

Kim Hazelwood, Ph.D.

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EDUCATION

Harvard University, Cambridge, MA Ph.D. in Computer Science Dissertation: "Code Cache Management in Dynamic Optimization Systems"	2004
North Carolina State University, Raleigh, NC M.S. in Computer Engineering Thesis: "Dynamic Optimizations Infrastructures and Algorithms for IA-64"	2000
Clemson University, Clemson, SC B.S. Honors in Computer Engineering (Minor: Mathematics) Honors Thesis: "A Precision Analysis Agent for Reconfigurable Computing"	1998

ACADEMIC FACULTY EXPERIENCE

University of Virginia, Charlottesville, VA Assistant Professor of Computer Science	2005–Present
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INDUSTRY EXPERIENCE

Intel Corporation, Hudson, MA Post-Doc / Faculty Consultant, Pin Dynamic Instrumentation Group.	2004–Present
IBM TJ Watson Research Center, Hawthorne, NY Summer Intern, Jikes RVM Group	2002
Hewlett-Packard Laboratories, Cambridge, MA Summer Intern, DELI Group (2001) and Dynamo Group (2000)	2000, 2001
Hewlett-Packard Company, Cupertino, CA Summer Intern, CarbonFIRE Group	1999

HONORS AND AWARDS

- Anita Borg Early Career Award, 2009.
 - Woodrow Wilson Foundation Career Enhancement Fellowship, 2008.
 - Microsoft Secure and Scalable Computing Award, 2008.
 - National Science Foundation CAREER Award, 2007.
 - Google Research Award, 2007.
 - FEST Distinguished Young Investigator Award, 2007.
 - Distinguished Lecture Series: IBM, Cornell, UT Austin, NC State.
 - Best Presentation Award, Code Generation and Optimization Conference, 2004.
 - Harvard University DEAS Fellowship, 2002.
 - North Carolina State University Dean's Fellowship, 2000.
 - National Science Foundation SURE Fellowship, 1998.
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FUNDING SOURCES

- NSF CSR CORE (9/2009-8/2012) \$500,000 – PI with Skadron
- NSF CAREER Award (5/2008-5/2013) \$400,000 – sole PI
- Semiconductor Research Consortium Grant (2/2008-2/2011) \$300,000 – with August, Mahlke
- NSF CSR-EHCS Grant (9/2008-8/2010) \$180,000 – co-PI with Whitehouse, Soffa
- Microsoft Secure and Scalable Computing Award (7/2008-6/2011) \$166,000 – sole PI
- NSF CPA Grant (7/2008-6/2009) \$150,000 – with August, Mahlke
- NSF CSR-EHS Grant (9/2007-9/2009) \$80,000 – PI with co-PIs Whitehouse, Soffa
- FEST Distinguished Young Investigator Award (7/2007) \$50,000 – sole PI
- Google Research Award (12/2007) \$50,000 – sole PI
- Woodrow Wilson Foundation Career Enhancement Fellowship (7/2008-6/2009) \$30,000 – sole PI
- Anita Borg Career Award (6/2009) \$5,000 – sole recipient
- Pending: NSF CSR CORE (5/2010-4/2013) \$900,000 – PI with August, Mahlke

GRADUATE STUDENTS

- Derek Davis, Ph.D. Student, Computer Science.
- Balaji Dhanasekaran, Ph.D. Student, Computer Science.
- Christopher Gregg, Ph.D. Student, Computer Engineering.
- Apala Guha, Ph.D. Candidate, Computer Engineering. Co-advised with Mary Lou Soffa.
- Dan Upton, Ph.D. Student, Computer Science.
- Daniel Dougherty, Ph.D. Student, Computer Science. On leave 2009-2010.
- Blake Sheridan, M.E. Computer Engineering. Graduated May 2009.
- Arun Thomas, M.E. Computer Engineering. Graduated August 2008.

REFEREED PUBLICATIONS (STUDENTS ARE UNDERLINED)

1. Moshe Bach, Mark Charney, Robert Cohn, Tevi Devor, Elena Demikovsky, Kim Hazelwood, Chi-Keung Luk, Gail Lyons, Harish Patil, Ady Tal. "Analyzing Parallel Programs with Pin," IEEE Computer. December 2009.
 2. Mojtaba Mehrara, Thomas Jablin, Dan Upton, David August, Kim Hazelwood, and Scott Mahlke. "Compilation Strategies and Challenges for Multicore Signal Processing," to appear in the *IEEE Signal Processing Magazine*. November 2009.
 3. Marisabel Guevara, Chris Gregg, Kim Hazelwood, Kevin Skadron. "Enabling Task Parallelism in the CUDA Scheduler," in *Proceedings of the Workshop on Programming Models for Emerging Architectures (PMEA)*. Raleigh, NC. September 2009.
 4. Daniel Williams, Aprotim Sanyal, Dan Upton, Jason Mars, Sudeep Ghosh, and Kim Hazelwood. "A Cross-Layer Approach to Heterogeneity and Reliability," *7th ACM/IEEE International Conference on Formal Methods and Models for Co-Design (MEMOCODE)*. Cambridge, MA, USA. July 2009, pages 88-97.
 5. Kim Hazelwood, Greg Lueck, and Robert Cohn. "Scalable Support for Multithreaded Applications on Dynamic Binary Instrumentation Systems," *Proceedings of the 2009 International Symposium on Memory Management (ISMM)*. Dublin, Ireland. June 2009, pages 20-29.
 6. Kim Hazelwood and Mohamed Zahran. "Challenges and Opportunities at All Levels: Interactions Among Operating Systems, Compilers, and Multicore Processors," *ACM SIGOPS Operating System Review*. Volume 43, Issue 2. April 2009.
 7. Arkaitz Ruiz-Alvarez and Kim Hazelwood. "Evaluating the Impact of Dynamic Instrumentation on Instruction Cache Performance," in Int'l Symposium on Workload Characterization. Seattle, WA. Sept 2008.
 8. Jason Mars, Daniel Williams, Dan Upton, Sudeep Ghosh, Kim Hazelwood. "Unobtrusive Reactive Prefetching: A Multicore Approach for Exploiting Hot Streams in Cache Misses," in Proceedings of the Workshop on Software and Hardware Challenges of Manycore Platforms (SHCMP). Beijing, China. June 2008.
 9. Apala Guha, Kim Hazelwood, Mary Lou Soffa. "Code Lifetime-Based Memory Reduction for Virtual Execution Environments," in *6th Annual Workshop on Optimizations for DSP and Embedded Systems (ODES)*. Apr 2008.
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10. Duane Merrill and Kim Hazelwood. "Exploring the Potential of Binary Trace Execution within Compile-Only JVMs," in *Proceedings of the 2008 Annual ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments (VEE)*. Seattle, WA. March 2008, pages 41-50. (Acceptance 32%)
 11. Steven Wallace and Kim Hazelwood. "SuperPin: Parallelizing Dynamic Instrumentation for Real-Time Performance," in *Proceedings of the 5th Annual IEEE/ACM International Symposium on Code Generation and Optimization (CGO-5)*. Palo Alto, California, USA. March 2007, pages 209-217. (Acceptance 32%)
 12. Apala Guha, Jason D. Hiser, Naveen Kumar, Jing Yang, Min Zhao, Shukang Zhou, Bruce R. Childers, Jack W. Davidson, Kim Hazelwood, Mary Lou Soffa. "Virtual Execution Environments: Support and Tools," in *NSF Next Generation Software Program Workshop*. Long Beach, CA, USA. March 2007, pages 1-6.
 13. Dan Upton and Kim Hazelwood. "Heterogeneous Chip Multiprocessor Design for Virtual Machines," in *Software Tools for Multicore Systems*. Palo Alto, CA. March 2007, pages 44-47.
 14. Apala Guha, Jason D. Hiser, Naveen Kumar, Jing Yang, Min Zhao, Shukang Zhou, Bruce R. Childers, Jack W. Davidson, Kim Hazelwood, Mary Lou Soffa. "Virtual Execution Environments: Support and Tools," *NSF Next Generation Software Program Workshop*, Long Beach, CA, March 2007.
 15. Dan Upton and Kim Hazelwood. "Heterogeneous Chip Multiprocessor Design for Virtual Machines," in *Proceedings of the Workshop on Software Tools for Multicore Systems*, Palo Alto, CA, March 2007.
 16. Apala Guha, Kim Hazelwood, Mary Lou Soffa. "Reducing Exit Stub Memory Consumption in Code Caches," in *High Performance Embedded Architectures and Compilers*. Ghent, Belgium. Jan 2007, pages 87-101. (29%)
 17. Kim Hazelwood and Artur Klauser. "A Dynamic Binary Instrumentation Engine for the ARM Architecture," in *Compilers, Architecture, and Synthesis for Embedded Systems*. Seoul, Korea. Oct 2006, pp 261-270. (41%)
 18. Kim Hazelwood and Michael D. Smith. "Managing Bounded Code Caches in Dynamic Binary Optimization Systems," *Transactions on Architecture and Code Optimization (TACO)*, Volume 3, Issue 3, September 2006, pages 263-294.
 19. Kim Hazelwood and Robert Cohn. "A Cross-Architectural Framework for Code Cache Manipulation," in *4th Symposium on Code Generation and Optimization (CGO-4)*. New York, NY. March 2006, pages 17-27. (35%)
 20. Kim Hazelwood. "Tortola: Addressing Tomorrow's Computing Challenges through HW/SW Symbiosis," *Boston Area Architecture Workshop*, Kingston, RI, February 2006.
 21. David Hiniker, Kim Hazelwood, Michael D. Smith. "Improving Region Selection in Dynamic Optimization Systems," in *Proceedings of the 38th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO-38)*. Barcelona, Spain. November 2005, pages 141-154. (Acceptance 20%)
 22. C-K Luk, R Cohn, R Muth, H Patil, A Klauser, G Lowney, S Wallace, V Janapa Reddi, K Hazelwood. "Pin: Building Customized Program Analysis Tools with Dynamic Instrumentation," in the *Conference on Programming Language Design and Implementation (PLDI)*. Chicago, IL. June 2005, pages 191-200. (21%)
 23. Kim Hazelwood and David Brooks. "Eliminating Voltage Emergencies via Microarchitectural Voltage Control Feedback and Dynamic Optimization," in *Proceedings of the 2004 ACM International Symposium on Low-Power Electronics and Design (ISLPED)*. Newport Beach, CA. August 2004, pages 326-331. (34%)
 24. Kim Hazelwood and James E. Smith. "Exploring Code Cache Eviction Granularities in Dynamic Optimization Systems," in *Proceedings of the 2nd Annual IEEE/ACM International Symposium on Code Generation and Optimization (CGO-2)*. Palo Alto, California, USA. March 2004, pages 89-99. (Best Presentation) (32%)
 25. Kim Hazelwood and Michael D. Smith. "Generational Cache Management of Code Traces in Dynamic Optimization Systems," in *Proceedings of the 36th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO-36)*. San Diego, California, USA. December 2003, pages 169-179. (26%)
 26. Kim Hazelwood and Michael D. Smith. "Characterizing Inter-Execution and Inter-Application Optimization Persistence," *Workshop on Exploring the Trace Space for Dynamic Optimization Techniques*. San Francisco, June 2003, pp. 51-58.
 27. Kim Hazelwood and David Grove. "Adaptive Online Context-Sensitive Inlining," in *International Symposium on Code Generation and Optimization (CGO-1)*. San Francisco, California, USA. March 2003, pages 253-264.
 28. Kim Hazelwood and Michael D. Smith. "Code Cache Management Schemes for Dynamic Optimizers," *Sixth Annual Workshop on Interaction between Compilers and Computer Architectures* held in conjunction with the *High-Performance Computer Architecture*. Boston, February 2002, pp. 102-110.
 29. Kim Hazelwood, Mark Toburen and Thomas Conte. "A Case for Exploiting Memory-Access Persistence," 2001 Workshop on Memory Performance Issues held in conjunction with the International Symposium on Computer Architecture. Gotenberg, Sweden, June 2001.
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30. Kim Hazelwood and Thomas Conte. "A Lightweight Algorithm for Dynamic If-Conversion during Dynamic Optimization," in Proceedings of the 2000 ACM International Conference on Parallel Architectures and Compilation Techniques (PACT). Philadelphia, Pennsylvania, USA. October 2000, pages 71-80. (21%)
 31. Kim Hazelwood, Walter Ligon, Greg Monn, Natasha Pothen, Ron Sass, Dan Stanzione, and Keith Underwood. "Creating Applications in RCADE," in *Proceedings of the IEEE Aerospace Conference, Volume 2*. Aspen, Colorado. IEEE Computer Society Press. March 1999, pages 337-349.
 32. Brian Boysen, Nathan DeBardeleben, Kim Hazelwood, Walter Ligon, Ron Sass, Dan Stanzione, and Keith Underwood. "A Development Environment for Configurable Computing," in *SPIE 3526: Configurable Computing Technology and Applications*, Bellingham, Washington, USA. November 1998, pages 103-112.
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THESES AND TECHNICAL REPORTS

33. Jiayuan Meng, Dee A. B. Weikle, Kim Hazelwood. "ParaWeaver: Performance Evaluation of Programming Models for Fine-Grained Threads," University of Virginia Technical Report CS-2007-09, May 2007.
 34. Kim Hazelwood. "Code Cache Management in Dynamic Optimization Systems." Ph.D. Thesis, Division of Engineering and Applied Sciences, Harvard University, May 2004.
 35. Kim Hazelwood. "Dynamic Optimization Infrastructure and Algorithms for IA-64." Master's Thesis, Department of Electrical and Computer Engineering, North Carolina State University, June 2000.
 36. Kim Hazelwood. "Feedback-Directed Query Optimization," *Harvard University Technical Report TR-03-03*, February 2003.
 37. Geetika Tewari and Kim Hazelwood. "Adaptive Web Proxy Caching Algorithms," *Harvard University Technical Report TR-13-04*, February 2004.
 38. Nathan DeBardeleben, Stacey Dorsey, Kim Hazelwood and Jonathan Perry. "Next-Generation Software Configuration Management System," Senior Design Project, Clemson University, June 1998.
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INVITED TALKS

- "Tortola: Addressing Tomorrow's Computing Challenges through Hardware/Software Symbiosis",
 - Keynote Address at the LSP Conference. Charlottesville, VA. October 2007.
 - T100 Entrepreneurs Reception. Darden Business School. Charlottesville, VA. September 2007.
 - IBM Distinguished Programming Languages Speaker Series, 2007.
 - Cornell University Distinguished Lecture Series, 2007.
 - North Carolina State University Distinguished Faculty Seminar, 2006.
 - University of Texas at Austin Distinguished Faculty Speaker Series, 2005.
 - UVa CS 696 Lecture Series, Charlottesville, VA. Oct 2006. Sept 2007. Sept 2008. Oct 2009.
 - Intel Guest Lecture, Hudson, MA. February 2006, June 2007, July 2009.
 - Boston Area Architecture Workshop, Kingston, RI. February 2006.
 - "Should I Do An Internship?"
 - CRA-W PLOSA Workshop for Women and Minorities, Washington, DC. March 2009.
 - "Getting Started on PL Implementation Research"
 - CRA-W/CDC Programming Languages Workshop, Austin, TX. May 2007.
 - "What Every Architect Should Know About Dynamic Optimization"
 - CRA-W/CDC Computer Architecture Summer School, Princeton, NJ. July 2006.
 - "What I Wish I'd Known in Graduate School"
 - CRA-W/CDC Distinguished Lecture Series, Austin, TX. December 2005.
 - "Managing Bounded Code Caches in DynamoRIO"
 - IBM T.J. Watson Research Center, Hawthorne NY. February 2004.
 - Intel Corporation, Hudson MA. January 2004.
 - "Generational Code Cache Management"
 - Harvard Industrial Partnership Workshop, November 2003.
 - Grace Hopper Celebration of Women in Computing, Chicago IL, October 2004.
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- “Adaptive Online Context-Sensitive Inlining”
 - Harvard Industrial Partnership Workshop, Cambridge MA, November 2002.
 - IBM TJ Watson Research Center, Hawthorne NY, August 2002.
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PROFESSIONAL SERVICE

- Program Co-Chair: International Symposium on Code Generation and Optimization (CGO). 2010.
 - Guest Editor: ACM SIGOPS Operating System Review, Special Issue on the Interaction among Compilers, Operating Systems, and Multicore Architectures. April 2009.
 - Program Committees:
 - International Symposium on Computer Architecture (ISCA). 2010.
 - International Symposium on Operating System Design and Implementation (OSDI). 2010.
 - International Symposium on Microarchitecture (MICRO). 2009.
 - International Conference on Parallel Architectures and Compilation Techniques (PACT). 2009.
 - Conference for High-Performance Computing Networking, Storage, and Analysis (SC). 2009.
 - Workshop on Architectural Support for Binary Translation (AMAS-BT). 2009.
 - International Symposium on Microarchitecture (MICRO). 2008.
 - International Conference on High-Performance Computing (HIPC). 2008.
 - International Symposium on Parallel Architectures (ISPA). 2008.
 - Workshop on Architectural Support for Binary Translation (AMAS-BT). 2008.
 - Workshop on Parallel Execution of Sequential Programs (PESPMA). 2008.
 - International Symposium on Programming Language Design and Implementation (PLDI). 2007.
 - International Symposium on Code Generation and Optimization (CGO). 2007.
 - International Symposium on High Performance Computer Architecture (HPCA). 2007.
 - International Conference on Parallel Architectures and Compilation Techniques (PACT). 2006.
 - International Conference on Virtual Execution Environments (VEE). 2006.
 - International Symposium on Code Generation and Optimization (CGO). 2006.
 - Workshop on Binary Instrumentation and Applications (WBIA). 2005.
 - Organizing Committees:
 - Tutorials Chair. Programming Language Design and Implementation (PLDI) 2009.
 - Web Chair. Workshop on Architectural Support for Binary Translation (AMAS-BT). 2008, 2009.
 - Student Poster Judge: Programming Language Design and Implementation (PLDI) 2007.
 - Publicity Chair. International Symposium on Computer Architecture (ISCA). 2006.
 - Web Chair. International Symposium on Microarchitecture (MICRO). 2003.
 - National Science Foundation Review Panels:
 - Foundations of Computing Processes and Artifacts (CPA) 2006.
 - Computing Research Infrastructure (CRI) 2007.
 - High End Computing University Research Activity (HECURA) 2008.
 - Computer Systems Research (CSR) 2009.
 - Outreach Activities for Women and Minorities in Computing:
 - CRA-W PLOSA Workshop. Speaker: 2009.
 - CRA-W/CDC Summer School (Women/Minorities). Speaker: 2006, 2007. Session Chair: 2007.
 - Diversity Committee. Founding Member. Univ. of Virginia CS Department. 2007–Present.
 - Grace Hopper Celebration of Women in Computing. Panelist 2005, 2007.
 - UT Austin Distinguished Female Faculty Lecture Series. 2005.
 - Society of Women Engineers – Annual Retreat for High School Girls. Panelist 2006.
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TUTORIALS AND SHORT COURSES PRESENTED

- “Using Pin for Compiler and Computer Architecture Research and Education”, Tutorial presented at PLDI 2007, ASPLOS 2008, ISCA 2008, Intel Beijing, Northeastern University, Tufts University.
- “Process Virtualization and Symbiotic Optimization”, One week short course taught at ACACES Summer School. Barcelona, Spain. July 2009.

GRADUATE COURSES TAUGHT

- Compilers. University of Virginia. Spring 2008.
- Virtual Machines. University of Virginia. Spring 2006. Spring 2007.
- Static and Dynamic Optimizations. University of Virginia. Fall 2005.

UNDERGRADUATE COURSES TAUGHT

- Computer Architecture. University of Virginia. Fall 2009.
- Compilers. University of Virginia. Fall 2006. Fall 2007.

SOFTWARE RELEASES

- SuperPin: A Parallelized Implementation of Pin. Released March 2007.
- PinARM: A Dynamic Binary Instrumentation System for the ARM Architecture. Released October 2006.
- CodeCacheAPI: An API for Code Cache Introspection and Manipulation. Released March 2006.
- Pin: A Dynamic Binary Instrumentation System. Released with colleagues while at Intel. July 2004.

MEMBERSHIPS

- Association of Computing Machinery (ACM, ACM-W)
 - Institute of Electrical and Electronic Engineers (IEEE)
 - Women in Computer Architecture (WiCArch)
-