

Alex Dodd Breslow

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Goal	I strive to become a generalist in the field of computer systems. My interests include computer architecture, performance modeling, runtime systems, operating systems, as well as distributed and networked systems. My research has largely focused on improving the performance, utilization and energy efficiency of supercomputers and commercial data centers through the development of adaptive runtime systems. As a researcher at AMD, I also study performance optimizations for data-intensive workloads and how they will interact with future near-data processing platforms.	
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Honors and Leadership	Finalist for Best Paper and for Best Student Paper at SC13 Invited by HPCwire.com to write a 1000 word piece highlighting my SC13 paper on fair pricing (See http://www.hpcwire.com/2013/11/13/fair-pricing-first-hurdle-node-sharing-hpc/)	
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Service and Affiliations	ACM student member SIGARCH and SIGOPS student member SIGCOMM, SIGHPC, SIGMETRICS student member	2012 - present 2012 - present 2013 - present
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Education	UC San Diego , Dept. of Computer Science and Engineering, La Jolla, CA, USA Ph.D. Computer Science, June 2011 - December 2016 (expected) (GPA 3.7) M.S. Computer Science, June 2011 - March 2014 Advisor: Dean Tullsen Swarthmore College , Dept. of Computer Science, Swarthmore, PA, USA B.A. Computer Science, May 2011 (GPA 3.6)	
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Select Research Experience	AMD Research , Sunnyvale, CA, USA <i>Intern supervised by Dong Ping Zhang and Nuwan Jayasena</i> <i>Postgrad Researcher</i> Exploring data-intensive computing for next generation heterogeneous processors and near-data computing architectures (<i>USENIX ATC'16</i>) Microsoft (Cloud and Information Services Lab) , Mountain View, CA, USA <i>Intern supervised by Sriram Rao, Konstantinos Karanasos, et al.</i> Research into improving the performance of open source distributed computing frameworks via adaptive scheduling of parallel tasks (work with Tez, Hive, and Hadoop YARN) Lawrence Livermore National Laboratory , Livermore, CA, USA <i>ISCR Summer Student supervised by Martin Schulz</i> Continued development of the POPPA runtime system that enables fair pricing on supercomputers with compute nodes where jobs from different users are co-located (<i>SC'13</i>) PMaC lab at San Diego Supercomputer Center , La Jolla, CA, USA PhD student advised by A. Snively, L. Carrington and A. Tiwari Research into increasing supercomputer throughput and energy efficiency via the development of performance models and reactive runtime systems (<i>CCPE'13 and SC'13</i>) Cross Layer Architectures and Runtimes Laboratory , La Jolla, CA, USA PhD student advised by Lingjia Tang and Jason Mars Research into increasing warehouse scale computer utilization through clever mechanisms and run-	February - May 2015 June 2015 - present Summer 2014 Summer 2013 June 2011 - June 2014 August - December, 2012
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time systems (ISCA'13 and SC'13)

Swarthmore College, Swarthmore, PA, USA

Summer student supervised by Prof. Andrew Danner

Summer 2010

Ported a serial grid digital elevation model building software pipeline to run on a GPGPU cluster using MPI and CUDA (ACM GIS'12)

Publications

Conferences:

Horton Tables: Fast Hash Tables for In-Memory Data-Intensive Computing. **Alex D. Breslow**, Dong Ping Zhang, Joseph L. Greathouse, Nuwan Jayasena, and Dean M. Tullsen. *The USENIX Annual Technical Conference (ATC) 2016*.

Enabling Fair Pricing on HPC Systems with Node Sharing. **Alex D. Breslow**, Ananta Tiwari, Martin Schulz, Laura Carrington, Lingjia Tang, and Jason Mars. *The International Conference for High Performance Computing, Networking, Storage and Analysis (SC) 2013*. **Best Paper Finalist and Best Student Paper Finalist**

Bubble-Flux: Precise Online QoS Management for Increased Utilization in Warehouse Scale Computers. Hailong Yang, **Alex Breslow**, Jason Mars, Lingjia Tang. *The International Symposium on Computer Architecture (ISCA) 2013*.

Hybrid MPI/GPU Interpolation for Grid DEM Construction. Andrew Danner, Jake Baskin, **Alexander Breslow**, and David Wilikofsky. *ACM Symposium on Advances in Geographic Information Systems (ACM GIS) 2012*.

Journals:

The Case for Colocation of HPC Workloads. **Alex D. Breslow**, Leo Porter, Ananta Tiwari, Michael Laurenzano, Laura Carrington, Dean M. Tullsen, Allan E. Snaveley. *Concurrency and Computation: Practice and Experience (CCPE) 2013*.

Pending Patents

A Control System and Architecture for Incorporating Microelectromechanical (MEM) Switches in Fluid-Based Cooling of 3D Integrated Circuits. **Alex D. Breslow**, Dong Ping Zhang, Nuwan Jayasena

Instruction Set Architecture and Generalized Software Support for Register State Migration. **Alex D. Breslow**, Nuwan Jayasena, Dong Ping Zhang

Bucketized Hash Tables with Improved Memory Awareness. **Alex D. Breslow**, Dong Ping Zhang, Nuwan Jayasena

Dynamic Adaptation of DRAM Page Management Policy Using Software Provided Information. Amin Farmahin-Farahani, **Alex D. Breslow**, Nuwan Jayasena

Savoir Faire

Human Language: *High proficiency in written and spoken Spanish and moderate proficiency in French*

High-level Skills: *Linux systems programming, runtime systems design, performance optimization and tuning, parallel programming, and strong critical thinking, speaking and writing*

Principal Knowledge Base: *High performance and parallel computing*

Primary Programming Languages: *C, Python, and Bash*

Less Used Languages: *C++ and Java*

Library Experience: *MPI, Pthreads, Cilk, OpenMP, CUDA, OpenCL, and libpfm4*

Tools: *awk, sed, make, gprof, matplotlib, CodeXL, MPI profiling and tracing, and L^AT_EX*

Relevant Coursework: *computer architecture, computer networking, distributed systems, high performance computing, scientific computing, compilers, database systems, discrete mathematics, theory of computation, algorithms, linear algebra, vector calculus, mathematical modeling, adaptive robotics, natural language processing, and computer graphics*