. *PLDI*, 2014.

Rahul Sharma, Eric Schkufza, Berkeley R. Churchill, and Alex Aiken. Data-driven equivalence checking. *OOPSLA*, 2013.

Eric Schkufza, Rahul Sharma, and Alex Aiken. Stochastic superoptimization. *ASPLOS*, 2013.

Paul Merrell, Eric Schkufza, Zeyang Li, Maneesh Agrawala, and Vladlen Koltun. Interactive furniture layout using interior design guidelines. *SIGGRAPH*, 2011.

Michael Bauer, John Clark, Eric Schkufza, and Alex Aiken. Programming the memory hierarchy revisited: supporting irregular parallelism in sequoia. *PPOPP*, 2011.

Paul Merrell, Eric Schkufza, and Vladlen Koltun. Computer-generated residential building layouts. *SIGGRAPH Asia*, 2010.

Eric Schkufza, Nathaniel Love, and Michael R. Genesereth. Propositional automata and cell automata: Representational frameworks for discrete dynamic systems. *AI*, 2008.

Refereed Workshop Publications

Tal Wagner, Eric Schkufza, and Udi Wieder. A sampling-based approach to accelerating queries in log management systems. *SPLASH*, 2016.

Himanshu Chauhan, Irina Calciu, Vijay Chidambaram, Eric Schkufza, Onur Mutlu, and Pratap Subrahmanyam. NVMOVE: helping programmers move to byte-based persistence. *INFLOW*, 2016.

Eric Schkufza and Alex Aiken. Optimizing out overcomputation. *APPROX*, 2014.

Evan Cox, Eric Schkufza, Ryan Madsen, and Michael R. Genesereth. Factoring general games using propositional automata. *GIGA*, 2009.

Eric Schkufza. Decomposition of games for efficient reasoning. *SARA*, 2007.

Technical Reports

Berkeley Churchill and Eric Schkufza. A compiler insensitive technique for identifying third-party components in x86_64 binaries. *VMware Research Group*, 2017.

Eric Schkufza. *Stochastic Program Optimization for x86_64 Binaries*. PhD thesis, Stanford University, 2015.

Eric Schkufza, Rahul Sharma, Berkeley R. Churchill, and Alex Aiken. Quantitative binary synthesis. *Stanford University*, 2014.

Eric Schkufza, Trishul Chilimbi, and James Larus. Visage: A domain-specific language for document feature extraction. *Microsoft Research*, 2011.

Nat Love, Tim Hinrichs, David Haley, Eric Schkufza, and Michael R. Genesereth. Game description language specification. *Stanford University*, 2008.