



Bruce R. Childers

Updated December 19, 2011

Professional Interests

Software dynamic translation, compilers and software development tools, computer architecture, power/energy management, and embedded systems.

Education

- 2000 **Ph.D., Computer Science**, *University of Virginia*, Charlottesville, Virginia.
Thesis title: *Custom Embedded Counterflow Pipelines*
Advisor: Dr. Jack W. Davidson
- 1991 **B.S., Computer Science**, *College of William and Mary*, Williamsburg, Virginia.
Thesis title: *Source Code Compaction*
Advisor: Dr. Phil Kearns
Graduated cum laude

Positions Held

- 2006–Present **Associate Professor**, *Computer Science Department, University of Pittsburgh.*
- 2000–2006 **Assistant Professor**, *Computer Science Department, University of Pittsburgh.*
- 2000–Present **Secondary Faculty Appointment**, *Computer Engineering Program (Graduate & Undergraduate)*, University of Pittsburgh.

Honors and Awards

Research

- 2011–2012 **Nominated for Chancellor's Distinguished Research Award**, *Junior Scholar Award.*
- 2010–2011 **Nominated for Chancellor's Distinguished Research Award**, *Junior Scholar Award.*
- 2001–2002 **IBM Faculty Partnership Award**, *IBM Austin Center for Advanced Studies.*
- 2000–2001 **IBM Faculty Partnership Award**, *IBM Austin Center for Advanced Studies.*
- 1990–1991 **Honors**, *College of William and Mary*, Source Code Compaction.

Teaching

- 2009–2010 **CSD Teaching Award**, *CS 447 Computer Organization.*
- 2007–2008 **CSD Teaching Award**, *CS 1541 Introduction to Computer Architecture.*
- 2001–2002 **CSD Teaching Award**, *CS 3410 Computer Architecture Seminar.*
- 2000–2001 **CSD Teaching Award**, *CS 3410 Computer Architecture Seminar.*

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Publications

Notation [*index,percentage*] gives *section–paper index* to dossier and *acceptance rate* when known.

Book Chapters

Dakai Zhu, Bruce R. Childers, Daniel Mossé and Rami Melhem, “Power Aware Mapping of Real-Time Tasks to Multiprocessors”, *The Handbook of Parallel Computing: Models, Algorithms, and Applications*, Edited by Sanguthevar Rajasekaran et al., CRC Press, 2006 [B–1]

Nevine AbouGhazaleh, Daniel Mossé, Bruce Childers, and Rami Melhem, “Compilers and Operating Systems for Low Power”, Kluwer Academic Publishers, ISBN 1-4020-7573-1, 2003 [B–2]

Journal

- TECS José A. Baiocchi, Bruce R. Childers, Jack W. Davidson and Jason Hiser, “Enabling DBT in Embedded Systems with Scratchpad Memory”, *ACM Transactions on Embedded Computing Systems*, Recommended minor revisions (September 2009), revisions submitted (October 24, 2009), accepted December 2011, camera-ready copy being prepared [J–1]
- TACO Miao Zhou, Santiago Bock, Alexandre Ferreira, Bruce R. Childers, Daniel Mossé, and Rami Melhem, “Writeback-aware Partitioning and Replacement for Last-Level Caches in Phase Change Main Memory Systems”, *ACM Transactions on Architecture and Compiler Optimization, Special Issue on High-Performance and Embedded Architectures and Compilers*, Paris, France, January 2012, accepted at HiPEAC for publication in ACM TACO (minor revisions, August 2011, and accepted November 2011) [J–2]
- TACO Jason D. Hiser, Daniel W. Williams, Wei Hu, Jack W. Davidson, Jason Mars and Bruce R. Childers, “Evaluating Indirect Branch Handling Mechanisms in Software Dynamic Translation Systems”, *ACM Transactions on Architecture and Compiler Optimization*, Vol. 8, Num. 2, pp. 1-28, June 2011 [J–3]
- TACO Hyunjin Lee, Sangyeun Cho and Bruce R. Childers, “DEFCAM: A Design and Evaluation Framework for Defect-Tolerant Cache Memories”, *ACM Transactions on Architecture and Compiler Optimization*, Accepted June 2011, appeared in Vol. 8, Num. 3, pp. 17:1–17:29, October 2011. [J–4]
- TOPLAS Yuqiang Huang, Bruce R. Childers and Mary Lou Soffa, “Detecting Bugs in Register Allocation”, *ACM Transactions on Programming Languages and Systems*, Vol. 32, Num. 4, pp. 1-36, April 2010 [J–5]
- TC Hyunjin Lee, Sangyeun Cho and Bruce R. Childers, “PERFECTION: A Fault-Tolerant Directory Memory Architecture”, *IEEE Transactions on Computers*, Accepted May 2009, appeared in Vol. 59, Num. 5, pp. 638-650, May 2010 [J–6]
- HPSA Mauricio L. Pilla, Bruce R. Childers, Felipe M.G. Franca, Amarildo T. Da Costa, Philippe O.A. Navaux, “Limits for a feasible speculative trace reuse implementation”, *Int’l. Journal of High Performance Systems Architecture*, InderScience Publishers, Vol. 1, Num. 1, pp. 69-76, 2007 [J–7]
- TC Nevine AbouGhazaleh, Bruce R. Childers, Daniel Mossé and Rami Melhem, “Near-Memory Caching for Improved Energy Consumption”, *IEEE Transactions on Computers*, Vol. 56, Num. 11, pp. 1441-1455, November 2007 [J–8]

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- TACO Min Zhao, Bruce R. Childers, and Mary Lou Soffa, "An Approach toward Profit-driven Optimization", *ACM Transactions on Architecture and Compiler Optimization*, Accepted May 2006, appeared in Vol. 3, Num. 3, pp. 231-262, September 2006 [J-9]
- IJES Nevine AbouGhazaleh, Bruce R. Childers, Daniel Mossé, Rami Melhem, "Power Management in External Memory using Power-Aware Cached-DRAM", *Int'l. Journal on Embedded Systems*, Accepted January 2006, appeared in Vol. 3, Num. 1/2, pp. 65-72, InderScience, 2007 [J-10]
- TECS Nevine AbouGhazaleh, Daniel Mossé, Bruce R. Childers, and Rami Melhem, "Collaborative Operating System and Compiler Power Management for Real-Time Applications", *ACM Transactions on Embedded Computing Systems*, appeared in Vol. 5, Num. 1, pp. 82-115, February 2006 [J-11]
- IJPP Naveen Kumar, Bruce R. Childers, Daniel Williams, Jack W. Davidson, and Mary Lou Soffa, "Compile-time planning for overhead reduction in software dynamic translators", *Int'l. Journal on Parallel Programming*, appeared in Vol. 33, Num. 2/3, pp. 103-114, June 2005 [J-12]
- JMM Bruce R. Childers and Jack W. Davidson, "An Infrastructure for Designing Custom Embedded Wide Counterflow Pipelines", *Journal of Microprocessors and Microsystems*, Accepted July 2004, appeared in Vol. 29, Num. 1, pp. 27-40, February 2005 [J-13]
- TC Bruce R. Childers and Jack W. Davidson, "Custom Wide Counterflow Pipelines for High Performance Embedded Applications", *IEEE Transactions on Computers*, Accepted January 2003, appeared in Vol. 53, Num. 2, pp. 141-158, February 2004 [J-14]
- TPDS Daki Zhu, Rami Melhem and Bruce R. Childers, "Scheduling with Dynamic Voltage/Speed Adjustment Using Slack Reclamation in Multi-processor Real-Time Systems", *IEEE Transactions on Parallel and Distributed Systems*, Accepted January 2003, appeared in Vol. 14, Num. 7, pp. 686-700, July 2003 [J-15]

Conference (Refereed)

- ISPASS Ryan Moore and Bruce R. Childers, "Using Utility Prediction Models to Dynamically Choose Program Thread Counts", *IEEE Int'l. Symp. on Performance Analysis of Systems and Software*, New Brunswick, New Jersey (paper accepted, final version being prepared), April 2012 [C-1]
- VEE Tanima Dey, Wei Wang, Ryan Moore, Mahmut Aktasoglu, Bruce R. Childers, Jack W. Davidson, Mary Jane Irwin, Mahmut Kandemir, Mary Lou Soffa, "C-DEM: A Customizable Virtual Execution Manager for Multicore Platforms", *ACM Int'l. Conf. on Virtual Execution Environments*, London, United Kingdom (accepted December 2011, camera-ready copy being prepared), March 2012 [C-2]
- HPCA Lei Jiang, Bo Zhao, Youtao Zhang, Jun Yang, and Bruce R. Childers, "Improving Write Operations in MLC Phase Change Memory", *18th Int'l. Symp. on High-Performance Computer Architecture*, New Orleans, Louisiana (accepted December 2011, camera-ready copy being prepared), February 2012 [C-3]
- ICESS Miao Zhou, Santiago Bock, Alexandre Ferreira, Bruce R. Childers, Daniel Mossé, and Rami Melhem, "Real-Time Scheduling for Phase Change Main Memory Systems", *8th IEEE Int'l. Conf. on Embedded Software and Systems*, Changsha, China (received **Best Paper Award**), November 2011 [C-4]

- PRDC Musfiq Rahman, Bruce R. Childers and Sangyeun Cho, "COMeT: Continuous On-line Memory Test", *17th IEEE Pacific Rim Int'l. Symp. on Dependable Computing*, Pasadena, California, December 2011 [C-5]
- PPPJ Jonathan Misurda, Bruce R. Childers and Mary Lou Soffa, "Jazz2: A Flexible and Extensible Framework for Structural Testing in a Java VM", *9th Int'l. Conf. on the Principles and Practice of Programming in Java*, Copenhagen, Denmark, August 2011 [C-6]
- DSN Lei Jiang, Yu Du, Youtao Zhang, Bruce R. Childers and Jun Yang, "LLS: Cooperative Integration of Wear-Leveling and Salvaging for PCM Main Memory", *41st Int'l. Conf. on Dependable Systems and Networks*, pp. 221-232, Hong Kong, China, June 2011 [C-7, 17.6%]
- SEAMS Ryan Moore and Bruce R. Childers, "Inflation and Deflation of Self-Adaptive Applications", *6th Int'l. Symp. on Software Engineering for Adaptive and Self-Managing Systems*, pp. 228-237, Waikiki, Honolulu, Hawaii, May 2011 [C-8, 27.2%]
- ISPASS Santiago Bock, Bruce R. Childers, Rami Melhem, Daniel Mossé, and Youtao Zhang, "Analyzing the Impact of Useless Write-backs on Endurance and Energy Consumption of PCM Main Memory", *IEEE Int'l. Symp. on Performance Analysis of Systems and Software*, pp. 56-65, Austin, Texas, April 2011 [C-9, 38%]
- HPCA Hyunjin Lee, Sangyeun Cho and Bruce R. Childers, "CloudCache: Expanding and Shrinking Private Caches", *17th Int'l. Symp. on High-Performance Computer Architecture*, pp. 219-230, San Antonio, Texas, February 2011 [C-10, 19%]
- DATE José A. Baiocchi and Bruce R. Childers, "Demand Code Paging for NAND Flash in MMU-less Embedded Systems", *Design Automation and Test in Europe*, Grenoble, France, March 2011 [C-11, 25.5%]
- DATE Alexandre Ferreira, Santiago Bock, Bruce R. Childers, Rami Melhem and Daniel Mossé, "Impact of Process Variation on Endurance Algorithms for Wear-Prone Memories", *Design Automation and Test in Europe*, Grenoble, France, March 2011 [C-12, 25.5%]
- RV Musfiq Rahman, Bruce R. Childers and Sangyeun Cho, "StealthWorks: Emulating Errors in Memory", *Int'l. Conf. on Runtime Verification*, pp. 360-367, Malta, November 2010 (Tool paper) [C-13]
- RTAS Alexandre P. Ferreira, Bruce R. Childers, Rami Melhem, Daniel Mossé and Mazin Yousif, "Using PCM in Next-Generation Embedded Space Applications", *IEEE Real-Time and Embedded Technology and Applications Symp.*, pp. 153-162, Stockholm, Sweden, April 2010 [C-14, 22%]
- DATE Alexandre P. Ferreira, Miao Zhou, Santiago Bock, Bruce R. Childers, Rami Melhem and Daniel Mossé, "Increasing PCM Main Memory Lifetime", *Design, Automation and Test in Europe*, pp. 914-919, Dresden, Germany, March 2010 [C-15, 26.8%]
- HPCA Hyunjin Lee, Sangyeun Cho and Bruce R. Childers, "StimulusCache: Boosting Performance of Chip Multiprocessors with Excess Cache", *16th Int'l. Symp. on High-Performance Computer Architecture*, pp. 1-12, Bangalore, India, January 2010 [C-16, 18.3%]
- DAC José A. Baiocchi and Bruce R. Childers, "Heterogeneous Code Cache: Using Scratchpad and Main Memory in Dynamic Binary Translators", *46th Design Automation Conf.*, pp. 744-749, San Francisco, California, July 2009 [C-17, 21.7%]

- DCOSS Weijia Li, Youtao Zhang and Bruce Childers, "MCP: An Energy-Efficient Code Distribution Protocol for Multi-Application WSNs", *Int'l. Conf. on Distributed Computing in Sensor Systems*, pp. 259–272, Marina Del Rey, California, June 2009 [C–18, 22.4%]
- LCOTES Ryan W. Moore, José A. Baiocchi, Bruce R. Childers, Jack W. Davidson, Jason D. Hiser, "Addressing the Challenges of DBT for the ARM Architecture", *ACM Conf. on Languages, Compilers and Tools for Embedded Systems*, pp. 147–156, Dublin, Ireland, June 2009 [C–19, 22%]
- CC Min Zhao, Bruce R. Childers, Mary Lou Soffa, "A Framework for Exploring Optimization Properties", *Int'l. Conf. on Compiler Construction*, pp. 32–47, York, United Kingdom, March 2009 [C–20, 25%]
- CGO Naveen Kumar, Bruce R. Childers, Mary Lou Soffa, "Transparent Debugging of Dynamically Optimized Code", *ACM/IEEE Int'l. Symp. on Code Generation and Optimization*, pp. 275–286, Seattle, Washington, March 2009 [C–21, 37%]
- CASES José A. Baiocchi, Bruce R. Childers, Jack W. Davidson and Jason Hiser, "Reducing Pressure in Bounded DBT Code Caches", *Int'l. Conf. on Compilers, Architecture and Synthesis for Embedded Systems*, pp. 109–118, Atlanta, Georgia, October 2008 [C–22, 42.2%]
- VEE Takashi Okumura, Bruce Childers and Daniel Mossé, "Running a Java VM inside an Operating System Kernel: A Networking Case Study", *ACM Int'l. Conf. on Virtual Execution Environments*, pp. 168–173, Seattle, Washington, March 2008 [C–23, 34%]
- HiPEAC Nevine AbouGhazaleh, Bruce R. Childers, Daniel Mossé, and Rami Melhem, "Integrated CPU and Cache Power Management", *Int'l. Conf. on High-Performance Embedded Architectures and Compilers*, pp. 209–223, Goteborg, Sweden, January 2008 [C–24]
- EUC Weijia Li, Yu Du, Youtao Zhang, Bruce Childers, Ping Zhou, and Jun Yang, "Adaptive Buffer Management for Efficient Code Dissemination in Multi-Application Wireless Sensor Networks", *IEEE Int'l. Conf. on Embedded and Ubiquitous Computing*, pp. 295–301, Shanghai, China, December 2008 [C–25, 40%]
- ICCD Hyunjin Lee, Sangyeun Cho, and Bruce R. Childers, "Exploring the Interplay of Yield, Area and Performance in Processor Caches", *IEEE Int'l. Conf. on Computer Design*, pp. 216–223, Lake Tahoe, CA, October 2007 [C–26, 32%]
- CASES José A. Baiocchi, Bruce R. Childers, Jack W. Davidson, Jason Hiser and Jonathan Misurda, "Fragment Cache Management for Dynamic Binary Translators in Embedded Systems with Scratchpad", *Int'l. Conf. on Compilers, Architecture and Synthesis for Embedded Systems*, pp. 75–84, Salzburg, Austria, October 2007 [C–27, 42.8%]
- LCOTES Nevine AbouGhazaleh, Alexandre Ferreira, Frank Liberato, Bruce R. Childers, Daniel Mossé and Rami Melhem, "Integrated CPU and L2 Cache Voltage Scaling using Machine Learning", *ACM Conf. on Languages, Compilers, and Tools for Embedded Systems*, pp. 41–50, San Diego, California, June 2007 [C–28, 28%]
- ISVLSI Hyunjin Lee, Sangyeun Cho and Bruce R. Childers, "Performance of Graceful Degradation for Cache Faults", *IEEE Int'l. Symp. on VLSI*, pp. 409–415, Porto Alegre, Brazil, May 2007 [C–29, 38.2%]
- CGO Jason D. Hiser, Daniel Williams, Wei Hu, Jack W. Davidson, Jason Mars, Bruce R. Childers, "Evaluating Indirect Branch Handling Mechanisms in Software Dynamic Translation Systems", *ACM/IEEE Int'l. Symp. on Code Generation and Optimization*, pp. 61–73, San Jose, California, March 2007 [C–30, 32%]

- SBAC-PAD Mauricio Pilla, Bruce R. Childers, Philippe Navaux, Felipe Franca, and Amarildo da Costa, "A Speculative Trace Reuse Architecture with Reduced Hardware Requirements", *IEEE Int'l. Symp. on Computer Architecture and High Performance Computing (SBAC-PAD)*, pp. 47–54, Ouroto, Brazil, October 2006 [C–31, 31%]
- SAS Yuqiang Huang, Bruce R. Childers, and Mary Lou Soffa, "Catching and Identifying Bugs in Register Allocation", *Int'l. Static Analysis Symp.*, pp. 281–300, Seoul, Korea, August 2006 [C–32, 28%]
- VEE Jason D. Hiser, Daniel Williams, Adrian Filipi, Jack W. Davidson, and Bruce R. Childers, "Evaluating Fragment Creation Policies for SDT Systems", *Int'l. Conf. on Virtual Execution Environments*, pp. 122–132, Ottawa, Canada, June 2006 [C–33, 41%]
- ICCD Nevine AbouGhazaleh, Bruce R. Childers, Daniel Mossé, Rami Melhem, "Near-memory Caching for Improved Energy Consumption", *IEEE Int'l. Conf. on Computer Design*, pp. 105–108, San Jose, California, October 2005 [C–34, 32%]
- AADEBUG Naveen Kumar, Bruce R. Childers, and Mary Lou Soffa, "TDB: A Source-Level Debugger for Dynamically Translated Programs", *ACM Sixth Int'l. Symp. on Automated and Analysis-Driven Debugging*, pp. 123–132, Monterey, California, September 2005 [C–35]
- VEE Shukang Zhou, Bruce R. Childers, Mary Lou Soffa, "Planning for Code Buffer Management in Distributed Virtual Execution Environments", *ACM/USENIX Conf. on Virtual Execution Environments*, pp. 100–109, Chicago, Illinois, June 2005 [C–36, 29%]
- CC J. Misurda, J. Clause, J. L. Reed, P. Gandra, B. R. Childers, and M. L. Soffa, "Jazz: A tool for demand-driven structural testing", *14th ETAPS Int'l. Conf. on Compiler Construction*, pp. 242–245, Edinburgh, Scotland, April 2005 (Tool paper) [C–37, 21%]
- ICSE Jonathan Misurda, James Clause, Juliya L. Reed, Bruce R. Childers, Mary Lou Soffa, "Demand-driven structural testing with dynamic instrumentation", *ACM SIGSOFT Int'l. Conf. on Software Engineering*, pp. 156–165, St. Louis, Missouri, May 2005 [C–38, 14%]
- CGO Min Zhao, Bruce R. Childers, Mary Lou Soffa, "A Model-based Framework: An Approach to Profit-Driven Optimization", *ACM/IEEE Int'l. Conf. on Code Generation and Optimization*, pp. 317–327, San Jose, California, March 2005 [C–39, 33%]
- SBAC-PAD Maurico L. Pilla, Philippe O. A. Navaux, Bruce R. Childers, Amarildo T. da Costa, and Felipe M. G. Franca, "Value Predictors for Reuse through Speculation on Traces", *IEEE 16th Symp. on Computer Architecture and High Performance Computing (SBAC-PAD)*, pp. 47–54, Foz do Igauçu, Brazil, October 2004 [C–40, 34%]
- DATE Shukang Zhou, Bruce R. Childers and Naveen Kumar, "Profile Guided Management of Code Partitions for Embedded Systems", *Conf. on Design, Automation and Test in Europe*, pp. 1396–1399 (Vol. 2), Paris, France, February 2004 (short) [C–41, 23%]
- SBAC-PAD Mauricio L. Pilla, Philippe O. A. Navaux, Amarildo T. da Costa, Felipe M. G. Franca, Bruce R. Childers, Mary Lou Soffa, "The Limits of Speculative Trace Reuse on Deeply Pipelined Processors", *IEEE 15th Symp. on Computer Architecture and High Performance Computing (SBAC-PAD)*, pp. 36–44, Sao Paulo/SP, Brazil, November 2003 [C–42, 30%]
- LCTES Min Zhao, Bruce R. Childers, and Mary Lou Soffa, "Predicting the Impact of Optimizations for Embedded Systems", *ACM Conf. on Languages, Compilers, and Tools for Embedded Systems*, pp. 1–11, San Diego, California, June 2003 [C–43, 23%]

- LC TES Nevine AbouGhazaleh, Bruce R. Childers, Daniel Mossé, Rami Melhem, and Matt Craven, “Energy Management for Real-Time Embedded Applications with Compiler Support”, *ACM Conf. on Languages, Compilers, and Tools for Embedded Systems*, pp. 284–293, San Diego, California, June 2003 [C–44, 23%]
- RTAS Nevine AbouGhazaleh, Daniel Mossé, Bruce R. Childers, Rami Melhem, and Matt Craven, “Collaborative Operating System and Compiler Power Management for Real-Time Applications”, *IEEE Real-Time/Embedded Technology and Applications Symp.*, pp. 133–141, Washington, DC, May 2003 [C–45, 30%]
- MSE Ivan Kourtev, Ray Hoare, Steve Levitan, Tom Cain, Bruce Childers, and Don Chiarulli, “Short Courses in System-on-a-Chip (SoC) Design”, *IEEE Int’l. Conf. on Microelectronic Systems Education*, pp. 126–127, Anaheim, California, June 2003 [C–46]
- CGO K. Scott, N. Kumar, S. Velusamy, B. Childers, J. Davidson, and M. L. Soffa, “Re-targetable and Reconfigurable Software Dynamic Translation”, *ACM SIGMICRO Int’l. Conf. on Code Generation and Optimization*, pp. 36–47, San Francisco, California, March 2003 [C–47, 32%]
- RTSS Daki Zhu, Rami Melhem and Bruce R. Childers, “Scheduling with Dynamic Voltage/Speed Adjustment Using Slack Reclamation in Multi-Processor Real-Time Systems”, *22nd IEEE Real-Time Systems Symp.*, pp. 84–94, London, UK, December 2001 [C–48, 21%]
- PACT Bruce R. Childers and Jack W. Davidson, “Custom Wide Counterflow Pipelines for High-Performance Embedded Applications”, *Int’l. Conf. on Parallel Architecture and Compilation Techniques*, pp. 57–68, October 2000 [C–49, 27%]
- HICSS Bruce R. Childers and Jack W. Davidson, “An Infrastructure for Designing Custom Embedded Counterflow Pipelines”, *Hawaii Int’l. Conf. on System Sciences*, pp. 1530–1605 (Vol. 8), Maui, Hawaii, January 2000 [C–50]
- ARVLSI Bruce R. Childers and Jack W. Davidson, “Architectural Considerations for Application-Specific Counterflow Pipelines”, *IEEE Conf. on Adv. Research in VLSI*, pp. 3–22, Atlanta, Georgia, March 1999 [C–51]
- HICSS Michael A. Alexander, Mark W. Bailey, Bruce R. Childers, Jack W. Davidson and Sanjay Jinturkar, “Memory Bandwidth Optimizations for Wide-Bus Machines”, *Hawaii Int’l. Conf. on System Sciences*, pp. 466–475 (Vol. 1), January 1993 [C–52]

Workshop (Refereed)

- SMART Nevine AbouGhazaleh, Alexandre Ferreira, Cosmin Rusu, Ruibin Xu, Bruce R. Childers, Rami Melhem and Daniel Mossé, “Integrated CPU and L2 Cache Frequency/Voltage Scaling using Supervised Learning”, *HiPEAC Workshop on Statistical and Machine Learning Approaches Applied to Architectures and Compilation*, Ghent, Belgium, January 2007 [W–1]
- WOSS Naveen Kumar, Jonathan Misurda, Bruce R. Childers, and Mary Lou Soffa, “Instrumentation in Software Dynamic Translators for Self-Managed Systems”, *ACM SIGSOFT Workshop on Self-Managed Systems*, pp. 90–94, Long Beach, California, October 2004 [W–2]
- ETX B. R. Childers, M. L. Soffa, J. Beaver, L. Ber, K. Cammarata, T. Kane, J. Litman, and J. Misurda, “SoftTest: A framework for software testing of Java programs”, *Eclipse Technology Exchange Workshop*, Anaheim, California, October 27, 2003 [W–3]

- Traces Naveen Kumar and Bruce R. Childers, "Flexible Instrumentation for Software Dynamic Translation", *Workshop on Exploring the Trace Space for Dynamic Optimization Techniques*, San Francisco, California, June 2003 [W-4]
- COLP Nevine AbouGhazaleh, Daniel Mossé, Bruce R. Childers, and Rami Melhem, "Toward The Placement of Power Management Points in Real Time Applications", *Workshop on Compilers and Operating Systems for Low Power*, October 2001 [W-5]
- Koolchips Bruce R. Childers, Hongliang Tang and Rami Melhem, "Adapting Processor Supply Voltage to Instruction-Level Parallelism", *Koolchips Workshop*, Monterey, California, December 2000 [W-6]
- FDDO Tarun Nakra, Bruce R. Childers, and Mary Lou Soffa, "Width-Sensitive Scheduling for Resource Constrained VLIW Processors", *ACM Workshop on Feedback-Directed and Dynamic Optimization*, Monterey, California, December 2000 [W-7]
- COLP Daniel Mossé, Hakan Aydin, Bruce R. Childers, and Rami Melhem, "Compiler-Assisted Dynamic Power-Aware Scheduling for Real-Time Applications", *Workshop on Compilers and Operating Systems for Low Power*, Philadelphia, Pennsylvania, October 2000 [W-8]
- LCTES Bruce R. Childers and Tarun Nakra, "Reordering Memory Bus Transactions for Reduced Energy Consumption", *ACM SIGPLAN Workshop on Languages, Compilers, and Tools for Embedded Systems*, pp. 146–161, Vancouver, Canada, June 2000 [W-9]
- CASES Bruce R. Childers and Jack W. Davidson, "Automatic Architectural Design of Wide-Issue Counterflow Pipelines", *Workshop on Compiler and Architecture Support for Embedded Systems*, Washington, DC, 1999 [W-10]
- LCTES Bruce R. Childers and Jack W. Davidson, "A Design Environment for Counterflow Pipeline Synthesis", *ACM SIGPLAN Workshop on Languages, Compilers, and Tools for Embedded Systems*, pp. 223–234 (Vol. 1474), Lecture Notes in Computer Science, Springer, June 1998 [W-11]
- INTERACT Bruce R. Childers, Jack W. Davidson, and Wm. Wulf, "Synthesis of Application-Specific Counterflow Pipelines", *Workshop on Interaction between Compilers and Computer Architecture*, San Jose, California, February 1996 [W-12]

Invited

- NGS Apala Guha, Jason D. Hiser, Naveen Kumar, Jing Yang, Min Zhao, Shukang Zhou, Bruce R. Childers, Jack W. Davidson, Kim Hazelwood, and Mary Lou Soffa, "Virtual Execution Environments: Support and Tools", *Workshop on Next Generation Software, Int'l. Symp. on Parallel and Distributed Systems*, pp. 1–6, Long Beach, California, March 2007 [I-1]
- NGS Jason D. Hiser, Naveen Kumar, Min Zhao, Shukang Zhao, Bruce R. Childers, Jack W. Davidson and Mary Lou Soffa, "Techniques and Tools for Dynamic Optimization", *NSF Next Generation Software Workshop*, Manhattan Beach, California, April 2006 [I-2]
- Dagstuhl Nevine AbouGhazaleh, Bruce R. Childers, Daniel Mossé, Rami Melhem, "Energy Conservation in Memory Hierarchies using Power-Aware Cached-DRAM", *Proceedings of the Schloss Dagstuhl Seminar on Power-Aware Computing Systems*, June 2005 [I-3]
- NGS Kevin Scott, Naveen Kumar, Bruce R. Childers, Jack W. Davidson, and Mary Lou Soffa, "Overhead reduction techniques for software dynamic translation", *NSF Next Generation Software Workshop, Int'l. Parallel and Distributed Processing Symp.*, Santa Fe, New Mexico, April 2004 [I-4]

NGS Bruce R. Childers, Jack W. Davidson and Mary Lou Soffa, "Continuous Compilation: A New Approach to Aggressive and Adaptive Code Transformation", *NSF Next Generation Software Workshop, Int'l. Parallel and Distributed Processing Symp.*, Nice, France, April 2003 [1–5]

Invited Talks

Hybrid Main Memory Systems for Energy-Efficient Computing, Rambus, Inc., Santa Clara, California (talk and tutorial), January 12, 2012

Cyberinfrastructure for Computer Architecture Research and Development, Computer Architecture Simulation Framework, Birds of a Feather, Supercomping 2011, Seattle, Washington, November 15, 2011

Commercially Available Chip Multiprocessors for Research, CRA-W/CDC Workshop on Multicore Computer Architecture Research, Newport Beach, California, March 6, 2011

Seminar on Emerging Paradigms and Uses for Dynamic Binary Translation, Schloss Dagstuhl - Leibniz Center for Informatics, Warden, Germany, October 26-31, 2008

Integrated CPU and L2 Cache Frequency/Voltage Scaling using Supervised Learning, Schloss Dagstuhl Seminar on Power-Aware Computing, Warden, Germany, January 23, 2007

Continuous Compilation for Aggressive and Adaptive Code Transformation, Center for Embedded Systems, University of California, Irvine, CA, May 13, 2005

Continuous Compilation for Aggressive and Adaptive Code Transformation, Department of Computer Science, North Carolina State University, Raleigh, NC, May 4, 2005

Continuous Compilation for Aggressive and Adaptive Code Transformation, Electrical and Computer Engineering and Computer Science, University of Rochester, Rochester, New York, March 31, 2005

Continuous Compilation for Aggressive and Adaptive Code Transformation, School of Electrical Engineering and Computer Science, Oregon State University, Corvallis, Oregon, February 17, 2005

Continuous Compilation: A New Approach to Aggressive and Adaptive Code Transformation, Pennsylvania State University, State College, PA, November 11, 2004

Continuous Compilation: A New Approach to Aggressive and Adaptive Code Transformation, COPPE – Systems Engineering and Computer Science Program, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil, July 1, 2004

Continuous Compilation: A New Approach to Aggressive and Adaptive Code Transformation, Instituto de Informatica, Federal University of Rio Grande do Sul, Porto Alegre, Brazil, June 29, 2004

Power-Aware Information Appliances, IBM Austin Center for Advanced Studies, Austin, Texas, February 2001

Reordering memory bus transactions for reduced power consumption, IBM Austin Research Lab, Systems Group, Austin, Texas, June 2000

Custom Counterflow Pipelines, Hewlett-Packard Inc., Performance Delivery Laboratory, Cupertino, California, March 1998

Application-Specific Counterflow Pipelines, Center for Computing Science, Institute for Defense Analysis, Bowie, Maryland, February 1998

Counterflow Pipeline Synthesis, Hewlett-Packard Inc., California Language Laboratory, Cupertino, California, August 1996

Student Advising

Ph.D. Theses Advised

Ryan Moore, *Dynamic Application Threading for Improved Performance*, University of Pittsburgh, passed proposal on December 15, 2011

Jon Misurda, *Efficient Branch and Node Testing*, University of Pittsburgh (Bruce Childers, Committee chair), graduated December 2011, employed at University of Pittsburgh as teaching faculty, Pittsburgh, Pennsylvania

José A. Baiocchi, *Dynamic Binary Translation for Embedded Systems with Scratchpad Memory*, University of Pittsburgh (Bruce Childers, Committee chair), graduated December 2011, employed at Intel as Software Engineer, Santa Clara, California

Yuqiang Huang, *Checking Static and Dynamic Optimizations*, University of Pittsburgh (Bruce Childers, Committee chair), admitted to candidacy, writing dissertation, employed at MicroStrategy, Tyson's Corner, Virginia

Hyunjin Lee, *Fault and Yield Aware On-Chip Memory Design and Management*, University of Pittsburgh (Bruce Childers, Committee co-chair and Sangyeun Cho, Committee co-chair), graduated August 2011, employed at Intel Labs, Microarchitecture Research Lab, as Software Engineer, Santa Clara, California

Alexandre Peixoto Ferreira, *The Design of a High Capacity and Energy Efficient Phase Change Main Memory*, University of Pittsburgh (Daniel Mossé, Committee chair and Bruce Childers, Committee co-chair), graduated April 2011, employed at IBM Research Austin as Post-Doctoral Researcher, Austin, Texas

Naveen Kumar, *Debugging Adaptive Code*, University of Pittsburgh (Bruce Childers, Committee chair and Mary Lou Soffa, Committee co-chair), graduated May 2008, employed at Intel as Engineering Manager (technical lead/architect), Santa Clara, California

Min Zhao, *Profit-Driven Optimization*, University of Pittsburgh (Bruce Childers, Committee chair and Mary Lou Soffa, Committee co-chair), graduated August 2006, employed at Hewlett-Packard as Senior Software Engineer, Cupertino, California

Other Ph.D. Theses Advised

I worked closely with and advised these students in group research.

Nevine AbouGhazaleh, *Power Management Techniques for Conserving Energy in Multiple System Components*, University of Pittsburgh (Rami Melhem, advisor, and Daniel Mossé, co-advisor), graduated May 2008 (acted as a mentor/advisor throughout dissertation in the PARTS group), employed at Intel Microarchitecture Research Labs, Hillsboro, Oregon.

Mauricio Lima Pilla, *Reuse through Speculation on Traces*, Computer Science Institute, Brazil (Pilippe O. A. Navauv, advisor, and Felipe M.G. Franca, co-advisor), visited the University of Pittsburgh in 2002-2003, graduated June 2004 (acted as a mentor/advisor at Pitt and during dissertation), employed at Universidade Federal de Pelotas, Rio Grande do Sul, Brazil as Assistant Professor

Ph.D. Students

These are junior Ph.D. students that have not been admitted to candidacy.

Musfiq Rahman, *Continuous Online Memory Testing*, University of Pittsburgh, passed comprehensive exam and completing dissertation proposal

Santiago Bock, University of Pittsburgh, passed preliminary exam

Miao Zhao, University of Pittsburgh, passed preliminary exam

Yu Du, University of Pittsburgh, passed preliminary exam

M.S. Projects

José Baiocchi, *Dynamic Translation for MIPS Processor Embedded Systems*, University of Pittsburgh, August 2007

Perry Rajnovic, *Instruction Set Support for Fast Indirect Branch Translation*, University of Pittsburgh, August 2007

Brian Smyth, *A Graphical User Interface for Structural Testing in Eclipse*, University of Pittsburgh, August 2005

Jonathan Misurda, *Demand-Driven Structural Software Testing with Dynamic Instrumentation*, University of Pittsburgh, April 2005

Jim Clause, *Demand-Driven Def-Use Testing*, University of Pittsburgh, Ph.D. student at Georgia Tech, April 2005

Shukang Zhou, *Code Buffer Management in Distributed Virtual Execution Environments*, University of Pittsburgh, December 2004

Juliya Litman, *An Integrated Code Coverage System for Software Test and Analysis*, University of Pittsburgh, April 2004, Microsoft

Haidong Xia, *Trace-Level Value Reuse*, University of Pittsburgh (co-advised with Mary Lou Soffa), December 2003

Joe Slember, *Program Profiling Primitives*, University of Pittsburgh (co-advised with Mary Lou Soffa), Ph.D. student at Carnegie Mellon University, December 2003

Sridhar Daita, *An API for Program Instrumentation in a Software Dynamic Translator*, University of Pittsburgh, December 2003

Nancy Miller, *Understanding and Controlling Static Leakage of Processor Functional Units*, University of Pittsburgh, April 2003, Carnegie Mellon University

Naveen Kumar, *Software Dynamic Translation on the MIPS/Irix Platform*, University of Pittsburgh, Ph.D. student at University of Pittsburgh, May 2002

Madhuri Vemulapalli, *Branch Coverage Analysis for Java Programs*, University of Pittsburgh (co-advised with Mary Lou Soffa), May 2001

Hongliang Tang, *Adapting Processor Supply Voltage to Instruction-Level Parallelism*, University of Pittsburgh, December 2001

Undergraduate Senior Projects and Independent Study

Matthew Monaco, *Senior capstone experience*, University of Pittsburgh, Computer Science undergraduate, Summer/Fall 2011

Christian DeLozier, *Graphical User Interface for Memory Fault Monitoring*, University of Pittsburgh, Computer Science undergraduate, senior capstone experience and independent study Fall 2009 and Spring 2010 (graduated with a B.S., 2010)

Jason Mars, *Overhead Reduction for Indirect Branch Handling in Dynamically Translated Code*, University of Pittsburgh, Computer Science undergraduate, Research Experience for Undergraduates (graduated with a B.S., 2005)

Stacey Shogan, *Compact Binaries with Code Compression in a Software Dynamic Translator*, University of Pittsburgh, Computer Engineering senior project (graduated with a B.S., April 2004)

Lidiya Ber, *SoftTest: A Framework for Software Testing of Java Programs*, University of Pittsburgh, CS undergraduate, independent study (graduated April 2004, co-advised with Mary Lou Soffa)

Kevin Cammarata, *SoftTest: A Framework for Software Testing of Java Programs*, University of Pittsburgh, CS undergraduate, independent study (graduated April 2003, co-advised with Mary Lou Soffa)

Joe Atzinger, *Power Measurement*, University of Pittsburgh, Computer Engineering independent study, 2002

Craig Williford, *Cache Line Reordering for Reduced Power Consumption*, University of Pittsburgh, Computer Engineering senior project (graduated May 2002)

Josh Mehl, *Student Co-op Internship*, University of Pittsburgh, Computer Science Co-op, Summer 2002

Chris Scott, *Power Measurement*, University of Pittsburgh, Computer Engineering independent study, 2001

Ph.D. Comprehensive and Defense Committees

Lei Jiang, University of Pittsburgh (ECE), comprehensive 2011 (scheduled)

Juyoung Jung, University of Pittsburgh, passed comprehensive 2011

Weijia Li, University of Pittsburgh, expected 2011

Ping Zhou, University of Pittsburgh (ECE), expected 2011

Luke Dalessandro, University of Rochester (external member), expected 2011

Michael Moeng, University of Pittsburgh, passed comprehensive 2009

Jin Lei, University of Pittsburgh, graduated August 2010

Mohammad Hammoud, University of Pittsburgh, graduated June 2010

Ruibin Xu, University of Pittsburgh, graduated January 2010

Jiang Zheng, University of Pittsburgh, graduated September 2008

Gregory Kapfhammer, University of Pittsburgh, graduated April 2007

Takashi Okumura, University of Pittsburgh, graduated April 2007

Cosmin Rusu, University of Pittsburgh, graduated August 2006

Jason Bakos, University of Pittsburgh, graduated April 2005

Dakai Zhu, University of Pittsburgh, graduated December 2004

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Leo Selavo, University of Pittsburgh, graduated August 2004

Mauricio Pilla, Federal University of Rio Grande do Sul, Computer Science Institute, Brazil (external committee member), graduated June 2004

Tarun Nakra, University of Pittsburgh, graduated April 2000

Tutorials

- HiPEAC Bruce R. Childers and Jack W. Davidson, "Techniques and Uses of Software Dynamic Translation in Embedded Systems", *Int'l. Conf. on High-Performance Embedded Architectures and Compilers*, Paris, France, January 2012
- MICRO Bruce R. Childers, Alexandre P. Ferreira, and Daniel Mossé, "Emerging Architectures for DRAM+PCM Main Memory Systems", *Int'l. Symp. on Microarchitecture*, Porto Alegre, Brazil, December 2011
- MICRO Bruce R. Childers and Jack W. Davidson, "Building Efficient Software Dynamic Translators", *38th Annual IEEE/ACM Int'l. Symp. on Microarchitecture*, Barcelona, Spain, November 2005
- CGO Bruce R. Childers and Jack W. Davidson, "Software Dynamic Translation: Challenges, Approaches, and Applications", *ACM/IEEE Int'l. Symp. on Code Generation and Optimization*, San Jose, California, March 2005

Software Systems (Deployed/Released)

- StrataX A software dynamic translator and executive to support embedded systems with tight constraints on memory and performance. Developed in collaboration with José Baiocchi (as part of his Ph.D. thesis) at the University of Pittsburgh. Jason Hiser and Jack Davidson at the University of Virginia also contributed. This system is the main focus of the tutorial to be given at the HiPEAC conference in Paris, France, January 2012.
- HM-Sim A framework for modeling, simulating and analyzing different computer main memory organizations, including organizations that use a combination of DRAM and phase-change memory. Developed in collaboration with Alexandre Ferreira (as part of his Ph.D. thesis), Miao Zhou (Ph.D. student), Rami Melhem and Daniel Mosse'. This simulator is the principal focus of the tutorial to be given at the MICRO-44 conference in Porte Alegre, Brazil, December 2011.
- Strata A retargetable and reconfigurable framework for software dynamic translation. Co-developed with numerous graduate and undergraduate students and faculty, including Jose Biacchoi, Naveen Kumar, Jason Mars, Ryan Moore and Stacey Shogan (students at University of Pittsburgh); Jason Hiser, Kevin Scott, and Dan Williams (students at University of Virginia); and, Jack Davidson and Mary Lou Soffa (faculty at University of Virginia). Targeted to ARM, MIPS, PowerPC, and PISA instruction sets and embedded system resource management at Pitt; targeted to SPARC and x86 instruction sets and security applications at the University of Virginia. This system was the primary focus of the tutorials given at the MICRO-38 and CGO 2005 conferences.
- TDB A source-level debugger for dynamically translated programs. Implemented with the gdb debugger and the Strata software dynamic translator for the SPARC instruction set architecture. Developed in collaboration with Naveen Kumar at the University of Pittsburgh (as part of his Ph.D. thesis) and Mary Lou Soffa at the University of Virginia. This system was described and demonstrated at the CGO 2005 conference tutorial.

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Sponsored Projects

Principal Investigator

- NSF *Cyberinfrastructure for Computer Architecture Design and Evaluation*, Bruce Childers (PI), National Science Foundation, Division of Computing and Communication Foundations, August 15, 2011-July 31, 2012 [CCF-1148646, \$89,335]
- NSF *CSR:Large: Storage Class Memory Architecture for Energy Efficient Data Centers*, Bruce Childers (PI), Sangyeun Cho (Co-PI), Rami Melhem (Co-PI), Daniel Mossé (Co-PI), Jun Yang (Co-PI), Youtao Zhang (Co-PI), National Science Foundation, Division of Computer and Network Systems, 2010-est. 2014 (CGI) [CNS-1012070, \$1,900,000]
- NSF *Tera-PCM: A Low Power Terabyte Main Memory Using Phase Change Memory*, Bruce Childers (PI), Rami Melhem (Co-PI), Daniel Mossé (Co-PI), National Science Foundation, Division of Computing and Communication Foundations, Computer Processes and Artifacts Program, 2008-2011 [CCF-0811295, \$300,000]
- NSF *REEdact: A Robust Execution Environment for Fragile Multicore Systems*, Bruce Childers (PI at Pitt), Mahmut Kandemir (PI at PSU), Mary Jane Irwin (Co-PI at PSU), Mary Lou Soffa (PI at UVA), Jack Davidson (Co-PI at UVA), National Science Foundation, Division of Computing and Communication Foundations, Computer Processes and Artifacts Program, 2008-2011 [CCF-0811352, \$224,000 (Pitt amount) of \$1,339,998 (total)]
- NSF *Yield and Reliability Enhancement for On-Chip Multicore Memories in Nanoscale Technology*, Bruce Childers (PI), Sangyeun Cho (Co-PI), National Science Foundation, Division of Computing and Communication Foundations, Computer Processes and Artifacts Program, 2007-2011 [CCF-0702236, \$400,000]
- NSF *REEdact: A Robust Execution Environment for Fragile Multicore Systems*, Bruce Childers (PI at Pitt), Mahmut Kandemir (PI at PSU), Mary Jane Irwin (Co-PI at PSU), Jack Davidson (Co-PI at UVA), Mary Lou Soffa (PI at UVA), National Science Foundation, Division of Computer and Network Systems, Computer Systems Program, 2007-2008 [CNS-0720483, \$40,000 (Pitt amount) of \$200,000 (total)]
- NSF *A Community Resource Development Project for a Retargetable and Reconfigurable Software Dynamic Translation Infrastructure*, Bruce Childers (PI at Pitt), Jack Davidson (PI at UVA), National Science Foundation, Computing Research Infrastructure Program, 2005-2008 [CNS-0551492, \$106,803 (Pitt amount) of \$213,606 (total)]
- NSF *Debugging Dynamic Code Modifications*, Bruce Childers (PI at Pitt), Mary Lou Soffa (PI at UVA), National Science Foundation, Division of Computer and Network Systems, Computer Systems Program, 2005-2007 [CNS-0509115, \$89,934 (Pitt amount) of \$200,000 (total)]
- NSF *Adapting Program Code Continuously and Adaptively*, Bruce Childers (PI at Pitt), Mary Lou Soffa (PI at UVA), Jack Davidson (Co-PI at UVA), National Science Foundation, Division of Computer and Network Systems, Next Generation Software Program, 2003-2007 [CNS-0305198, \$660,538 (Pitt amount) of \$1,192,949 (total)]

Co-Principal Investigator

- Raytheon *Memory Systems for Cognitive Architectures*, Daniel Mossé (PI), Bruce Childers (Co-PI), Raytheon, 2004-2005 [\$150,000]

- NSF *Continuous Compilation: A New Approach to Aggressive and Adaptive Code Transformation*, Bruce Childers (Co-PI at Pitt), Mary Lou Soffa (PI at Pitt), Jack Davidson (PI at UVA), National Science Foundation, Next Generation Software Program, 2002-2003 [CNS-0203945, \$159,781 (Pitt amount) of \$319,781 (total)]
- PDG *Systems-on-a-chip Education and Training*, Tom Cain (PI), Don Chiarulli (Co-PI), Bruce Childers (Co-PI), Steven Levitan (Co-PI), Raymond Hoare (Co-PI), Ivan Kourtev (Co-PI), Pittsburgh Digital Greenhouse, 2000-2001 [\$500,000]

Other Funding

- MSR *Phoenix Summer Workshop*, Bruce Childers, Microsoft Corporation, held at University of Virginia, Charlottesville, Virginia, 2007 [\$2,000]
- CRDF *Demand-driven Structural Testing*, Bruce Childers, Central Research Development Fund, University of Pittsburgh, 2005-2007 [\$15,000]
- Pitt *Jazz: A Tool for Demand-Driven Structural Testing*, Bruce Childers, Hewlett International Small Grant, University of Pittsburgh, 2005 [\$1,500]
- NSF *Research Experience for Undergraduates supplement to Adapting Program Code Continuously and Adaptively*, Bruce Childers (Co-PI) and Mary Lou Soffa (PI), National Science Foundation, 2004-2005 [CNS-0305198, \$6,000]
- IBM *SoftTest: Scalable and Flexible Software Testing of Java Programs*, Bruce Childers (Co-PI) and Mary Lou Soffa (PI), IBM Research, 2002-2003 [\$35,000]
- IBM *Power-Aware Information Appliances*, Bruce Childers, IBM Faculty Partnership Award, IBM Austin Center for Advanced Studies, 2001-2002 [\$25,000]
- IBM *Power-Aware Information Appliances*, Bruce Childers, IBM Faculty Partnership Award, IBM Austin Center for Advanced Studies, 2000-2001 [\$25,000]

Teaching

Teaching Awards

- Fall 2009 *CS 447 Computer Organization and Assembly Language Programming*
- Fall 2007 *CS/COE 1541 Introduction to Computer Architecture*
- Spring 2001 *CS 3410 Advanced Topics in Computer Architecture*
- Spring 2000 *CS 3410 Advanced Topics in Computer Architecture*

Undergraduate Courses Taught at University of Pittsburgh

- Spring 2011 *CS 447 Computer Organization and Assembly Language Programming*
- Fall 2010 *CS 447 Computer Organization and Assembly Language Programming*
- Spring 2009 *CS 447 Computer Organization and Assembly Language Programming*
- Fall 2008 *CS/COE 1541 Introduction to Computer Architecture*
- Spring 2008 *CS 1590 Social Implications of Computing*
- Fall 2006 *CS 1680 Program Design and Implementation*
- Fall 2006 *CS/COE 1541 Introduction to Computer Architecture*
- Spring 2006 *CS/COE 1541 Introduction to Computer Architecture*
- Fall 2005 *CS/COE 1541 Introduction to Computer Architecture*
- Spring 2005 *CS/COE 1541 Introduction to Computer Architecture*

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- Fall 2004 *CS/COE 1541 Introduction to Computer Architecture*
- Spring 2004 *CS/COE 1520 Programming Languages for Web Applications*
- Fall 2003 *CS/COE 1541 Introduction to Computer Architecture*
- Spring 2003 *CS/COE 1520 Programming Languages for Web Applications*
- Spring 2003 *CS/COE 1541 Introduction to Computer Architecture*
- Spring 2002 *CS/COE 1541 Introduction to Computer Architecture*
- Fall 2000 *CS/COE 1541 Introduction to Computer Architecture*

Graduate Courses Taught at University of Pittsburgh

- Spring 2010 *CS 3210 Advanced Topics in Programming Languages*
- Fall 2008 *CS 2410 Graduate Computer Architecture*
- Spring 2006 *CS 3210 Advanced Topics in Programming Languages*
- Fall 2004 *CS 2410 Computer Architecture*
- Spring 2004 *CS 3410 Advanced Topics in Computer Architecture*
- Fall 2002 *CS 2410 Computer Architecture*
- Fall 2001 *CS 2410 Computer Architecture*

Professional Preparation Courses Developed and Taught

- May 2002 *Pittsburgh Digital Greenhouse System on a Chip, System Level Design*, taught at the University of Pittsburgh, Pittsburgh, PA (with Don Chiarulli)
- January 2002 *Pittsburgh Digital Greenhouse System on a Chip, System Level Design*, taught at the University of Pittsburgh, Pittsburgh, PA (with Don Chiarulli)

Professional Service

Editorship/Editorial Board

- 2010-Present *Member of the Editorial Advisory Board*, Computer Languages, Systems and Structures Journal, Elsevier
- March 2007 *Guest Co-Editor*, Computer Languages, Systems and Structures, Special Issue on Embedded Systems: Compiler-Architecture Interaction, Elsevier
- 2006 *Guest Editorial Board*, Int'l. Journal on Embedded Systems, Special Issue on Power-Aware Real-Time Computing, Elsevier
- August 2001 *Guest Co-Editor*, IEEE Transactions on Computers, Special Issue on Parallel Architectures and Compilation Techniques

Leadership Role in Conferences and International Meetings

- 2010-Present *Steering committee*, ACM SIGPLAN and SIGBED Conf. on Languages, Compilers and Tools for Embedded Systems
- 2010 *Program chair*, ACM SIGPLAN and SIGBED Conf. on Languages, Compilers and Tools for Embedded Systems, Stockholm, Sweden
- 2010 *Steering committee*, 14th Annual Workshop on the Interaction between Compilers and Computer Architecture, Pittsburgh, Pennsylvania
- 2008 *General chair*, 12th Annual Workshop on the Interaction between Compilers and Computer Architecture, Salt Lake City, Utah

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- 2008 *Lead organizer*, Schloss Dagstuhl Seminar on Emerging Uses and Paradigms for Binary Translation, Warden, Germany
- 2007 *Program committee chair*, 11th Annual Workshop on the Interaction between Compilers and Computer Architecture, Phoenix, Arizona
- 2003 *Co-organizer*, Workshop on Constraint-Aware Embedded Systems, Cancun, Mexico
- 2003 *Co-organizer*, Workshop on Exploring the Trace Space for Dynamic Optimization Techniques, San Francisco, California
- 2001 *Co-organizer*, IEEE Workshop on Power Management for Real-Time and Embedded Systems, Taipei, Taiwan ROC

Conference Organizing Committees

- 2006 *Americas Publication Chair*, ACM SIGPLAN and SIGBED Conf. on Languages, Compilers and Tools for Embedded Systems
- 2005 *Student poster chair*, ACM SIGPLAN and SIGBED Conf. on Languages, Compilers, and Tools for Embedded Systems
- 2003 *Publications chair*, Int'l. Conf. on Parallel Architectures and Compilation Techniques, New Orleans, Louisiana
- 2002 *Local Arrangements Co-chair*, Int'l. Conf. on Parallel Architectures and Compilation Techniques, Charlottesville, Virginia
- 2002 *Co-organizer Work in Progress*, Int'l. Conf. on High-Performance Computer Architecture, Boston, Massachusetts
- 2001 *Co-organizer Work in Progress*, Int'l. Conf. on Parallel Architectures and Compilation Techniques, Barcelona, Spain
- 2000 *Program Web Master*, Int'l. Conf. on Parallel Architectures and Compilation Techniques, Philadelphia, Pennsylvania

Program Committees

- 2012 Int'l. Conf. on the Principles and Practice of Programming in Java
- 2011 IEEE Int'l. Symp. on Workload Characterization
- 2011 Int'l. Conf. on Compilers, Architecture and Synthesis for Embedded Systems
- 2011 Int'l. Conf. on the Principles and Practice of Programming in Java
- 2010 IEEE Int'l. Parallel and Distributed Processing Symp., computer architecture track
- 2010 Int'l. Conf. on Compilers, Architecture and Synthesis for Embedded Systems
- 2010 Int'l. Conf. on the Principles and Practice of Programming in Java
- 2009 Parallel Architectures and Compilation Techniques
- 2009 ACM SIGPLAN and SIGBED Conf. on Languages, Compilers, and Tools for Embedded Systems
- 2009 ACM Int'l. Conf. on the Principles and Practice of Programming in Java
- 2009 IEEE Int'l. Conf. on Embedded Software and Systems
- 2009 Testing: Academic and Industrial Conf. - Practice and Research Techniques
- 2009 6th IEEE Int'l. Conf. on Embedded Software and Systems
- 2008 ACM Symp. on Code Generation and Optimization
- 2007 Virtual Machines and Intermediate Languages for Emerging Modularization Mechanisms

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- 2007 Workshop on Integrating System Environments into Software Testing
- 2007 Int'l. Conf. on High Performance Embedded Architectures and Compilers
- 2006 10th IEEE Workshop on the Interaction between Compilers and Computer Architecture
- 2006 12th IEEE Real-Time and Embedded Technology and Applications Symp.
- 2006 Int'l. Conf. on Autonomic Computing
- 2005 Second Int'l. Workshop on Power-Aware Real-Time Computing
- 2005 2nd Workshop on High-Performance Fault-Adaptive Large-Scale Embedded Real-Time Systems
- 2005 Int'l. Conf. on Autonomic Computing
- 2005 11th IEEE Real-Time and Embedded Technology and Applications Symp.
- 2004 First Int'l. Workshop on Power-Aware Real-Time Computing
- 2004 ACM SIGPLAN and SIGBED Conf. on Languages, Compilers, and Tools for Embedded Systems
- 2003 Workshop on Compilers and Operating Systems for Low Power
- 2002 IEEE Workshop on Large Scale Real-Time and Embedded Systems
- 2001 Workshop on Compilers and Operating Systems for Low Power
- 2000 Int'l. Conf. on Parallel Architectures and Compilation Techniques

Funding Panel Reviewing

Specific panel names and dates removed for confidentiality.

CISE CNS, CSR, CCF, ITR, CAREER, CPA, SBIR and others (multiple times on some panels), National Science Foundation

Reviewer, Science Foundation Ireland

Reviewer, Swedish Research Council

Journal, Conference and Book Reviewing

Reviewed multiple times for most journals and conferences.

ACM Transactions on Design Automation of Electronic Systems

ACM Transactions on Computer Architecture and Compiler Optimization

ACM Transactions on Embedded Systems

ACM Transactions on Software Engineering and Management

IEEE Transactions on Computers

IEEE Transactions on Software Engineering

IEEE Transactions on Parallel and Distributed Systems

IEEE Computer

IEEE Micro

IEE Proceedings of Computers and Digital Techniques

Journal of Microsystems and Microprocessors

The Computer Journal, Oxford Journals

Int'l. Symp. on High-Performance Computer Architecture

Conf. on Programming Language Design and Implementation

Conf. on Principles of Programming Languages

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Architectural Support for Programming Languages and Operating Systems
Int'l. Symp. on Microarchitecture
Int'l. Conf. on Parallel Compilation and Architecture Techniques
Int'l. Conf. on Virtual Execution Environments
Int'l. Symp. on Performance Analysis of Systems and Software
Int'l. Symp. on Code Generation and Optimization
Real-Time and Embedded Technology and Applications Symp.
Int'l. Conf. on Compilers, Architecture and Synthesis for Embedded Systems
Int'l. Conf. on Embedded Software
Asia South Pacific Design Automation Conf.
Int'l. Conf. on High Performance Embedded Architectures and Compilers
Design Automation and Test in Europe
Design Automation Conf.
Kluwer Academic Publisher
John Wiley & Sons
Computer Architecture Letters

Department and University Service

Leadership Role in Department

- 2009-2012 *Committee chairperson*, Graduate Admission and Financial Aid committee
- 2009-2012 *Director*, Graduate Studies
- 2008-2009 *Committee chairperson*, Graduate Program and Examinations Committee
- 2005-2006 *Committee co-chairperson*, Graduate Program and Examinations Committee
- 2005-2006 *Committee chairperson*, Graduate Program and Examinations Committee

Department Committees

- 2007-2008 *Committee member*, Faculty Recruiting Committee
- 2006-2007 *Committee member*, Faculty Recruiting Committee
- 2006-2007 *Committee member*, Department Vision Task Force
- 2005-2006 *Committee member*, The Space Committee
- 2004-2005 *Committee member*, Promotions, Computer Engineering graduate program
- 2004-2005 *Committee member*, Graduate Admission and Financial Aid
- 2003-2004 *Committee member*, Computer Science Department Annual Research Competition
- 2003-2004 *Committee member*, Graduate Admission and Financial Aid
- 2000-2003 *Department Web Master*, Outreach Committee
- 2001-2002 *Committee member*, Computer Science Department Annual Research Competition

University Committees

- 2011 *Reviewer*, Central Research Development Fund, Office of Research
- 2008-2010 *Computer Science representative*, Tenure Council, Faculty of Arts and Sciences

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2007 *Committee member*, Hewlett Int'l. Grant Program Selection Committee, University Center for International Studies

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