

## KATHRYN S. MCKINLEY

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### EDUCATION

PhD, Rice University 1992, Computer Science. (Automatic and Interactive Parallelization)  
MS, Rice University 1990, Computer Science  
BA, Rice University 1985, Computer Science and Electrical Engineering

### EXPERIENCE

- *Research Scientist*, (2017–present), Google
- *Principal Researcher*, (2011–2017), Microsoft Research
- *Adjunct Professor*, Department of Computer Science, The University of Texas at Austin (2013-present)
- *Endowed Professorship in Computer Science #5*, Department of Computer Science, The University of Texas at Austin (2010-2013)
- *Professor*, Department of Computer Science, The University of Texas at Austin, (2005-2013)
- *Associate Professor*, Department of Computer Sciences, The University of Texas at Austin (2001-2005)
- *Visiting Associate Professor*, Department of Computer Sciences, The University of Texas at Austin (1999-2000)
- *Professor*, Department of Electrical and Computer Engineering, The University of Texas at Austin, (2005-2013).  
Associate Professor (2003-2005)
- *Academic Visitor*, IBM Watson Research Center, Hawthorne, (August 2007-January 2008)
- *Adjunct Professor*, Department of Computer Science, University of Massachusetts, Amherst (2001-2011)
- *Associate Professor*, Department of Computer Science, University of Massachusetts, Amherst (1999-2001)
- *Visiting Scholar*, University de Paris, Sud (May 2000)
- *Assistant Professor*, Department of Computer Science, University of Massachusetts, Amherst (1993-1999)
- *Research Scientist*, Centre de Recherche en Informatique à Ecole Nationale Supérieure des Mines de Paris (1992-1993)
- *Research Scientist*, Computer Science Department, Rice University (1992)

### HONORS

ACM Fellow (2008) for contributions to compilers and memory management  
IEEE Fellow (2011) for contributions to compiler technologies  
ACM SIGPLAN Programming Languages Software Award, for Jikes RVM, 2012  
ACM SIGPLAN Distinguished Service Award, 2011  
Faculty Research Assignment, The University of Texas at Austin, 2007-2008  
David Bruton Jr. Centennial Fellow, 2005-2006  
College of Natural Science's Dean's Fellow, 2005-2006  
College of Natural Science's Innovative Outreach Program Award, 2006  
IBM Faculty Award, 2003, 2004, 2005, 2006, 2007, and 2008  
College of Natural Science's Everybody WINS Award, 2005  
Department of Computer Sciences Faculty Fellowship #7, 2004-2005  
Texas Institute for Computational and Applied Mathematics (TICAM) Fellowship, 1999-2000  
NSF CAREER Award, 1996-2000  
Chateaubriand Scholarship for the Exact Sciences, Engineering, and Medicine, 1992-1993

## BEST PAPER AND TEST OF TIME AWARDS

- *OOPSLA Most Influential Paper Award*, 2016 (for OOPSLA 2006). S. M. Blackburn, R. Garner, C. Hoffman, A. M. Khan, K. S. McKinley, R. Bentzur, A. Diwan, D. Feinberg, D. Frampton, S. Z. Guyer, M. Hirzel, A. Hosking, M. Jump, H. Lee, J. E. B. Moss, A. Phansalkar, D. Stefanovic, T. VanDrunen, D. von Dincklage, and B. Wiedermann, The DaCapo Benchmarks: Java Benchmarking Development and Analysis, *The ACM SIGPLAN Conference on Object Oriented Programming Systems, Languages and Applications (OOPSLA)*, Portland, OR, pp. 169-190, October 2006.
- *IEEE MICRO Top Picks*, 2016 (for ISCA 2015). V. Karakostas, J. Gandhi, F. Ayar, A. Cristal, M. D. Hill, K. S. McKinley, N. Nemirovsky, M. M. Swift, and O. Unsal, Range Translations for Fast Virtual Memory. *IEEE Micro*, 36(3):118-126, May-June 2016.
- *IEEE MICRO Top Picks, Honorable Mention*, 2016 (for ISCA 2015). X. Yang, S. M. Blackburn, and K. S. McKinley, Computer Performance Microscopy with Shim. *IEEE Micro*, 36(3), May-June 2016.
- *IEEE MICRO Top Picks*, 2015 (for ASPLOS 2014). J. Bornholt, Todd Mytkowicz, and K. S. McKinley, Uncertain<T>: Abstractions for Uncertain Hardware and Software, *IEEE Micro*, 35(3): 132-143, May-June, 2015.
- *ACM SIGPLAN Research Highlight*, 2014 (for ASPLOS 2014). J. Bornholt, Todd Mytkowicz, and K. S. McKinley, Uncertain<T>: A First-Order Type for Uncertain Data, *The ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, March, 2014.
- *ACM SIGMETRICS Test of Time Award*, 2014 (for SIGMETRICS 2004). S. Blackburn, P. Cheng and K. S. McKinley, Myths and Realities: The Performance Impact of Garbage Collection, *Proceedings of the ACM SIGMETRICS Conference on Measurement & Modeling Computer Systems*, pp. 25-36, New York, NY, June, 2004.
- *ICS 25th Anniversary Volume*, 2014, 35 of 1,231 ICS publications (for ICS 1992). K. Kennedy and K. S. McKinley, Optimizing for Parallelism and Data Locality, *ACM International Conference on Supercomputing (ICS)*, pp. 323-334, Washington, D.C., July, 1992.
- *Most Influential OOPSLA Paper Award*, 2012 (for OOPSLA 2002). E. Berger, B. Zorn, and K. S. McKinley, Reconsidering Custom Memory Allocation, *The ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages and Applications (OOPSLA)*, pp. 1-12, Seattle, WA, November, 2002.
- *CACM Research Highlights, Invited Paper*, 2012 (for ASPLOS 2011). H. Esmailzadeh, T. Cao, X. Yang, S. M. Blackburn, and K. S. McKinley, Looking Back and Looking Forward: Power, Performance, and Upheaval, *Communications of the ACM (CACM)*, Research Highlight, 55(7):105-114, July, 2012.
- *IEEE MICRO Top Picks*, 2012 (for ASPLOS 2011). H. Esmailzadeh, T. Cao, X. Yang, S. M. Blackburn, and K. S. McKinley, What is Happening to Power, Performance, and Software?, *IEEE MICRO*, 32(3):110-121, March, 2012.
- *ASPLOS Best Paper Award*, 2009. M. Gebhart, B. A. Maher, J. Burrill, K. E. Coons, J. Diamond, P. Gratz, M. Marino, N. Ranganathan, B. Robotmili, A. Smith, S. W. Keckler, D. Burger, and K. S. McKinley, An Evaluation of the TRIPS Computer System, *The ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, Washington, D.C., pp. 1-12, March, 2009.
- *CACM Research Highlights, Invited Paper*, 2008 (for OOPSLA 2006). S. M. Blackburn, K. S. McKinley, R. Garner, C. Hoffman, A. M. Khan, R. Bentzur, A. Diwan, D. Feinberg, D. Frampton, S. Z. Guyer, M. Hirzel, A. Hosking, M. Jump, H. Lee, J. E. B. Moss, A. Phansalkar, D. Stefanović, T. VanDrunen, D. von Dincklage, and B. Wiedermann, Wake up and Smell the Coffee: Evaluation Methodology for the 21st Century, *Communications of the ACM (CACM)*, Research Highlights, 51(8):83-89, August, 2008.

## RIGOROUSLY REFEREED PUBLICATIONS

1. X. Yang, S. M. Blackburn, K. S. McKinley, Elfen Scheduling: Fine-Grain Principled Borrowing from Latency-Critical Workloads Using Simultaneous Multithreading, USENIX Annual Technical Conference (ACT), June 2016.
2. V. Karakostas, J. Gandhi, F. Ayar, A. Cristal, M. D. Hill, K. S. McKinley, N. Nemirovsky, M. M. Swift, and O. Unsal, Range Translations for Fast Virtual Memory, *IEEE MICRO Top Picks*, 36(3):118-126, May-June 2016. (Summarizes Redundant memory Mappings for Fast Access to Large Memories, ISCA 2015.)
3. I. Jibaja, T. Cao, S. Blackburn, and K. McKinley, Portable Performance on Asymmetric Multicore Processors, *The ACM/IEEE International Symposium on Code Generation and Optimization (CGO)*, pp. 24-35, Barcelona, Spain, March 2016.
4. V. Karakostas, J. Gandhi, F. Ayar, A. Cristal, M. D. Hill, K. S. McKinley, N. Nemirovsky, M. M. Swift, and O. Unsal, Energy Efficient Address Translation, *The IEEE High Performance Computer Architecture (HPCA)*, Barcelona, Spain, March 2016.
5. J. Li, S. Elnikety, Y. He, K. Agrawal, A. Lee, K. S. McKinley, and C. Lu, Work Stealing for Interactive Services to Meet Target Latency, *The ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPOPP)*, pp. 14:1-13, Barcelona, Spain, March 2016.
6. I. Jibaja, P. Jensen, and J. McCutchan, N. Hu, D. Gohman, M. R. Haghighat, S. M. Blackburn, and K. S. McKinley, Vector Parallelism in JavaScript: Language and Compiler Support for SIMD, *The International Conference on Parallel Architectures and Compilation Techniques (PACT)*, San Francisco, October 2015.
7. J. Bornholt, T. Mytkowicz, and K. S. McKinley, Uncertain<T>: Abstractions for Uncertain Hardware and Software, *IEEE MICRO Top Picks*, 35(3):132-143, May-June, 2015. (Summarizes Uncertain<T>: A First-Order Type for Uncertain Data, ASPLOS 2014 for architects.)
8. X. Yang, S. M. Blackburn, and K. S. McKinley, Computer Performance Microscopy with Shim, *ACM/IEEE International Symposium on Computer Architecture (ISCA)*, pp. 170-184, Portland, OR, June 2015. Selected for *IEEE MICRO Top Picks, Honorable Mention, IEEE MICRO Top Picks, 36(3), May-June 2016*.
9. V. Karakostas, J. Gandhi, F. Ayar, A. Cristal, M. D. Hill, K. S. McKinley, N. Nemirovsky, M. M. Swift, and O. Unsal, Redundant memory Mappings for Fast Access to Large Memories, *ACM/IEEE International Symposium on Computer Architecture (ISCA)*, pp. 66-78, Portland, OR, June 2015. Selected for *IEEE MICRO Top Picks, 2016*.
10. N. Meng, L. Hua, M. Kim, and K. S. McKinley, Does Automated Refactoring Obviate Systematic Edits? *The ACM International Conference on Software Engineering (ICSE)*, pp. 392-402, Florence, Italy, May, 2015.
11. M. E. Haque, Y. H. Eom, Y. He, R. Bianchini, S. Elnikety, and K. S. McKinley, Few-to-Many: Incremental Parallelism to Reduce Tail Latency in Interactive Services, *The ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, pp. 161-175, March, 2015.
12. D. Porter, M. D. Bond, I. Roy, K. S. McKinley, and E. Witchel, Practical Fine-Grained Information Flow Control Using Laminar, *ACM Transactions on Programming Languages and Systems*, 37(1): Article 4:1-51, November, 2014.
13. R. Shahriyar, S. M. Blackburn, and K. S. McKinley, Fast Conservative Garbage Collection, *The ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, pp. 121-139, October, 2014.
14. S. Ren, Y. He, and K. S. McKinley, A Theoretical Foundation for Scheduling and Designing Heterogeneous Processors for Interactive Applications, *International Symposium on Distributed Computing, (DISC)*, European Association for Theoretical Computer Science, pp. 152-166, October 2014.
15. J. B. Sartor, W. Heirman, S. M. Blackburn, L. Eeckhout, and K. S. McKinley, and Cooperative Cache Scrubbing, *The International Conference on Parallel Architectures and Compilation Techniques (PACT)*, Edmonton, Alberta, Canada, pp. 15-26, August, 2014. **Nominated for Best Paper.**
16. K. S. McKinley, Author Retrospective for Optimizing for Parallelism and Data Locality, *ICS 25th Anniversary Volume*, July, 2014. The original: Optimizing for Parallelism and Data Locality, K. Kennedy and K. S. McKinley, pp. 15-17, 1992 *ACM International Conference on Supercomputing (ICS)*.
17. A. Sampson, P. Panchekha, T. Mytkowicz, K. S. McKinley, D. Grossman, and L. Ceze, Expressing and Verifying Probabilistic Assertions, *The ACM Conference on Programming Language Design and Implementation (PLDI)*, pp. 112-122, June 2014.

18. B. Lee, M. Hirzel, R. Grimm, and K. S. McKinley, Debugging Mixed-Environment Programs with Blink, *Software - Practice and Experience*, doi: 10.1002/spe.2276, 45(9):1-30, June 2014.
19. J. Bornholt, Todd Mytkowicz, and K. S. McKinley, Uncertain<math>T</math>: A First-Order Type for Uncertain Data, *The ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, pp. 51–66, March, 2014. Selected for **ACM SIGPLAN Research Highlight, November 2014** and **IEEE MICRO Top Picks, 2015**.
20. S. Son, K. S. McKinley, and V. Shmatikov, Diglossia: Detecting Code Injection Attacks With Precision and Efficiency, *The ACM Conference on Computer and Communications Security (CCS)*, Berlin, Germany, pp. 1181-1192, November, 2013.
21. K. Coons, M. Musuvathi, and K. S. McKinley, Bounded Partial-Order Reduction, *The ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Indianapolis, IN, pp. 833-848, October, 2013.
22. A. Kansal, S. Saponas, A. J. Brush, K. S. McKinley, T. Mytkowicz, and R. Ziola, The Latency, Accuracy, and Battery (LAB): Abstraction: Enabling Programmer Productivity and Energy Efficiency for Continuous Mobile Context Sensing, *The ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Indianapolis, IN, pp. 661-676, October, 2013.
23. R. Shahriyar, S.M. Blackburn, X. Yang, and K. S. McKinley, Taking Off the Gloves with Reference Counting Immix, *The ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Indianapolis, IN, pp. 93-110, October, 2013.
24. S. Ren, Y. He, S. Elnikety, and K. S. McKinley, Exploiting Heterogeneity in Interactive Services, *The International Conference on Autonomic Computing (ICAC)*, San Jose, CA, pp. 45-58, June, 2013.
25. T. Gao, K. Strauss, S. M. Blackburn, D. Burger, J. Larus, and K. S. McKinley, Using Managed Runtime Systems to Tolerate Holes in Wearable Memories, *The ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Seattle, WA, pp. 297-308, June 2013.
26. N. Meng, M. Kim, and K. S. McKinley, LASE: Locating and Applying Systematic Edits by Learning from Examples, *International Conference on Software Engineering (ICSE)*, San Francisco, CA, pp. 502-511, May 2013.
27. S. Son, K. S. McKinley, and V. Shmatikov, FixMeUp: Repairing Access-Control Bugs in Web Applications, *Network and Distributed System Security Symposium (NDSS)*, San Diego, CA, February 2013.
28. S. Magill, M. Hicks, S. Subramanian, and K. S. McKinley, Automating Object Transformations for Dynamic Software Updating, *The ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Tucson, AZ, pp. 265-280, October, 2012.
29. J. Bornholt, T. Mytkowicz, and K. S. McKinley, The Model Is Not Enough: Understanding Energy Consumption in Mobile Devices, Hot Chips, San Jose, CA, August 2012.
30. T. Cao, S. Blackburn, T. Gao, and K. S. McKinley The Yin and Yang of Power and Performance for Asymmetric Hardware and Managed Software, *ACM/IEEE International Symposium on Computer Architecture (ISCA)*, Portland, OR, June 2012.
31. B. Lee, R. Grimm, M. Hirzel, and K. S. McKinley, MARCO: Safe, Expressive Macros for Any Language, European Conference on Object Oriented Programming (ECOOP), Beijing, China, LNCS 7313, pp. 589–613, June 2012.
32. H. Esmaeilzadeh, T. Cao, X. Yang, S. M. Blackburn, and K. S. McKinley, Looking Back and Looking Forward: Power, Performance, and Upheaval, *Communications of the ACM (CACM), Research Highlight*, 55(7):105–114, July, 2012. (Summarizes Looking Back on the Language and Hardware Revolutions: Measured Power, Performance, and Scaling, ASPLOS 2011, for wide CACM audience.)
33. H. Esmaeilzadeh, T. Cao, X. Yang, S. M. Blackburn, and K. S. McKinley, What is Happening to Power, Performance, and Software?, **IEEE MICRO Top Picks**, 32(3):110–121, March, 2012. (Summarizes Looking Back on the Language and Hardware Revolutions: Measured Power, Performance, and Scaling, ASPLOS 2011, for architects.)
34. R. N. Zaeem, D. Gopinath, S. Khurshid, and K. S. McKinley, History-Aware Data Structure Repair Using SAT, International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), Tallinn, Estonia, March, 2012.

35. X. Yang, S. M. Blackburn, D. Frampton, J. B. Sartor, and K. S. McKinley, Why Nothing Matters: The Impact of Zeroing, *The ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, pp. 307–324, October 2011.
36. S. Son, K. S. McKinley, and V. Shmatikov, RoleCast: Finding Missing Security Checks When You Do Not Know What Checks Are, *The ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, pp. 1069–1084, October 2011.
37. N. Meng, M. Kim, and K. S. McKinley, Systematic Editing: Generating Program Transformations from an Example, *The ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, San Jose, CA, pp. 329–342, June, 2011.
38. V. Srivastava, M. D. Bond, K. S. McKinley, and V. Shmatikov, A Security Policy Oracle: Detecting Security Holes using Multiple API Implementations, *The ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, San Jose, CA, pp. 343–354, June, 2011.
39. I. Jibaja, S. M. Blackburn, Mohammad R Haghghat, and K. S. McKinley, Deferred Gratification: Engineering for High Performance Garbage Collection from the Get Go, *The ACM SIGPLAN Workshop on Memory System Performance and Correctness (MSPC)*, San Jose, CA June, 2011.
40. H. Esmaeilzadeh, T. Cao, X. Yang, S. M. Blackburn, and K. S. McKinley, Looking Back on the Language and Hardware Revolutions: Measured Power, Performance, and Scaling, *The ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, March, 2011. Selected for **CACM Research Highlights, 2012** and **IEEE MICRO Top Picks, 2012**.
41. D. Proutzos, R. Manevich, K. Pingali, and K. S. McKinley, A Shape Analysis for Optimizing Parallel Graph Programs, *ACM SIGPLAN Conference on the Principles of Programming Languages (POPL)*, Austin, TX, pp. 159-172, January 2011.
42. M. Jump and K. S. McKinley, Detecting Memory Leaks in Managed Languages with Cork, *Software: Practice and Experience (SP&E)*, 40(1):1-22, 2010.
43. M. E. Taylor, K. E. Coons, B. Robatmili, B. A. Maher, D. Burger, and K. S. McKinley, Evolving Compiler Heuristics to Manage Communication and Contention, *The 24th Conference on Artificial Intelligence–New Scientific and Technical Advances in Research (NECTAR) track*, Atlanta, GA, July, 2010.
44. M. D. Bond, K. E. Coons, and K. S. McKinley, Pacer: Proportional Detection of Data Races, *The ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Toronto, Canada, pp. 255-268, June, 2010.
45. B. Lee, B. Wiedermann, M. Hirzel, R. Grimm, and K. S. McKinley, Jinn: Synthesizing Dynamic Bug Detectors for Foreign Language Interfaces, *The ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Toronto, Canada, pp. 36-49, June, 2010.
46. J. B. Sartor, S. M. Blackburn, M. Hirzel, D. Frampton, and K. S. McKinley, Z-Rays: Divide Arrays and Conquer Speed and Flexibility, *The ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Toronto, Canada, pp. 471-482, June, 2010.
47. B. Lee, M. Hirzel, R. Grimm, and K.S. McKinley, Debug All Your Code: Portable Mixed-Environment Debugging, *ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Orlando, FL, pp. 207-226, October 2009.
48. J. Ha, M. Arnold, S. M. Blackburn, and K. S. McKinley, A Concurrent Dynamic Analysis Framework for Multicore Hardware, *ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Orlando, FL, pp. 155-174, October 2009.
49. S. Subramaniam, M. Hicks, and K. S. McKinley, Jvolve: Dynamic Software Updates for Java, *The ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Dublin, Ireland, pp. 1-12, June 2009.
50. I. Roy, D. Porter, M. D. Bond, K. S. McKinley, and E. Witchel, Laminar: Practical Fine-Grained Decentralized Information Flow Control, *The ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Dublin, Ireland, pp. 63-74, June 2009.
51. M. Jump and K. S. McKinley, Dynamic Shape Analysis, *The ACM SIGPLAN International Symposium on Memory Management (ISMM)*, Dublin, Ireland, pp. 119-128, June 2009.

52. M. Gebhart, B. A. Maher, J. Burrill, K. E. Coons, J. Diamond, P. Gratz, M. Marino, N. Ranganathan, B. Robotmili, A. Smith, D. Burger, S. W. Keckler, and K. S. McKinley, An Evaluation of the TRIPS Computer System, *The ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, Washington, D.C., pp. 1-12, March 2009. (Extended Version: UT Computer Sciences TR-08-31, 2009.) **Best Paper Award.**
53. S. Subramanian and K. S. McKinley, HeDGE: Hybrid Dataflow Graph Execution in the Issue Logic, *The International Conference on High Performance and Embedded Architectures and Compilers (HiPEAC)*, pp. 308-323, January 2009.
54. B. Robotmili, K. E. Coons, D. Burger, and K. S. McKinley, Strategies for Mapping Dataflow Blocks to Distributed Hardware, *IEEE/ACM International Symposium on Microarchitecture (MICRO)*, Lake Como, Italy, pp. 23-34, November 2008.
55. M. D. Bond and K. S. McKinley, Tolerating Memory Leaks, *ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Nashville, TN, pp. 109-126, October 2008.
56. K. E. Coons, B. Robotmili, M. E. Taylor, B. A. Maher, D. Burger, and K. S. McKinley, Feature Selection and Policy Optimization for Distributed Instruction Placement Using Reinforcement Learning, *The International Conference on Parallel Architectures and Compiler Techniques (PACT)*, Toronto Canada, pp. 32-42, October 2008.
57. S. M. Blackburn, K. S. McKinley, R. Garner, C. Hoffman, A. M. Khan, R. Bentzur A. Diwan, D. Feinberg, D. Frampton, S. Z. Guyer, M. Hirzel, A. Hosking, M. Jump, H. Lee, J. E. B. Moss, A. Phansalkar, D. Stefanovic, T. VanDrunen, D. von Dincklage, and B. Wiedermann, Wake Up and Smell the Coffee: Evaluation Methodology for the 21st Century, *Communications of the ACM (CACM) Research Highlights(Invited)*, 51(8) pages 83-89, August, 2008.
58. S. M. Blackburn and K. S. McKinley, Immix: A Mark-Region Garbage Collector with Space Efficiency, Fast Collection, and Mutator Locality, *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Tuscon AZ, pages 22-32, June 2008.
59. J. B. Sartor, M. Hirzel, and K. S. McKinley, No Bit Left Behind: The Limits of Heap Data Compression, *ACM-SIGPLAN International Symposium on Memory Management (ISMM)*, Tuscon AZ, pages 111-120, June 2008. (Extended version: UT Computer Sciences TR-08-17, 2008)
60. M. D. Bond and K. S. McKinley, Probabilistic Calling Context, *ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Montreal, Canada, pages 97-112, October 2007.
61. M. D. Bond, N. Nethercote, S. W. Kent, S. Z. Guyer, and K. S. McKinley, Tracking Bad Apples: Reporting the Origin of Null and Undefined Value Errors, *ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Montreal, Canada, pages 405-422, October 2007.
62. B. Elkarablieh, S. Khurshid, and D. Vu, K. S. McKinley, STARC: Static Analysis for Efficient Repair of Complex Data, *ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, Montreal, Canada, pages 387-404, October 2007.
63. Mark Grechanik, Kathryn S. McKinley, and Dewayne E. Perry, Recovering and Using Use-Case-Diagram-To-Source-Code Traceability Links, *The joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2007)*, Dubrovnik, Croatia, pp. 95-104, September 2007.
64. Byeongcheol Lee, Kevin Resnick, Michael D. Bond, and Kathryn S. McKinley, Correcting the dynamic call graph using control flow constraints, *International Conference on Compiler Construction (CC)*, Braga, Portugal, pp. 80-95, March 2007.
65. M. Jump and K. S. McKinley, Cork: Dynamic Memory Leak Detection for Garbage-Collected Languages, *ACM SIGPLAN Conference on the Principles of Programming Languages (POPL)*, Nice, France, pp. 31-38, January 2007.
66. S. M. Blackburn, M. Hertz, K. S. McKinley, J. E. B. Moss, and T. Yang, Profile-Based Pretenuing, *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 29(1):2:1-57, 2007.
67. A. Smith, R. Nagarajan, K. Sankaralingam, R. McDonald, D. Burger, S. W. Keckler, and K. S. McKinley, Dataflow Predication, *ACM/IEEE International Conference on Microarchitecture (MICRO)*, pp. 89-102, December 2006.

68. B. A. Maher, A. Smith, D. Burger, and K. S. McKinley, Merging Head and Tail Duplication for Convergent Hyperblock Formation, *ACM/IEEE International Conference on Microarchitecture (MICRO)*, pp. 65-76, December 2006.
69. S. M. Blackburn, R. Garner, C. Hoffman, A. M. Khan, K. S. McKinley, R. Bentzur A. Diwan, D. Feinberg, D. Frampton, S. Z. Guyer, M. Hirzel, A. Hosking, M. Jump, H. Lee, J. E. B. Moss, A. Phansalkar, D. Stefanovic, T. VanDrunen, D. von Dincklage, and B. Wiedermann, The DaCapo Benchmarks: Java Benchmarking Development and Analysis, *The ACM SIGPLAN Conference on Object Oriented Programming Systems, Languages and Applications (OOPSLA)*, Portland, OR, pp. 169-190, October 2006. (Extended Version: ANU Computer Science TR-CS-06-01, 2006.)
70. M. D. Bond and K. S. McKinley, Bell: Bit-Encoding Online Memory Leak Detection, *The International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, San Jose, CA, pp. 61-72, October 2006.
71. K. E. Coons, X. Chen, S. Kushwaha, K. S. McKinley, and D. Burger, A Spatial Path Scheduling Algorithm for EDGE Architectures, *The International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, San Jose, CA, pp. 129-140, October 2006.
72. K. K. Agaram, S. W. Keckler, C. Lin, and K. S. McKinley, Decomposing Memory Performance: Data Structures and Phases, *ACM International Symposium on Memory Management (ISMM)*, pp. 95-103, Ottawa, Canada, June 2006.
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## PATENTS

- Probabilistic Assertions and Verifying Them, MS 355172.01 filed on 9/1/2014.
- Multiplexed Memory for Segments and Pages, US 9,483,400, November 1, 2016.
- User Interruptibility Aware Notifications, US 9,332,411, May 3, 2016.
- Assigning Jobs to Heterogeneous Processing Modules, US 9,336,057, June 26, 2014.
- Memory Segment Remapping to Address Fragmentation, US 9032244, May 12, 2015.

## MICROSOFT TECHNOLOGY TRANSFERS

**Azure ML 2015-2016** We improved responsiveness, elasticity, and efficiency of Azure ML deployments. we designed a better service start up, server location, and elastic provisioning scheme for customer designed and facing ML services. This work delivered two orders of magnitude improvements in 90th percentile latencies for key customer workloads with 25% fewer resources. It shipped in 2015. Collaborators: Sameh Elnikety, Yuxiong He, Srikanth Shoroff, Pavel Dournov, Dmitry Kakurin, Gregg McKnight, and interns.

**Windows 2013-2016** We transferred performance analysis and big-little scheduling technology to Windows. Collaborators: Sameh Elnikety, Yuxiong He, Arun Kishnan, Gregg McKnight, and interns.

**Azure SQL 2015** We designed and implemented optimizations and snap shot isolation semantics to Azure SQL. For instance, we more than doubled the throughput of reads. Collaborators: Sameh Elnikety, Yuxiong He, Rohan Kumar, Srikumar Rangarajan, Stuart Padley, Gregg McKnight, and interns.

**The Band 2014-2015** Using our Uncertain  $\langle T \rangle$  abstraction, we improved heart rate, hiking, and biking accuracy. Collaborators: Todd Mytkowicz, Haithem Albadawi, Joe Liu, and interns.

**Bing 2014** We developed a dynamic scheduling algorithm that incrementally adds parallelism to Bing index serve requests based on few-to-many principals to meet tail latency constraints. This technology shipped in 2014. Incremental parallelism delivered a 25% reduction in 99% tail latency, or at the same latency, Microsoft can buy 40% fewer index servers. Collaborators: Sameh Elnikety, Yuxiong He, Ricardo Bianchini, Gregg McKnight, and interns.

## MAJOR SOFTWARE ARTIFACTS

**Uncertain  $\langle T \rangle$  Compiler and Runtime.** Modern applications operate on data estimates from sensors, machine learning algorithms, big data, and approximate computing. Popular languages, such as C#, C++, and Java, however treat values as facts, which results in errors for estimates. The Uncertain  $\langle T \rangle$  programming system is designed to make these applications correct and easy to write. In 2015, Todd Mytkowicz and I released the first prototype of our Uncertain  $\langle T \rangle$  compiler and runtime. The release includes programming language abstractions in C# and automated inference in the runtime.

**DaCapo Benchmarks.** In 2009, the DaCapo research team released a new version of the DaCapo suite with a focus on parallel Java Application Benchmarks. In 2006, the DaCapo research group released a set of complex, realistic Java Benchmarks to improve provide a more realistic and challenging target for VM, runtime system, architecture, OS, and implementation innovations. Since benchmarks drive computer science research and industry product development, which ones we use and how we evaluate them are key questions for the community. We found the standard SPEC Java benchmarks themselves, benchmark selection methodologies, and benchmarking for Java methodology lacking, and we thus developed the DaCapo benchmark suite (representing the work of 20 researchers and thousands of hours), analysis and selection criteria, and benchmarking and evaluation methodologies. In our OOPSLA 2006 paper, we show that the DaCapo benchmarks represent a wide variety of complex, interesting behaviors that are more representative of software in use today, and improve substantially over the SPEC Java benchmarks. In December 2009, we issued our second release, which includes 14 programs, 9 of which are multithreaded. Six benchmarks are entirely new and the other nine are substantially updated with updated inputs. As of June 2015, the DaCapo benchmarks had been downloaded over 31,800 times.

**MMTk & Immix.** In 2002, Steve Blackburn (ANU), Perry Cheng (IBM), and I collaborated on the design and implementation of the MMTk portable infrastructure for building high performance garbage collectors. MMTk is currently part of the freely available and widely used IBM Jikes RVM, a Java in Java virtual machine, and was ported to VMs for C# and Haskell. MMTk includes all the classic algorithms, providing for the first time an apples-to-apples setting. We introduced mark-region collection and delivered an instance called Immix that used a hierarchy of fixed sized blocks divided in to fixed sized lines. Immix is the fast collector in the literature and the default in Jikes RVM, Haxe, and Rubinius. Haxe is framework for producing multi-platform systems from a single code base. Major users of Haxe include TiVo, Prezi, Nickelodeon, Disney, Mattel, Hasbro, Coca Cola, Toyota and BBC. Rubinius is a platform for building programming language technology that is the basis for over 10 new language implementations. Jikes RVM won the ACM SIGPLAN Programming Languages Software Award in 2012.

**Jikes RVM.** In 2000, our DaCapo research group partnered with IBM researchers to further develop the Jikes RVM Java-in-Java Research Virtual Machine into an open source resource for the community to accelerate research in dynamic optimizations, compilers, runtimes, and garbage collection. The continued efforts of this collaboration over the past 15 years produced a high quality and modular design that helped researchers to develop, share, and compare advances in programming language implementations. I was part of the Jikes RVM core team, which nurtured and supported a large community of researchers. By 2012, 200+ publications, at least 40 dissertations, 25 courses, and research spanning almost 100 universities were based on Jikes RVM. This project won the ACM SIGPLAN Programming Languages Software Award, for Jikes RVM in 2012

**Hoard & Heap Layers.** My PhD student, Emery Berger (now a Professor at University of Massachusetts, Amherst)

developed Heap Layers, a scalable explicit memory management infrastructure for C and C++ that combines portability, extensibility, and high performance. The cornerstone of this work, is Hoard, a scalable and provably efficient memory manager for shared-memory multi-threaded C/C++ programs. The Hoard release is deployed in numerous commercial settings, and offered stunning improvements over vendor allocators when it was first deployed. Prof. Berger is now continuing the development of Heap Layers independently. The Hoard algorithm is widely adapted in industry; Sun and IBM use it in their C/C++ standard library, and OS X implemented it for their operating system memory management algorithm. Industry continues to license it for applications they sell.

**Scale.** I led the design and implementation of the Scale research compiler infrastructure for C/C++ and Fortran written in Java from 1996 to 2011. Dramatic and continuous changes in architecture are requiring that next generation compilers be more powerful, flexible, and reusable in order to achieve high performance. The Scale compilation system is designed to meet this challenge. In addition to new cooperative memory optimizations, Scale analyses and optimizations include alias analyses, static single assignment form (SSA), a collection of scalar optimizations, (PRE, value numbering, copy propagation, dead code elimination, and constant propagation), inlining, dependence testing, loop optimizations, hyperblock formation, register allocation, and scheduling. Scale performs these optimizations with a new intermediate representation, called Scribble. Scale outputs Sparc and Alpha that is not quite as good as the vendor compilers, but sometimes beats gcc.

**TRIPS Compiler.** Explicit dataflow graph architectures (EDGE), developed at UT in collaboration with Doug Burger and Steve Keckler, are designed to achieve scalable performance in future technologies by exploiting coarse and fine grain concurrency, while addressing power and wire technology limitations. EDGE architectures implement a block atomic execution model and within blocks, dataflow execution. The TRIPS architecture and compiler are the first EDGE system consisting of fully functional ASICS chip and compiler. Doug Burger and I led the TRIPS compiler team, which built on the Scale Compiler. The TRIPS compiler includes new algorithms for generating TRIPS ISA (TASL), TRIPS block formation that meet special constraints, predication, register bank assignment, and scheduling to expose parallelism and hide latency. On C and Fortran SPEC CPU benchmarks, compiler performance beats the Intel Pentium 4, but is not as good as the Intel Core 2 Duo. On small benchmarks, the compiler improves over the Core 2 by 40% on average. The ASPLOS 2009 paper evaluating TRIPS won Best Paper. The TRIPS compiler is the first demonstration of a compiler for general purpose languages to a dataflow execution model.

**The ParaScope Editor.** While under the supervision of my thesis advisor, Ken Kennedy, I led the design and implementation of the first parallel programming tool to provide interactive compiler transformations and dependence analysis to assist programmers in parallelizing their applications. Several commercial products were patterned after this work. The rebirth of parallel computing in the early 2000s has renewed demand for such tools and increased the impact of this work.

## PROFESSIONAL SERVICE

### National Technical Leadership

- CRA-W Board Member, Computing Research Association (CRA) Committee on the Status of Women in Computing Research, 2009-present.
- CRA-W Director of Development, 2014-present
- Computing Research Association (CRA) Board 2011-2018
- DARPA ISAT committee member, 2012-2015
- CRA-W Chair, Computing Research Association (CRA) Committee on the Status of Women in Computing Research, 2011-2014
- Congressional Testimony to the House Science Committees Subcommittee on Research and Science Education on the topic of information technology innovation, February 14, 2013.
- Committee Member, National Academies Committee study on: The Shift to Multicore Processors and the Future of Computing Performance: Global Assessment and Implications for U.S. Science and Technology, 2011-2012.
- Committee Member, National Academies Committee study on: Sustaining Growth in Computing Performance, 2007-2011
- Intellectual Leader for Programming Languages and Compilers, NSF Computer Systems Research (CSR) Future Directions Study, 2010

- Committee Member, DARPA study on Reliability in Extreme Scale Systems, 2008-2009
- Invited participant, NSF CS Outside the Box, NSF workshop, Washington DC, December 2008

### **Technical Program Chairs and Editorial Positions**

- Program Chair, International Symposium on Code Generation and Optimization (CGO), 2013
- Program Chair, ACM International Symposium on Memory Management (ISMM), 2012
- Editor-in-Chief, ACM Transactions on Programming Languages and Systems (TOPLAS), 2007-2010
- Program Chair, ACM Conference on Programming Language Design and Implementation (PLDI), 2007
- Associate Editor, ACM Transactions on Architecture and Code Optimization (TACO), 2003-2007
- Program Chair, International Conference on Parallel Architectures and Compilation Techniques (PACT), 2005
- Program Chair, ACM Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2004

### **Steering Committees**

- Steering Committee Member, ACM Workshop on Approximate Computing across the Stack (WAX), 2017-present
- Secretary, ACM Special Interest Group on Programming Languages (SIGPLAN), 2015-present
- Steering Committee Member, ACM International Symposium on Memory Management (ISMM), 2012-2015
- Steering Committee Member, IEEE/ACM International Symposium on Code Generation and Optimization (CGO), 2012-2015
- Steering Committee Member, ACM Conference on Programming Language Design and Implementation (PLDI), 2006-2009
- Steering Committee Member, ACM Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2004-2008
- Steering Committee Member, ACM/IEEE International Conference on Parallel Architectures and Compilation Techniques (PACT), 2005-2007
- Steering Committee Member, ACM Conference on Object-Oriented Programming Languages, Systems, and Applications (OOPSLA), 1999-2001
- Secretary & Treasurer, ACM Special Interest Group on Programming Languages (SIGPLAN), 1999-2001

### **Program Committees**

- ACM Conference on Object-Oriented Programming Languages, Systems, and Applications (OOPSLA), 1994, 2003, 2009, 2017; External Review Committee 2015
- ACM SIGOPS European Conference on Computer Systems (EuroSys), 2017
- ACM Conference on Principles and Practice of Parallel Programming (PPoPP), 2017
- IEEE MICRO Top Picks, 2006, 2007, 2014, 2016
- MICRO 2013, External Review Committee 2016
- ACM Architectural Support for Programming Languages and Operating Systems (ASPLOS), 1996, 1998, 2002, 2004, 2012, 2014, 2016; External Review Committee 2015
- Workshop on Approximate Computing (WAX), 2015, 2016
- Summit on Advances in Programming Languages (SNAPL), 2015
- ACM Conference on Programming Language Design and Implementation (PLDI), 1996, 2007, 2011, 2015; External Review Committee 2009, 2012, 2016
- IEEE/ACM International Symposium on Code Generation and Optimization (CGO), 2008, 2015
- ACM International Symposium on Memory Management (ISMM), 2002, 2006, 2008, 2012, External Review Committee 2013, 2015
- Compiler Construction Conference (CC), 1998, 2002, 2011
- International Conference on High-Performance Embedded Architectures and Compilers (HiPEAC), 2011

- X10 Workshop, 2011
- SPLASH Doctoral Symposium Committee, 2010
- Workshop on Statistical and Machine learning approaches to Architecture and Compilation (SMART), 2010
- ACM Conference on Object-Oriented Programming Languages, Systems, and Applications (OOPSLA), 1994, 2003, 2009
- ACM SIGMETRICS, 2009
- ACM/IEEE International Symposium on Computer Architecture (ISCA), 2005
- ACM Workshop on Management System Performance (MSP), 2002, 2004
- ACM/IEEE International Conference on Parallel Architectures and Compilation Techniques (PACT), 1996, 1997, 1998, 1999, 2001
- ACM Compilers, Architecture and Synthesis for Embedded Systems (CASES), 2000
- ACM Workshop on Java for High-Performance Computing, 1999, 2000
- International Conference on Parallel Processing (ICPP), 1999
- The International Parallel Processing Symposium (IPPS), 1998 1999
- International Conference on Supercomputing (ICS), 1995, 1997, 1999
- Computer Architectures for Machine Perception (CAMP), 1997
- International Conference on Parallel Processing (ICPP), 1997

### **Other Professional Service**

- Member, IEEE Computer Society Fellow selection committee, 2011, 2015, 2017
- Member, The Australian National University, Department of Computer Science Review Committee, 2016
- Chair, INRIA Research Theme review of Architecture, Languages and Compilation, 2016
- Organizing Committee, Programming Languages Mentoring Workshop at PLDI (PLMW@PLDI), 2016
- Chair, IEEE/ACM International Symposium on Code Generation and Optimization (CGO), Test of Time Award Committee, 2013, 2014, 2015
- NSERC grant reviewer, 2015
- Member, IEEE Rebooting Computing, Santa Cruz, CA, October, 2014.
- Organizer, Workshop on Approximate Computing Across the Stack, (WAX), Portland, OR, June 2015.
- SIGPLAN Achievement Award selection committee, 2011, 2013
- Chair IEEE/ACM Ken Kennedy Award selection committee, 2012; member 2009-2010
- External Review Committee for Department of Computer Science, Purdue University, 2011
- Associated member, HiPEAC, 2008-present
- NSF grant reviewer, 1999, 2000, 2001, 2002, 2003, 2004, 2006, 2007, 2008, 2009, 2010, 2011
- DOE grant reviewer, 2010
- Judge, OOPSLA Doctoral Symposium, Reno, NV, OOPSLA, 2010
- CRA-W Distinguished Professor, Mentoring Cohort of Associate Professors, 2010
- Chair, CRA-W/STARS Alliance Celebration Mentoring Track, Tallahassee, FL, August 2009, 2010
- Chair, CRA-W/CDC Programming Language, Operating Systems, and Architecture (PLOS) Workshop for under-represented graduate students, Washington DC, 2009
- Panelist, Paper and Proposal Reviews: Is the Process Flawed? CRA Conference, Snowbird UT, July 2008
- Chair, CRA-W/CDC Programming Language Summer School for under-represented graduate students, Austin TX, May 9-11, 2007
- CRA-W Mentor for First Year Graduate Student Women Cohort, to encourage retention of women graduate students, 2004, 2005

- Ad hoc grant reviewer, Amherst College Research Award Program
- Tutorial Chair, ACM SIGPLAN Conference on Programming Language Design and Implementation, 2002
- Member, Board of Directors, Focal Point Software, 1999-2005
- Mentor in the CRA-W Distributed Mentor Program, 1995, 1999, 2002, 2004
- Local Arrangements Chair, Conference on Programming Language Design and Implementation (PLDI), 1997
- Local Arrangements Chair, ACM Symposium on Principles & Practice of Parallel Programming (PPOPP), 1997
- Finance Chair, International Conference on Distributed Computing Systems (ICDCS), 1997
- Finance Chair, Computer Architectures for Machine Perception (CAMP), 1997
- Ad hoc grant reviewer, Natural Sciences and Engineering Research Council of Canada, 1996
- CRA-W mentor and mentee selection committee, 1994
- Ad hoc reviewer, ACM TOPLAS, ACM TACO, ACM TOCS, ACM TOSE, IEEE TPDS, ACM PLDI, ACM ISCA, and numerous other journals and conferences, 1990-present
- Member Sigma Xi, 1999-present

### **MICROSOFT SERVICE LEADERSHIP**

- 2015 Workshop Chair, Microsoft Faculty Summit System Services for Cloud Services
- 2014-2015: Microsoft Faculty Summit, Program Chair.
- 2011-2014: Research in Software Engineering (RiSE), Leadership Team
- 2011-2013: Microsoft Research, Diversity Leadership Team
- 2011-2012: Microsoft, Programming Languages Technical Community Advisory Council
- 2011-2012: Microsoft Research, Research Strategy Team

### **DEPARTMENTAL SERVICE**

#### **The University of Texas at Austin**

- 2010-2011: Chair, Faculty Awards
- 2009-2010: Chair, Faculty Awards; Tenure & Promotion committee
- 2008-2009: Chair, Faculty Awards; Department Chair Search committee  
Chair, Graduate Student Advising Day; Undergraduate honors thesis committee
- 2006-2007: Chair, Graduate Student Advising Day; Faculty Evaluation; Assistant Professor Third Year Review
- 2005-2006: Chair, Faculty Recruiting, Initiated & organized, Graduate Student Advising Day
- 2005: Initiated & organized, Distinguished Faculty Lecture Series (6 speakers), Fall 2005
- 2004-2005: Faculty Recruiting, First Bytes Committee, First Bytes Speaker
- 2002-2004: Director First Bytes, High School Girl Computer Science Summer Camps
- 2003-2004: Faculty Recruiting
- 2002-present: CISE Research Infrastructure Committee

#### **University of Massachusetts, Amherst**

- 2000-2001: Executive Committee, Faculty Recruiting
- 1998-1999: Chair, Faculty Recruiting; Librarian
- 1997-1998: Executive Committee, Recruiting, New Building (Development), Special Events, Librarian, Organized Women in Science Video Series and Assistant Prof. Women's Lunches
- 1996-1997: Executive Committee, Recruiting, Librarian, New Building (Development), Special Events Organized Women in Science Video Series and Assistant Prof. Women's Lunches
- 1996-1997: Personnel Committee, Librarian, Space, Faculty Recruiting, Chair Search Committee,

Organized Women in Science Video Series and Assistant Prof. Women's Lunches  
 1995-1996: Personnel Committee, Librarian, Space, Faculty Recruiting  
 Organized Women in Science Video Series and Assistant Prof. Women's Lunches  
 1994-1995: Executive Committee, Faculty Recruiting, Organization of CS Women's Activities  
 1993-1994: Graduate Admissions Committee, Space Allocation Committee, Faculty Recruiting

## UNIVERSITY SERVICE

2010-2011: Teaching Awards Committee, College of Natural Sciences  
 2009: Computer Science Chair Selection Committee, College of Natural Sciences  
 2009-2010: Teaching Awards Committee, College of Natural Sciences  
 2005-2008: Faculty Advisory Committee on Budgets, University  
 2001-2005: Women in Science Advisory Committee, College of Natural Sciences

## SUPERVISED PHD DEGREES

Ivan Jibaja *Exploiting Hardware Heterogeneity and Parallelism for Performance and Energy Efficiency of Managed Languages*, Ph.D. 2016, with S. M. Blackburn, Software Engineer, Pure Storage (2016)

Rifat Shahriyar *High Performance Reference Counting and Conservative Garbage Collection*, Ph.D. 2015, Australian National University, with S. M. Blackburn, Assistant Professor, Bangladesh University of Engineering and Technology (2016)

Na Meng *Automating Program Transformations based on Examples of Systematic Edits*, Ph.D. 2015, with M. Kim, Assistant Professor, Virginia Polytechnic Institute and State University (2016)

Sooel Son *Toward Better Server-side Web Security* Ph.D. 2014, with V. Shmatikov, Google (2016)

Ting Cao *Power, Performance, and Upheaval: An Opportunity for Managed Languages*, Ph.D. 2014, Australian National University, with S. M. Blackburn, Chinese Academy of Science (2016)

Katherine Coons *Fast Error Detection with Coverage Guarantees for Concurrent Software*, Ph.D. 2013 Facebook (2016)

Byeongcheol Lee *Language and Tool Support for Multilingual Programs*, Ph.D. 2011 Assistant Professor, Gwangju Institute of Science and Technology (GIST), Korea (2016)

Behnam Robatmili *Efficient Execution of Sequential Applications on Multicore Systems*, Ph.D., with D. Burger, 2011 Qualcomm Research (2015)

Jennifer Sartor *Exploiting Language Abstraction to Optimize Memory Efficiency*, Ph.D. 2010, with S. M. Blackburn, Research Scientist, Ghent University, Belgium (2016)

Bertrand Maher *Atomic Block Formation for Explicit Data Graph Execution Architectures*, Ph.D. 2010 with D. Burger, FaceBook (2016)

Suriya Subramanian *Dynamic Software Updates: A VM-centric Approach*, Ph.D. 2010 Start up, India (2016).

Jungwoo Ha *Scaling Managed Runtime Systems for Future Multicore Hardware*, Ph.D. 2009 Google (2016)

Maria Eva Jump *Discovering Heap Anomalies in the Wild*, Ph.D. 2009 Associate Professor, Kings College (2016)

Michael D. Bond *Diagnosing and Tolerating Bugs in Deployed Systems*, Ph.D. 2008  
**ACM SIGPLAN Outstanding Dissertation Award**

	Associate Professor, Ohio State University (2016)
Xianglong Huang	<i>Improving Program Locality on-the-Fly</i> , Ph.D. 2006 Alibaba (2016)
Zhenlin Wang	<i>Cooperative Hardware/Software Caching for Next-Generation Memory Systems</i> , Ph.D. 2004 Associate Professor, Michigan Technological University (2016)
Emery Berger	<i>Memory Allocation for High-Performance Applications</i> , Ph.D. 2002 Professor, University of Massachusetts Amherst (2016)
Brendon Cahoon	<i>Effective Compile Time Analysis for Data Prefetching in Java</i> , Ph.D. 2002 Qualcomm (2016)
Sharad Singhai	<i>Data Reorganization for Improving Cache Performance of Object-Oriented Programs</i> , Ph.D. 2002 Google (2016)
Zhihong Lu	<i>Providing Fast and Effective Distributed Information Retrieval</i> , Ph.D. 1999 AT&T (2012)
Darko Stefanovic	<i>Age-Based Garbage Collection</i> , with J. E. B. Moss, Ph.D. 1998 Professor, University of New Mexico (2016)
Amer Diwan	<i>Understanding and Improving the Performance of Modern Programming Languages</i> , Ph.D. 1996 with J. E. B. Moss, Associate Professor, University of Colorado, Boulder (position as of 2010), Google (2016)

## CURRENT PHD STUDENTS IN CANDIDACY

Xi Yang, Australian National University, joint with Steve Blackburn (Advised since 2010)

## MASTERS STUDENTS

Varun Srivastava	<i>Static Analysis for Finding Security Inconsistencies Between Similar Implementations</i> , co-supervised with Vitaly Shmatikov, Masters 2010
Razieh Nokhbeh Zaeem	<i>Contract-based Data Structure Repair Using Alloy</i> , member, Masters 2010
Byeongcheol Lee,	<i>Call Graph Construction Using Control Flow Constraints</i> , supervisor, Masters 2010
Subramaniam Venkiteswaran	<i>Cooperative Caching for Spatial and Temporal Loads</i> , supervisor, Masters 2005
Sundeeep Kumar Kushwaha	<i>Instruction Scheduling for EDGE Architectures</i> , supervisor, Masters 2005
Goetz Lindenmaier	<i>Load Scheduling with Profiling Information</i> , supervisor, Diploma Thesis 1999
Stephanie Coleman	<i>Selecting Tile Sizes Based on Cache and Data Organization</i> , supervisor, Masters 1994

## PHD DEGREE COMMITTEE MEMBERSHIP

Jayneel Gandhi	<i>Efficient Memory Virtualization</i> , University of Wisconsin, Madison, 2016.
Vincent St-Amour,	<i>How to Generate Actionable Advice about Performance Problems</i> , Northeastern, Ph.D. 2015
Michelle Goodstein,	<i>Dataflow Analysis-Based Dynamic Parallel Monitoring</i> , CMU, Ph.D., 2014
Razieh Nokbeh Zaeem	<i>Contract-Driven Data Structure Repair: A Novel Approach for Error Recovery</i> Ph.D., member, 2014
Hadi Esmaeilzadeh	<i>Approximate Acceleration for a Post Multicore Era</i> , Ph.D., member, 2013
Mark Gebhart	<i>Energy-Efficient Mechanisms for Managing On-Chip Storage in Throughput Processors</i> , Ph.D., member, 2012
Ciji Isen	<i>The Use of Memory State Knowledge to Improve Computer Memory System Organization</i> , Ph.D., member, 2011

Don Porter *Operating System Transactions*, Ph.D., member, 2010

Alison Norman *Compiler-Assisted Staggered Checkpointing*, Ph.D., member, 2010

M.S. Sibi Govinadan *E<sup>3</sup>: Energy-Efficient EDGE Architectures*, Ph.D., member, 2010

Indrajit Roy *Protecting Sensitive Information from Untrusted Code*, Ph.D., member, 2010

Walter Chang *Improving Dynamic Analysis with Data Flow Analysis*, member, Ph.D. 2010

Benjamin Wiedermann *Integrating Programming Languages and Databases via Program Analysis and Language Design*, member, Ph.D. 2009

Aaron Smith *Explicit Data Graph Compilation*, member, Ph.D. 2009

Bassem Elkarablieh *Assertion-Based Repair Of Complex Data Structures*, member, Ph.D. 2009

Benjamin Hardekopf *Pointer Analysis: Building a Foundation for Effective Program Analysis*, member, Ph.D., 2009

Nitya Ranganathan *Control Flow Speculation for Distributed Architectures*, member, Ph.D. 2009

Haiming Lui *Hardware Techniques to Improve Cache Efficiency*, member, Ph.D. 2009

Simha Sethumadhavan *Scalable Hardware Memory Disambiguation*, member, Ph.D. 2007

Teck Bok Tok *Removing Unimportant Computations in Interprocedural Program Analysis*, member, Ph.D. 2007

Kartik Agaram *Prefetch Mechanisms by Application Memory Access Pattern*, member, Ph.D. 2007

Changkyu Kim *A Technology Scalable Composable Architecture*, member, Ph.D. 2007

Ramadass Nagarajan *Design and Evaluation of a Technology-Scalable Architecture for Instruction-Level Parallelism*, member, Ph.D. 2007

Mark Grechanik *Design and Analysis of Interoperating Components*, member, Ph.D. 2006

Rajagopalan Desikan *Distributed Selective Re-execution—A Mechanism for Efficient Recovery from Incorrect Computation*, member, Ph.D. 2005

Jayaram Mudigonda *Addressing the Memory Bottleneck in Packet Processing Systems*, member, Ph.D. 2005

Shiwen Hu *Optimizing Adaptive Computing Environments via Binary Translation Systems*, member, Ph.D. 2005

Madhavi Gopal Valluri *A Hybrid-Scheduling Approach for Low Energy Processors*, member, Ph.D. 2005

Narendran Sachindran *Fast Copying Garbage Collection with Low Space Overhead*, member, Ph.D. 2005

Samuel Guyer *Incorporating Domain-Specific Information into the Compilation Process*, member, Ph.D. 2003

Steve Dropsho *Enhancing Branch Prediction via On-Line Statistical Analysis*, member, Ph.D. 2002

Daniel Jimenez *Delay-Sensitive Branch Predictors for Future Technologies*, member, Ph.D. 2002

Olivier Temam *Bridging the Gap between Programs and Processor Architecture*, juror, L'Habilitation a Diriger des Recherches 1999.

Gleb Naumovich *Data Flow Analysis for Verification of Application-specific Properties of Concurrent Software*, member, Ph.D. 1999

David Yates *Connection-Level Parallelism for Network Protocols in Shared-Memory Multiprocessor Servers*, member, Ph.D. defended 1997

Lixin Goa *Scheduling Tasks in Multiprocessors to Enhance Performance*, member, Ph.D. 1996

## POSTDOCTORAL STUDENTS

Na Meng (2014-2015), Assistant Professor, Virginia Polytechnic Institute and State University (2015)

Byeongcheol Lee (2011-2012), Assistant Professor, Gwangju Institute of Science and Technology (GIST), Korea (2013)

Michael Bond (2009-2010), Assistant Professor, Ohio State University (2013)

Nicholas Nethercote (2005), Firefox (2013)  
Samuel Guyer (2003-2005), Associate Professor, Tufts University (2013)  
Steve Blackburn (1999-2002), Professor, Australian National University (2013)

## **UNDERGRADUATE RESEARCH SUPERVISION**

Emily McAlister	Undergraduate Honors Thesis, ANU, member 2014
James Bornholt	Undergraduate Honors Thesis, ANU, member 2013 CRA Undergraduate Research Award Competition, 2008
Augustine Mathews	Undergraduate Honors Thesis, member, 2010
Vincent Liu	Undergraduate Honors Thesis, member, 2010
Stephen Kent	Undergraduate Honors Thesis, chair, 2008 Honorable Mention, CRA Undergraduate Research Award Competition, 2008
Jose Falcon	Undergraduate Honors Thesis, member, 2008
Kevin Resnick	Undergraduate Honors Thesis, chair, 2006
Gene Novark	Undergraduate Honors Thesis, chair, 2004
Aimee Ronn	Undergraduate Honors Thesis, chair, 2004
Kenneth Fiduk	Undergraduate Honors Thesis, chair, 2003
Jeffrey Stylos	Undergraduate Honors Thesis, chair, 2002
Katherine Coons	CRA Mentee, Summer 2004
Julia Gilinets	CRA Mentee, Summer 2004
Erin Zsolcsak	CRA Mentee, Summer 2002
Sara Smolensky	CRA Mentee, Summer 1998
Dawn Werner	CRA Mentee, Summer 1996

## **Research Interns at Microsoft**

Chandrakana Nandi	University of Washington, Seattle, 2016
Minjia Zhang	Ohio State University, 2015, 2016
Aritra Sengupta	Ohio State University, 2016
Aniket Chakrabarti	Ohio State University, 2016
Xiaoqi Ren	California Institute of Technology, 2016
Arpan Bharat Gujarati	Max Planck Institute for Software Systems, 2015
Ming Liu	University of Washington, Seattle, 2015
Diman Zad Tootaghaj	University of Pittsburgh, 2015
Yong He	CMU, 2015
Jing Li	Washington University, St. Louis, 2014
Md Ehtesamul Haque	Rutgers University, 2014
Adrian Sampson	University of Washington, Seattle, 2013
Yong Hun Eom	University of California, Irvine, 2013
Xi Yang	Australian National University, 2013
Youngjoon Jo	Purdue University, 2012
James Bornholt	Australian National University, 2011-2014

## MAJOR KEYNOTES

- Programming Uncertain <T>hings, ACM Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), Atlanta GA, March, 2016.
- Next Generation Virtual Memory Management, ACM Convergence on Virtual Execution Environments (VEE), March 2016.
- Programming Uncertain <T>hings, ACM Conference on the Principals of Programming Languages (POPL), St. Petersburg, FL, January, 2016.
- The Yin and Yan of Hardware Heterogeneity: Can Software Survive? Tapia Celebration of Diversity, Seattle, WA, February, 2014.
- The Yin and Yan of Hardware Heterogeneity: Can Software Survive? ACM Conference on Object-Oriented Programming Languages, Systems, and Applications (OOPSLA), Indianapolis, IN, October, 2013.
- How's the Parallel Computing Revolution Going? Joint Keynote for IEEE High Performance Computer Architecture (HPCA) and ACM Principles and Practices of Parallel Programming (PPoPP), San Antonio, TX, February 2011.

## INVITED LECTURES & OTHER KEYNOTES

- Programming Uncertain <T>hings, University of Toronto, April, 2016. University of Chicago, February 2016. University of Utah, October 2015. Andreessen Horowitz Academic Roundtable, Menlo Park, CA, September 2015, <https://vimeo.com/141859726>. Workshop on Approximate Computing Across the Stack, (WAX), Portland, OR, June 2015. Simon Fraser University, January 2015. Rice University, Houston, Texas, November, 2014.
- Computer Performance Microscopy with Shim, Ghent University, Ghent, Belgium, March 2016.
- Cooperative System Design: Cross layer abstractions for optimizing parallelism and heterogeneity, Microsoft Systems Workshop, Cambridge, January 2016.
- Presentation Skills, CRA-Women Grad Cohort Mentoring Workshop, San Deigo, CA, April 2016. Microsoft Mid-western Sales Women Chicago, IL, January 2016. Grace Hopper Conference, Houston TX, October 2015. CRA-Women Grad Cohort, San Francisco, CA, April 2015. CRA-Women Grad Cohort, Santa Clara, CA, April 2014.
- Career Networking, CRA Career Mentoring Workshop, Washington, D.C., February 2016.
- Representing Yourself Outward, & Leading Initiatives, Building New Programs, Negotiating Skills, CRA-Women Mid-Career Mentoring Workshop, Portland, OR, June 2015.
- Few-to-Many: Incremental Parallelism to Reduce Tail Latency in Interactive Services, conference presentation, ASPLOS, Istanbul, Turkey, March 2015.
- Preparing for Promotion, and Successful Leadership, CRA-W mentoring workshops at Grace Hopper, Phoenix, AZ, October 2015.
- How to Answer 'Haven't We Done This Already?', and Challenges/Opportunities in Approximate Computing, Edinburgh, Scotland, 2014.
- The Yin and Yan of Hardware Heterogeneity: Can Software Survive? The University of Wisconsin, February, 2013. Purdue University, March, 2013. UCLA, April 2013. UCI April 2014.
- Uncertain<T>: A First-Order Type and Abstraction for Estimated Data, DARPA ISAT Approximate Computing Workshop, Orlando, FL, February 2014. Microsoft Practice of Machine Learning, Seattle, March, 2014. Microsoft Programming Language Mindswap, March, 2014.
- Career Networking, and Mentoring and Managing Students, CRA Career Mentoring Workshop, February, 2014.
- SWE Webinar Networking: Building Your Research Village January, 2014.
- Keynote: The Yin and Yan of Hardware Heterogeneity: Can Software Survive? Intel Compiler Conference, Haifa, Israel, November, 2013.
- Panelist, Effective Leadership and Creating Change, Grace Hopper, Minneapolis, MN, October, 2013.
- Networking, CRA-Women Grad Cohort, April 2013.
- Panelist, Human-to-Human Interaction, CRA-Women Grad Cohort, April 2013.
- Panelist, Research Directions for 21st Century Computer Systems, ASPLOS, March 2013.

- Getting Software into the Energy Efficiency Game, MSR China, June 2012; ITC China, June 2012.
- System Design for Heterogeneity: VM Services: A Test Case, MSR India, Bangalore, November 2011.
- Networking for Research, CRA-W Grad Cohort, Seattle, WA, April, 2012.
- How to Land your Dream Job, CRA-W Mentoring Grace Hopper, Portland OR, November, 2011.
- Software and Hardware Optimizations for Power Requires Measuring Power, Universal Parallel Computing Research Center meeting, Intel, Santa Clara, July 2011.
- Looking back on the Language and Hardware Revolutions: Measured Power, Performance, and Scaling, IBM ARL, Austin, TX, August 2010; Intel Research, Santa Clara, CA, August 2010; AMD, Austin, TX, May 2011.
- How's the Parallel Computing Revolution Going? Oracle Labs, Menlo Park, CA, January 2011; IBM Research, Hawthorne, NY, January 2011; Microsoft Research, Seattle, WA, February 2011; University of Michigan, Ann Arbor, April 2011; University of Illinois, Urbana-Champaign, April 2011.
- Visions of Computer Science Lecture: A Better Space-Time Tradeoff: Past, Present, Future, Austin, TX, November 2010.
- Keynote: How's the Parallel Computing Revolution Going? Towards Scalable Virtual Machine Services, 4<sup>th</sup> Workshop on Virtual Machines & Intermediate Languages (VMIL), Reno, NV, October 2010.
- Mark Region and Other Advances in Garbage Collection, University of Maryland, May 2008; Microsoft Research, Cambridge, May 2009; INRIA, Paris, May 2009; William & Mary College, September 2010.
- Setting Life and Technical Goals and Meeting Them and Enjoying Your Job and Getting Tenure Too, STARS Alliance, Champions Gate, FL, August, 2010.
- Keynote: Towards Scalable Virtual Machine Services, 9th ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering (PASTE), Toronto, Canada, June 2010.
- Promotion to Full Professor and Research Collaboration, CRA-W Advanced Career Mentoring Workshop (CAPP), Providence, RI, June 2010.
- Software Developer Dreams, Southwestern University, Georgetown, TX, April 2010.
- Towards Scalable Virtual Machine Services, Google, Seattle, WA, December 2009; Intel Santa Clara, CA, December 2009.
- Panelist: Becoming an Academic Leader, Grace Hopper, Tucson, AZ, October 2009.
- Wake Up and Smell the Coffee: Performance Analysis Methodologies for the 21st Century, University of Nebraska, April 2009.
- On Writing Well, CRA-W/CDC Programming Language, Operating Systems, and Architecture Workshop (PLOSA) Workshop, Washington, DC, March 2009; CRA-W/STARS Alliance Celebration, Tallahassee, FL, August 2009.
- Panelist: Grand Challenges in Programming Languages, Savannah, GA, POPL 2009.
- Panelist: Paper and Proposal Reviews: Is the Process Flawed? CRA Chairs Conference, Snowbird, UT, July 2008.
- Keynote: Wake Up and Smell the Coffee: Performance Analysis Methodologies for the 21st Century, SPEC Benchmark Workshop, San Francisco CA, January 2008.
- Dynamic Bug Detection for Managed Languages, Microsoft Research, Redmond, WA, June 2007; IBM Watson, Hawthorne NY, September 2007; Rice University, Houston TX, December 2007; Australian National University (ANU), Canberra, Australia, February 2008. Intel, Santa Clara CA, February 2008. Ghent University, Ghent Belgium, May 2008.
- Compiling for EDGE Architectures: The TRIPS Prototype Compiler, Princeton University, Princeton NJ, December 2007; IBM Watson, Yorktown NY, December 2007; University of New South Wales (UNSW), Sydney, Australia, February 2008. INRIA Futurs, Paris France, May 2008. Texas A&M, College Station, Feb 2009.
- Optimizing and Measuring Dynamic Languages, ACACES International Summer School on Advanced Computer Architecture and Compilation for Embedded Systems, Invited Short Course (5 lectures), L'Aquila, Italy, July 15-20, 2007.
- Career Paths, CRA-W Career Mentoring Workshop, June 2007.
- Dynamic Languages: Opportunities and Challenges, Invited Distinguished Lecture, University of Utah, Salt Lake, April 2007.

- O Java, Java! Wherefore art thou Java? Invited, Workshop on Computer Architecture Evaluation using Commercial Workloads (CAECW), Phoenix, Arizona, January 2007.
- Software Developer Dreams, Invited, Workshop on Compiler Research Future Directions, Los Angeles California, February 2007.
- Methodology Challenges and Optimization Opportunities for Java, Invited, Java Users Group, Austin, TX, February, 2007.
- Compiling for EDGE Architectures: The TRIPS Prototype Compiler, Rice University, Houston TX, October 2006.
- Convergent Compilation: Optimization in the Face of Software and Hardware Complexity, DARPA IPTO Heterogeneous Embedded Computing Systems (HECS) Workshop, Los Angeles CA, July 2006.
- Compilation Basics and How to Give a Bad Talk, CRA-W/CDC Computer Architecture Workshop for Graduate Students, Princeton NJ, July 2006.
- Convergent Compilation: Modern Software for Modern Hardware, Symposium on Tools for Multi Core Systems, NY NY, March 2006.
- Modern Software and Modern Architecture, IBM Watson, Hawthorn NY, Feb 2006; AMD, Austin TX, March 2006.
- Transient Cache Design, IBM Austin, Austin TX, Feb 2006.
- Design and Implementation of the TRIPS Architecture, ISCA Tutorial, Madison WI, June 2005; HPCA Tutorial, Austin TX, January 2006.
- Cache Memory Design for Java Programs, IBM, Austin TX, August 2005.
- A Collision Course: Modern Software and Modern Architecture, Intel, Portland OR, August 2005.
- Compiler Structure and Unrolling for TRIPS DARPA review, Boulder CO, August 2005.
- Compiling for TRIPS DARPA review, Austin TX, May 2005.
- 10 Ways to Succeed and 10 Ways to Fail in Graduate School, CRA Mentor Workshop for First and Second Year Women Graduate Students, San Francisco, February 2005.
- Modern Cache Architecture for Modern DaCapo Winter Meeting, Boulder CO, January 2005.
- Keynote: Polar Opposites: Next Generation Languages and Architectures, Workshop on Management System Performance (MSP), Washington DC, June 2004.
- Combining Cooperative Software/Hardware Prefetching and Cache Replacement, IBM CAS Workshop, Austin, February 2004.
- Next Generation Garbage Collection: Algorithms and Performance Analysis, Cray Research, Seattle, February 2004.
- Garbage Collection: The Next Generation. Microsoft Research, Seattle, January 2003, University of Massachusetts, Amherst, September 2003, University of Washington, Seattle, February 2004.
- Personal Networking. CRA Workshop on Research Careers for Women in Computer Science and Engineering, Atlanta, April 1999, CRA Workshop for First Year Graduate Students, Seattle, February 2004.
- Women Scientists at UT. Panelist, October 2003.
- Cooperative Caching: Hardware and Software Together at Last. University of Colorado, Boulder, August 2003.
- Getting an Academic Job. Featured speaker and panelist. Journey to Academia Workshop, sponsored by Women in Natural Sciences at the University of Texas, Austin, August 2003.
- Getting a Job. Panelist for Computing Research Association (CRA) Career Workshop, San Diego, June 2003.
- Memory Management. First Bytes summer camp for High School girls, Austin, June 2003.
- The Memory Bottleneck. IBM Austin Research Laboratory, February 2003. Cray Research, Seattle, January 2003.
- Memory Systems and Memory Management. Sun Microsystems, Austin, August 2002.
- Improving Memory Performance for Java. CRA Distinguished Lecturer. University of California, Irvine, February 2001. Carnegie Mellon University, December 2000.
- Improving Memory Performance for Java. Michigan Technological University, December 2000.

- Partial Collection Replication versus Caching for Information Retrieval Systems. The ACM SIGIR International Conference on Research and Development in Information Retrieval, Athens Greece, July 2000.
- The Impulse Memory Controller. Data Intensive Systems Symposium, DARPA, Phoenix, May 2000.
- Understanding, Exploiting, and Improving Data Locality. University of Texas, March 2000.
- Older-first Garbage Collection. University of Texas, March 2000. IBM Austin, March 2000. University of Paris, South, April 2000.
- Replication for IR Systems: Effectiveness and Performance. CIIR Industrial Advisory Board meeting, May 1999.
- Panel moderator. Compiler Infrastructure for the Twenty-First Century. Compaq symposium, Nashua, January 1999.
- Age-Based Garbage Collection. MIT, Cambridge, August 1998. IBM, T.J. Watson Research, Hawthorne, August 1998.
- Quantifying Loop Nest Locality Using SPEC'95 and the Perfect Benchmarks. Compaq Computer, Nashua, August 1998. Center for Computing Sciences, Bowie, June 1998.
- Using Types in Object-Oriented Program Analysis and Optimization, University of Virginia, June 1998.
- Understanding and Improving the Performance of Modern Programming Languages. Williams College, Williamstown, MA, October 1997. Universitat Politecnica de Catalunya, Spain, August 1997.
- A Quantitative Analysis of Loop Nest Locality. Digital Equipment, Nashua, May 1997. Hewlett Packard, Chelmsford, MA November 1996. The 7th International Conference on Architectural Support for Programming Languages and Operating Systems, Boston, October 1996.
- Compiling for a Moving Target. DARPA, December 1996. IBM, T.J. Watson Research, Yorktown Heights, November 1996.
- Loop Fusion and Cross Loop Locality., Digital Equipment, Nashua, March 1996.
- Time Management. Workshop on Academic Careers for Women Panel, Washington D.C., November 1995.
- Tile Size Selection Using Cache Organization and Data Layout. SIGPLAN 1995 Conference on Programming Language Design and Implementation, La Jolla, June 1995, Hewlett-Packard Laboratories, Cambridge, April 1995.
- Improving Short and Long Term Reuse for Cache Memories. Hewlett Packard, Cambridge, April 1995.
- Compiler Optimizations for Improving Data Locality. SGI, San Jose, July 1994. Hewlett Packard, Palo Alto, July 1994. The Sixth International Conference on Architectural Support for Programming Languages and Operating Systems, San Jose, October 1994.
- Evaluating Automatic Parallelization for Efficient Execution on Shared-Memory Multiprocessors. International Conference on Supercomputing, Manchester, England, July 1994.
- Compiler and Tool Support for Machine Independent Programming. CSPI, Billerica, MA, May 1994.
- Compiler Optimizations for Improving Data Locality and Exploiting Parallelism. MIT, Cambridge, June 1994. Digital Equipment, Nashua, May 1994. Hewlett Packard, Chelmsford, August 1994. Dartmouth, Hanover, November 1994.
- A New Programming Translation Framework for High Performance Homogeneous and Heterogeneous Systems. Digital Equipment, Nashua, February 1994.
- Experiences using the ParaScope Editor: An Interactive Parallelization Tool. Ecole Nationale Superieure des Mines de Paris, Fontainebleau, France, June 1993. Symposium on Principles and Practice of Parallel Programming, San Diego, May 1993.
- Automatic and Interactive Parallelization. KSR, Boston, November 1993. Ecole Normale Superieure de Lyon, Lyon, France, February 1993. Siemens, Munich, Germany, February 1993. Tera Computer, Seattle, September 1992. Intel, Portland, September 1992.
- Automatic and Interactive Parallelization. In the spring of 1993, I gave interview talks at Bell Labs, Brown University, IBM Santa Teresa, University of Maryland, University of Massachusetts at Amherst, University of Rochester, University of Texas at Austin, University of Utah, and University of Washington at Seattle.
- Optimizing for Parallelism and Data Locality. INRIA, Rocquencourt, France, January 1993. Elf Aquitaine, Pau, France, November 1992. University of Washington, Seattle, September 1992. International Conference on Supercomputing, Washington, D.C., July 1992.

- The ParaScope Editor. Elf Aquitaine, Pau, France, November 1992.
- Analysis and Transformation in the ParaScope Editor. International Conference on Supercomputing, Cologne, Germany, June 1991.
- Loop Distribution with Arbitrary Control Flow. Supercomputing 90, NY, NY, November 1990.
- The ParaScope Editor: An Interactive Parallelization Tools. Supercomputing 89, Reno, November 1989.

## COURSES

### The University of Texas at Austin

2011 Spring	CS395T,	Memory Management. 3 credits.
2010 Spring	CS352	Computer Systems Architecture. 3 credits
2009 Fall	CS380C	Advanced Compiler Techniques. 3 credits
2009 Spring	CS395T,	Memory Management. 3 credits.
2008 Fall	CS380C	Advanced Compiler Techniques. 3 credits
2007 Spring	CS305j	Introduction to Computing. 4 credits
2006 Fall	CS380C	Advanced Compiler Techniques. 3 credits
2005 Fall	CS305j	Introduction to Computing. 4 credits
2005 Spring	CS372	Operating Systems. 3 credits
2004 Fall	CS380C	Advanced Compiler Techniques. 3 credits
2004 Spring	CS372	Operating Systems. 3 credits
2003 Fall	CS395T,	Memory Management. 3 credits.
2003 Spring	CS372	Operating Systems. 3 credits
2003 Spring	CS395T,	Binary Editing and Dynamic Compilation. (with Lin & C Moore) 3 credits.
2002 Fall	CS380C	Advanced Compiler Techniques. 3 credits
2002 Spring	CS372	Operating Systems. 3 credits
2001 Fall	CS395T,	Advanced Topics in Compilers. (with Lin) 3 credits.

### University of Massachusetts, Amherst

2001 Spring	COMPSCI 791V,	Architectural Simulators. (with Moss) 1 credit.
2000 Fall	COMPSCI 710,	Advanced Compiler Techniques. 3 credits.
1999 Spring	COMPSCI 377,	Operating Systems. 4 credits.
	COMPSCI 791S,	Optimizing Java. (with Moss) 1 credit
1998 Fall	COMPSCI 710,	Advanced Compiler Techniques. 3 credits.
	COMPSCI 791N,	Scheduling. (with Moss) 1 credit
	Spring COMPSCI 791S,	Out-of-Core Algorithms. (with Moss) 1 credit
1997 Fall	COMPSCI 377,	Operating Systems. 4 credits.
	COMPSCI 791M,	Garbage Collection. (with Moss) 1 credit.
1997 Spring	COMPSCI 377,	Operating Systems. 3 credits.
	COMPSCI 791U,	Compiler Dependence and Pointer Analysis. (with Moss) 1 credit.
1996 Fall	COMPSCI 377,	Operating Systems. 3 credits. <i>Fully revised.</i>
	Fall COMPSCI 691B,	Parallel Programming. (with Weems) 3 credits.
	Spring COMPSCI 710,	Advanced Translator Design. 3 credits.
1995 Spring	COMPSCI 710,	Advanced Translator Design. 3 credits.
	Fall COMPSCI 610,	Translator Design. (with Moss) 3 credits
1994 Spring	COMPSCI 710,	Advanced Translator Design. 3 credits. <i>New Course.</i>
	Fall COMPSCI 610,	Translator Design. (with Moss) 3 credits
	COMPSCI 791M,	Compiler Architecture. (with Moss and Weems) 3 credits.
1993 Fall	COMPSCI 791S,	Compiler Optimization for High Performance Architectures. 3 credits
	COMPSCI 691R,	Linguistic Support for Heterogeneous Parallel Processing. (with Moss and Weems) 3 credits.

## GRANTS and GIFTS

- *TWC: Small: Finding and Repairing Semantic Vulnerabilities in Modern Software*, co-PI with Vitaly Shmatikov (PI), \$499,930, NSF (9/2012-8/2015).
- *NSF SHF:Large:Collaborative Research: PASS: Perpetually Available Software Systems*, PI, joint with M. Hicks

- (UMD) and E. Berger (UMass). \$2,282,376 (UT share \$1,000,956), NSF (9/2009-8/2015).
- *SHF:Small:Collaborative Research: Languages and Tools for Multilingual Systems*, PI, joint with R. Grimm (NYU). \$500,000 (UT share \$200,000), NSF (8/2010-9/2013).
  - *NSF CSR:Small: Scalable Applications Start with Scalable Virtual Machine Services*, PI, \$499,996, NSF (8/2009-7/2012).
  - *NSF CCF: Efficient Dynamic Analysis for Detecting and Tolerating Program Anomalies*, PI, \$399,450, NSF (8/2008-7/2011).
  - *Workload Characterization for PHP*, \$140,000, Intel, 2010-2012.
  - *Optimizing VM Services For Next Generation Client Platforms*, joint with S. Blackburn (ANU), \$75,000, Google, 2009-2010. (\$25,000 at UT).
  - *Scalable Virtual Machine Services*, joint with S. Blackburn (ANU), \$100,000, Google, 2008-2009.
  - *Evaluation Infrastructure for Parallel Systems: Benchmarks Tools, and Experimental Design*, joint with S. Blackburn (ANU), \$120,000, Intel 2008-2009.
  - *Automation of Source Code Analysis*, PI, \$65,000, CISCO 2008.
  - *NSF CSR-AES: Optimizations for Optimistic Parallelization Systems*, co-PI with K. Pingali (PI) and G. Gao (Delaware), \$600,000, NSF (7/2007-7/2011),
  - *NSF Next Generation Garbage Collection*, PI, \$611,979 NSF (12/2004-12/2009). Supplement: \$100,000, 2007.
  - *Extension to TeraOp Reliable Intelligently adaptive Processing System (XTRIPS)*, co-PI with S. Keckler (PI) and Doug Burger, \$4,303,874, DARPA (10/2005-12/2008).
  - *Cross Platform Performance Analysis of Java Workloads*, PI, \$17,500, IBM Faculty Award, 2008.
  - *Exploring the Interactions of JVMs, Architectures, and Java Workloads*, PI, \$25,000, IBM Faculty Award, 2007.
  - *Tools for Java Reliability and Performance*, PI, \$40,000, Intel 2007.
  - *RI: Mastodon: A Large-Memory, High-Throughput Scientific Infrastructure*, co-PI with R. Miikkulainen (PI) and others, \$1,418,231 NSF (CISE Research Infrastructure), (9/2003-8/2008).
  - *Exploiting Multi-core for Bug Detection and Correction*, PI, \$75,000, Microsoft, 2006.
  - *Tools for Java Reliability and Performance on Many Core Architectures*, PI, \$40,000, Intel, 2006.
  - *Transient Cache Design*, PI, \$25,000, IBM Faculty Award, 2006.
  - *Expanding Write Buffer Duties*, PI, \$25,000, IBM Faculty Award, 2005.
  - *Cooperative Software/Hardware Caching for Future Memory Systems*, PI, \$25,000, IBM Faculty Award, 2004.
  - *Closing the Memory Gap for Future Memory Systems*, PI, \$25,000, IBM Faculty Award 2003.
  - *NSF Compiling for and Designing Next Generation Memory Systems*, PI with D. Burger and S. Keckler, \$357,910, NSF (6/2003-5/2006).
  - *NSF ITR:Medium Designing a Programming Environment for Network Systems*, co-PI with H. Vin (PI) and others, \$500,000, NSF (9/2003-8/2007).
  - *TRIPS: The Tera-op Reliable Intelligently adaptive Processing System Implementation for Polymorphous Computer Architecture (PCA)*, co-PI with S. Keckler (PI) and others, \$7,617,912, DARPA (6/2003-12/2005).
  - *The Programmable Easy-To-Use, Reliable Computing System*, co-PI with D. Burger (PI) and others, \$2,517,891, DARPA (9/2003-8/2006).
  - *NSF ITR:Large Dynamic Cooperative Performance Optimization*, co-PI with E. Moss (PI) and others, \$3,156,903, NSF (9/2000-8/2005).
  - *TRIPS: The Tera-op Reliable Intelligently adaptive Processing System*, co-PI with S. Keckler (PI) and others, \$3,550,480, DARPA (6/2001-5/2003).
  - *Women in Computer Science*, \$5000, Microsoft, 2002.
  - *Compilers as Cartographers; Architectures as Navigators*, PI with C. Weems, \$205,428, NSF (1/2000-12/2001).
  - *Compiling for an Impulse Memory Controller*, PI with C. Weems and E. Moss, subcontract from the University of Utah, \$1,091,435, DARPA, (5/1999-8/2002)

- *Improving Memory Performance*, PI, \$457,463 Equipment gift, Compaq Computer, 1998.
- *Automatic Interpretation of High-Altitude Image Data for Eco-System Modeling*, co-PI with E. Riseman (PI) and others, \$1,800,000, NSF (2/1998-3/2001).
- *Compiling for Heterogeneous Systems*, PI, \$200,000, NSF CAREER Award (6/1996-5/2000).
- *Infrastructure for Distributed Multimedia Information Systems*, co-PI with J. Kurose (PI) and others, \$1,480,654, NSF (7/1995-6/2000).
- *Improving Uniprocessor Locality*, PI, \$200,000 equipment gift, Digital Equipment, 1996.
- *Commercialization of DoD IUA Vision Computer*, co-PI, \$180,000, subcontracted from Amerinex Artificial Intelligence, Inc., Darpa, (5/1995-8/1997).
- *Improving Cache Performance for Uniprocessors*, PI, \$18,000, NSF (9/1995-8/1996).
- *Improving Cache Performance of Uniprocessors*, PI, \$4000, University of Massachusetts Faculty Research Grant (4/1995-3/1996).

## **PERSONAL**

I am married to Scotty Strahan, an artist. We have three sons, Cooper (1995), Dylan (1998), and Wyatt (2001). Our family shares a passion for ice hockey. I enjoy circuit training, running, biking, step, dancing, and poker.