

# CURRICULUM VITAE

## MARY LOU SOFFA

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### RESEARCH INTERESTS

Optimizing compilers, software engineering, program analysis, instruction level parallelism, program debugging and testing tools, virtual execution environments, multicore software.

### EDUCATION

Ph.D. in Computer Science, University of Pittsburgh  
M.S. in Mathematics, Ohio State University  
B.S. in Mathematics, University of Pittsburgh, magna cum laude, Phi Beta Kappa

### ACADEMIC APPOINTMENTS

Owen R. Cheatham Professor of Science, Department of Computer Science, University of Virginia, 2004-present  
Chair, Department of Computer Science, University of Virginia, 2004-present  
Professor, Department of Computer Science, University of Pittsburgh, 1990-2004  
Graduate Dean in Arts and Sciences, University of Pittsburgh, 1991-1996  
Visiting Associate Professor, Department of Electrical Engineering and Computer Science, University of California at Berkeley, January 1987-December 1987  
Associate Professor, Department of Computer Science, University of Pittsburgh, 1983-1990  
Assistant Professor, Department of Computer Science, University of Pittsburgh, 1977-1983

### HONORS (Selected)

ACM SIGSOFT 2010 Distinguished Service Award, 2010  
Keynote Speaker, International Conference on Software Testing, Paris France, 2010  
Distinguished Speaker, University of California at Irvine, 2010  
Distinguished Speaker, Triangle CS Distinguished Lecturer Series, Raleigh, NC 2010  
Deans Distinguished Lecture, University of Texas at San Antonio, April 2009  
Keynote Speaker, REU, University of Alabama, 2009  
Keynote Speaker, 11<sup>th</sup> IEEE High Assurance systems Engineering Symposium (HASE 2008)  
WISE Distinguished Speaker, University of Delaware, 2008  
CS Distinguished Lecture Series, University of Illinois, 2008  
Nico Habermann Award, presented by Computing Research Association, June 2006  
Selected as ACM Fellow, 1999  
Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring, White House, Washington, D.C., 1999  
Keynote Speaker, Mid-Atlantic Student Workshop on Programming Languages and Systems,

April 2005  
 Keynote Speaker, Fifth International Conference on Quality Software, Melbourne, Australia, 2005  
 Keynote Speaker, NSF ITWF and ITR PIs Conference, October 2004  
 Keynote Speaker, Compiler Construction Conference, Barcelona, March 2004  
 Distinguished paper, "A Family of Test Adequacy Criteria for Database-Driven Applications," (co-authored with Greg Kapfhammer), ACM SISOFIT Foundations of Software Engineering (FSE), 2003  
 Most Influential papers of 20 years in ACM/SIGPLAN Programming Languages Design and Implementation (PLDI), "Complete Removal of Redundant Expressions," (co-authored with R. Bodik and R. Gupta), 40 out of 550 papers selected and appeared in a PLDI Anniversary issue, 2003  
 ACM/SIGPLAN Distinguished Service Award, June 2003  
 Distinguished Speaker, IBM Lecturer Series, Notre Dame, Department of Computer Science, November 2003  
 Girl Scout Woman of Distinction for 2003  
 Distinguished Speaker, Department of Computer Science, University of Maryland, 2002  
 Distinguished Speaker, Department of Computer Science and Engineering, University of Michigan, 2001  
 Distinguished Speaker, IBM T.J. Watson Research Center, 2001  
 Dissertation Adviser of Rastislav Bodik, winner of ACM SIGPLAN Award for the Best Dissertation in Programming Languages, 2000  
 Invited Speaker, Model Checking and Program Analysis Seminar, Munich, Germany, February 2000  
 Teaching Award, Department of Computer Science, University of Pittsburgh, 1999 and 2001  
 Faculty Honor Roll, University of Pittsburgh, 1999  
 Keynote Speaker, "Advances in Data Flow," International Symposium on Static Analysis, Venice, September 1999  
 NSF Visiting Professorship for Women, University of California at Berkeley, 1987

## JOURNAL PUBLICATIONS

Yuqiang Huang, Bruce Childers and Mary Lou Soffa, "Detecting Bugs in Register Allocation," **ACM Transactions on Programming Languages and Systems** 32(4): (2010).  
 Sandra Katz, David Allbritton, John Aronis, Christine Wilson and Mary Lou Soffa, "Gender, achievement, and persistence in an undergraduate computer science program," **ACM SIGMIS Database** 37(4): 42-57 (2006).  
 Min Zhao, Bruce Childers, and Mary Lou Soffa, "An Approach Toward Profit-Driven Optimization," **ACM Transactions on Architecture and Code Optimization** 3(3): 231-262 (2006).  
 Barbara Ryder, Mary Lou Soffa, and Margaret Burnett, "The Impact of Software Engineering Research on Modern Programming Languages," **ACM Trans. Soft. Eng. Methodol.** 14(4): 431-477 (2005).  
 Naveen Kumar, Bruce R. Childers, Dan Williams, Jack W. Davidson and Mary Lou Soffa, "Compile-time Planning for Overhead Reduction in Software Dynamic Translators," **International Journal on Parallel Programming**, 33(2-3): 103-114 (2005).  
 Sandra Katz, David Allbritton, John Aronis, Christine Wilson and Mary Lou Soffa, "Gender and Race in Predicting Achievement in Computer Science," **Special Issue on Women and Minorities in Information Technology, IEEE Technology and Society**, 22(3): 20-27 (2003).  
 Barbara G. Ryder and Mary Lou Soffa, "Influences on the Design of Exception Handling ACM SIGSOFT Project on the Impact of Software Engineering Research on Programming

- Language Design,” **ACM SIGSOFT Software Engineering Notes**, 28(4): 29-35 (2003).
- Angela M. Balcitra, Doris L. Carver and Mary Lou Soffa, “Shortchanging the Future of Information Technology: The Untapped Resource,” **Inroads, Special Issue on Women and Computing. SIGCSE Bulletin** 34(2): 32-25 (2002).
- Atif Memon, Martha E. Pollack and Mary Lou Soffa, “Hierarchical GUI Test-Case Generation Using Automated Planning,” **IEEE Trans. Software Eng.** 27(2): 144-155 (2001).
- Deborah Whitfield and Mary Lou Soffa, “An Approach for Exploring Code Improving Transformations,” **ACM Trans. Program. Lang. Syst.** 19(6): 1053-1084 (1997).
- Evelyn Duesterwald, Rajiv Gupta and Mary Lou Soffa, “A Practical Framework for Demand-Driven Interprocedural Data Flow Analysis,” **ACM Trans. Program. Lang. Syst.** 19(6): 992-1030 (1997).
- Rajiv Gupta, Mary Lou Soffa and John Howard, “Hybrid Slicing: Integrating Dynamic Information with Static Analysis,” **ACM Trans. Softw. Eng. Methodol.** 6(4): 370-397 (1997).
- Rajiv Gupta, Mary Jean Harrold and Mary Lou Soffa, “Program Slicing-Based Regression Testing Techniques,” **Softw. Test., Verif. Reliab.** 6(2): 83-111 (1996).
- Chyi-Ren Dow, Shi-Kuo Chang and Mary Lou Soffa, “Visual Transformation Specifications,” in **Software Visualization**, (Peter Eades and Kang Zhang, Eds.), World Scientific Pub. Co., 1996, 141-162.
- Robert Kramer, Rajiv Gupta and Mary Lou Soffa, “The Combining DAG: A Technique for Parallel Data Flow Analysis,” **IEEE Trans. Parallel Distrib. Syst.** 5(8): 805-813 (1994).
- Brian A. Malloy, Errol L. Lloyd and Mary Lou Soffa, “Scheduling DAGS for Asynchronous Multiprocessor Execution,” **IEEE Trans. Parallel Distrib. Syst.** 5(5): 498-508 (1994).
- Rajiv Gupta, Mary Lou Soffa and Denise Ombres, “Efficient Register Allocation Via Coloring Using Clique Separators,” **ACM Trans. Program. Lang. Syst.** 16(3): 370-386 (1994).
- Deborah Whitfield and Mary Lou Soffa, “The Design and Implementation of Genesis,” **Softw. Pract. Exper.** 24(3): 307-325 (1994).
- Mary Jean Harrold and Mary Lou Soffa, “Efficient Computation of Interprocedural Definition-Use Chains,” **ACM Trans. Program. Lang. Syst.** 16(2): 175-204 (1994).
- Mary Jean Harrold, Rajiv Gupta and Mary Lou Soffa, “A Methodology for Controlling the Size of a Test Suite,” **ACM Trans. Softw. Eng. Method.** 2(3): 270-285 (1993).
- Rajiv Gupta and Mary Lou Soffa, “Employing Static Information in the Generation of Test Cases,” **Softw. Test. Verif. Reliab.** 3(1): 29-48 (1993).
- Lori L. Pollock and Mary Lou Soffa, “Incremental Global Reoptimizations of Programs,” **ACM Trans. Program. Lang. Syst.** 14(2): 173-200 (1992).
- Mary Jean Harrold and Mary Lou Soffa, “Selecting and Using Data for Integration Testing,” **IEEE Software** 8(2): 58-65 (1991).
- Rajiv Gupta and Mary Lou Soffa, “Compile-time Techniques for Improving Scalar Access Performance in Parallel Memories,” **IEEE Trans. Parallel Distrib. Syst.** 2(2): 138-148 (1991).
- Mary Bivens and Mary Lou Soffa, “Incremental Register Allocation,” **Softw. Pract. Exper.** 20(10): 1015-1047 (1990).
- Rajiv Gupta and Mary Lou Soffa, “Region Scheduling: An Approach for Detecting and Redistributing Parallelism,” **IEEE Trans. Software Eng.** 16(4): 421-431 (1990).
- Brian A. Malloy and Mary Lou Soffa, “Conversion of Simulation Processes to Pascal Constructs,” **Softw. Pract. Exper.** 20(2): 191-207 (1990).
- Rajiv Gupta and Mary Lou Soffa, “Compilation Techniques for a Reconfigurable LIW Architecture,” **The Journal of Supercomputing**, Vol. 3(4): 271-304 (1989).
- Lori L. Pollock and Mary Lou Soffa, “An Incremental Version of Iterative Data Flow Analysis,” **IEEE Trans. Softw. Eng.** 15(12): 1537-1549 (1989).
- Errol L. Lloyd, Mary Lou Soffa and Ching-Chy Wang, “On Locating Minimum Feedback Vertex

- Sets,” **Journal of Computer and System Sciences**, 37(3): 292-311 (1988).
- Jean R. Stephenson Blair, Phil Kearns and Mary Lou Soffa, “An Optimistic Implementation of the Stack-Heap,” **The Journal of Systems and Software** 5(3): 193-202 (1985).
- Donna J. Quammen, John P. Kearns and Mary Lou Soffa, “Efficient Storage Management for Temporary Values in Concurrent Programming Languages,” **IEEE Trans. Computers** 34(9): 832-840 (1985).
- Ching-Chy Wang, Errol L. Lloyd and Mary Lou Soffa, “Feedback vertex sets and cyclically reducible graphs,” **J. ACM** 32(2): 296-313 (1985).
- Ching-Chy Wang and Mary Lou Soffa, “Eager Reclamation,” **IEEE Trans. Software Eng.** 11(4): 437-439 (1985).
- Fernando Lafora and Mary Lou Soffa, “Reverse Execution in Debugging a Generalized Control Regime,” **Comput. Lang.** 9(3/4): 183-192 (1984).
- Lawrence A. Coon, John P. Kearns and Mary Lou Soffa, “The Contraction of Control Implementations,” **Comput. Lang.** 8(1): 15-25 (1983).
- John P. Kearns and Mary Lou Soffa, “The Implementation of Retention in a Coroutine Environment,” **Acta Inf.** 19: 221-233 (1983).
- Mary Lou Soffa, “Control Discipline Necessity: Making the Languages as General as the Implementation,” **BIT** 22(2): 169-182 (1982).
- John P. Kearns, Carol J. Meier and Mary Lou Soffa, “The Performance Evaluation of Control Implementations,” **IEEE Trans. Softw. Eng.** 8(2): 89-96 (1982).
- Gary Lindstrom and Mary Lou Soffa, “Referencing and Retention in Block Structured Coroutines,” **ACM Trans. Program. Lang. Syst.** 3(3): 263-292 (1981).
- W. Pauli and Mary Lou Soffa, “Coroutine Behavior and Implementation,” **Softw. Pract. Exper.** 10(3): 189-204 (1980).

## REFEREED CONFERENCE/WORKSHOP PUBLICATIONS

- Wei Le and Mary Lou Soffa, “Generating Analyses for Detecting Faults in Path Segments,” International Symposium on Software Testing and Analysis (ISSTA), July, 2011.
- Lingjia Tang, Jason Mars, Neil Vachharajani, Robert Hundt, Mary Lou Soffa, The Impact of Memory Subsystem Resource Sharing on Datacenter Applications, *Proceedings of the 37th Annual International Symposium on Computer Architecture (ISCA)* June, 2011
- Mary Lou Soffa, Kristen Walcott, Jason Mars, “Exploiting Hardware Advances for Software Testing and Debugging” *Proceedings of the 33rd ACM/IEEE International Conference on Software Engineering (ICSE) NIER Track, 2011*
- Wei Le, Jing Yang, Mary Lou Soffa and Kamin Whitehouse, Lazy Preemption to Enable Path-Based Analysis of Interrupt-Driven Code, *Second International Workshop on Software Engineering for Sensor Network Applications*, May, 2011.
- Jing Yang, Kevin Skadron and Kamin Whitehouse, “Feasibility of Dynamic Binary Parallelization, *HotPar*, 2011
- Tanima Dey, Wei Wang, Jack Davidson, Mary Lou Soffa, “Characterizing Multi-threaded Applications based on Shared-Resource Contention,” *IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)*, Austin, Texas, April 2011
- Jason Mars, Lingjia Tang and Mary Lou Soffa, “Directly Characterizing Cross Core Interference Through Contention Synthesis,” *International Conference on High Performance Embedded Architectures & Compilers (HiPEAC)*, Heraklion, Greece, January 2011
- Wei Le and Mary Lou Soffa, “Path-Based Fault Correlations,” *18th Foundations of Software Engineering (FSE)*, Santa Fe, NM, November 2010
- Apala Guha, Kim Hazelwood and Mary Lou Soffa, “Balancing Memory and Performance through Software Flushing of Software Code Cache,” *International Conference on Compilers Architecture and Synthesis for Embedded Systems (CASES)*, Scottsdale, AZ, October 2010
- Jason Mars, Neil Vachharajani, Robert Hundt and Mary Lou Soffa, “Contention Aware

- Execution: Online Contention Detection and Response,” *ACM/IEEE International Symposium on Code Generation and Optimization (CGO)*, April 2010, 257-265.
- Apala Guha, Kim Hazelwood and Mary Lou Soffa, “DBT Path Selection for Holistic Memory Efficiency and Performance,” *ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments (VEE)*, Pittsburgh, PA, March 2010, 145-156.
- Min Zhao, Bruce Childers and Mary Lou Soffa, “A Framework for Exploring Optimization Properties,” *Compiler Conference*, York, United Kingdom, March 2009, 32-47.
- Naveen Kumar, Bruce Childers and Mary Lou Soffa, “Transparent Debugging of Dynamically Optimized Code,” *International Symposium on Code Generation and Optimization (CGO)*, Seattle, Washington, March 2009, 275-286.
- Apala Guha, Kim Hazelwood and Mary Lou Soffa, “Code Lifetime Based Memory Reduction for Virtual Execution Environments,” *Proceedings of the 6th Workshop on Optimizations for DSP and Embedded Systems (ODES)* Boston, Massachusetts, April 2008.
- Jason Mars and Mary Lou Soffa, “Mats: MultiCore Adaptive Trace Selection,” *Third Workshop on Software Tools for MultiCore Systems (STMCS 2008)*, collocated with *Code Generation and Optimization (CGO)*, April 2008.
- Gregory M. Kapfhammer and Mary Lou Soffa, “Database-Aware Test Coverage Monitoring,” *ACM India Software Engineering Conference*, Hyderabad, India, February 2008, 77-86.
- Mary Lou Soffa and Evelyn Duesterwald (Eds.): *Sixth International Symposium on Code Generation and Optimization (CGO 2008)*, April 5-9, 2008, Boston, Massachusetts, ACM 2008.
- Wei Le and Mary Lou Soffa, “Marple: a demand-driven path-sensitive buffer overflow detector,” *Proceedings of the 16th ACM SIGSOFT International Symposium on Foundations of Software Engineering*, San Diego, California, November 2008, 272-282.
- Mary Lou Soffa, “Path Sensitive Analysis for Security Flaws,” *11<sup>th</sup> IEEE High Assurance Systems Engineering Symposium (HASE)*, Nanjing, China, 2008, 3.
- Adam Smith, Joshua Geiger, Gregory M. Kapfhammer and Mary Lou Soffa, “Test Suite Reduction and Prioritization with Call Trees,” *Proceedings of the IEE/ACM International Conference on Automated Software Engineering*, Atlanta, Georgia, November, 2007, 539-540.
- Gregory M. Kapfhammer and Mary Lou Soffa, “Using Coverage Effectiveness to Evaluate Test Suite Prioritizations,” In the *Proceedings of the ACM International Workshop on Empirical Assessment of Software Engineering Languages and Technologies*, Atlanta, Georgia, November 2007
- Sara Alspaugh, Kristen R. Walcott, Michael Belanich, Gregory M. Kapfhammer and Mary Lou Soffa, “Efficient Time-Aware Prioritization with Knapsack Solvers,” In the *Proceedings of the ACM International Workshop on Empirical Assessment of Software Engineering Languages and Technologies*, Atlanta, Georgia, November 2007.
- Nguyet T.M. Nguyen and Mary Lou Soffa, “Program Representations for Testing Wireless Sensor Network Applications,” *DOSTA 07 Workshop on Domain Specific Approaches to Software Test Automation*, in conjunction with the *6<sup>th</sup> ESEC/FSE Conference*, September 2007, 20-26.
- Wei Le and Mary Lou Soffa, “Refining Buffer Overflow Detection via Path Sensitive, Demand Driven Analysis,” *Program Analysis for Software Tools and Engineering (PASTE)*, San Diego, California, June 14, 2007, 63-68.
- Apala Guha, Kim Hazelwood and Mary Lou Soffa, “Reducing Exit Stub Memory Consumption in Code Caches,” *International Symposium on High Performance Embedded Architectures and Compilers (HiPEAC)*, Ghent, Belgium, January 2007, 87-101.
- Apala Guha, Jason Hiser, Naveen Kumar, Jing Yang, Min Zhao, Shukang Zhou, Bruce R. Childers, Jack W. Davidson, Kim M. Hazelwood and Mary Lou Soffa, “Virtual Execution Environments: Support and Tools,” in *Proceedings of the NSF Next Generation Software Program Workshop*

- held in conjunction with the *International Parallel and Distributed Processing Symposium*, Long Beach, California, USA. March 2007, pages 1-6.
- Jing Yang, Mary Lou Soffa, Leo Selavo and Kamin Whitehouse, "Clairvoyant: a comprehensive source-level debugger for wireless sensor networks," *The 5th ACM Conference on Embedded Networked Sensor Systems (Sensys)*, Sydney, Australia, November 2007, 189-203.
- Jason D. Hiser, Naveen Kumar, Min Zhao, Shukang Zhou, Bruce R. Childers, Jack W. Davidson, and Mary Lou Soffa, "Techniques and Tools for Dynamic Optimization," *NSF Next Generation Software Workshop, collocated with the International Parallel and Distributed Processing Symposium (NSFNGS '06)*. Rhodes Island, Greece, April 25-29, 2006, 312-320.
- Kristen R. Walcott, Mary Lou Soffa, Gregory M. Kapfhammer, and Robert S. Roos, "Time-Aware Test Suite Prioritization," *ACM SIGNOFF/SIGPLAN International Symposium on Software Testing and Analysis*, Portland, Maine, July 2006, 1-12.
- Yuqiang Huang, Bruce R. Childers, and Mary Lou Soffa, "Catching and Identifying Bugs in Register Allocation," *13th International Static Analysis Symposium*, Seoul, Korea, August 2006, 281-300.
- Jing Yang, Shukang Zhou, and Mary Lou Soffa, "Dimension: An Instrumentation Tool for Virtual Execution Environments," *Second International Conference on Virtual Execution Environments (VEE '06)*, Ottawa, Canada, June 14-16, 2006, 164-174.
- Gregory M. Kapfhammer, Mary Lou Soffa and Daniel Mosse, "Testing in resource constrained execution environments," *ACM/IEEE International Conference on Automated Software Engineering*, Long Beach, California, November 7-11, 2005, 418-422.
- Naveen Kumar, Bruce R. Childers and Mary Lou Soffa, "TDB: A Source-Level Debugger for Dynamically Translated Programs," *ACM SIGPLAN/SIGSOFT Sixth Int'l. Symposium on Automated and Analysis-Driven Debugging (AADEBUG'05)*, Monterey, California, September 19-21, 2005, 123-132.
- Naveen Kumar, Bruce R. Childers and Mary Lou Soffa, "Low Overhead Program Monitoring and Profiling," *ACM SIGPLAN/SIGSOFT Workshop on Program Analysis for Software Tools and Engineering (PASTE'05)*, Lisbon, Portugal, September 5-6, 2005, 28-34.
- Jonathan Misurda, James A. Clause, Juliya L. Reed, P. Gandra, Bruce R. Childers and Mary Lou Soffa, "Jazz: A Tool for Demand-Driven Structural Testing," *14th ETAPS International Conference on Compiler Construction (CC'05)*, Edinburgh, Scotland, April 2005, 242-245.
- Jonathan Misurda, James A. Clause, Juliya L. Reed, P. Gandra, Bruce R. Childers and Mary Lou Soffa, "Demand-Driven Structural Testing with Dynamic Instrumentation," *International Conference on Software Engineering*, St. Louis, May 2005, 156-165.
- Min Zhao, Bruce R. Childers and Mary Lou Soffa, "A Model-based Framework: An Approach for Profit-driven Optimization," *ACM SIGMICRO Int'l. Conference on Code Generation and Optimization (CGO'05)*, San Jose, California, March 2005, 317-327.
- Shukang Zhou, Bruce Childers, and Mary Lou Soffa, "Planning for Code Buffer Management in Distributed Virtual Execution Environments," *ACM/USENIX Virtual Execution Environments Conference (VEE'05)*, Chicago, Illinois, June 2005, 100-109.
- 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-Managing Systems (WOSS'04) during the ACM SIGSOFT Int'l. Symposium on Foundations of Software Engineering*, 2004, 90-94.
- 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, collocated with 18th International Parallel and Distributed Processing Symposium (IPDPS '04) – Workshop 10*, April 2004, 200a.
- Mary Lou Soffa, "Developing a Foundation for Code Optimization," in *Compiler Construction* (Ed. Evelyn Duesterwald), *13th International Conference, CC 2004*, Held as part of the *Joint European Conferences on Theory and Practice of Software, ETAPS 2004*, Barcelona, Spain, March 29 - April 2, 2004.

- Sandra Katz, David Allbritton, John Aronis, Christine Wilson and Mary Lou Soffa, *Proceedings of the 6th International Conference on Learning Sciences*, Santa Monica, CA 2004.
- Gregory M. Kapfhammer and Mary Lou Soffa, "A Family of Test Adequacy Criteria for Database-Driven Applications," *ACM SIGSOFT Foundations of Software Engineering Conference*, Sept. 2003, selected as a Distinguished Paper, 98-107.
- Min. Zhao, Bruce R. Childers and Mary Lou Soffa, "Predicting the Impact of Optimizations for Embedded Systems," *2003 ACM SIGPLAN Conference on Languages, Compilers, and Tools for Embedded Systems*, San Diego, CA, 1-11, 2003.
- Atif Memon and Mary Lou Soffa, "Regression Testing of GUIs," *ACM SIGSOFT Foundations of Software Engineering Conference*, Sept. 2003, 118-127.
- Mauricio L. Pilla, Amarildo T. da Costa, Felipe M. G. Franca, Bruce R. Childers and Mary Lou Soffa, "The Limits of Speculative Trace Reuse on Deeply Pipelined Processors," *15<sup>th</sup> Symposium of Computer Architecture and High Performance Computing (SBAC-PAD03)*, Brazil, 36-45.
- Sandra Katz, John Aronis, David Allbritton, Christine Wilson and Mary Lou Soffa, "A Study to Identify Predictors of Achievement in an Introductory Computer Science Course," *Proceedings of SIG Computer Personnel Research Conference '03, 2003*, New York: Association for Computing Machinery, 157-161.
- B. 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 (eTX) Workshop, held with the ACM SIGPLAN Conf. on Object-Oriented Programming, Systems, Languages, and Applications*, October 27, 2003, 79-83.
- Bruce Childers, Jack W. Davidson and Mary Lou Soffa, "Continuous Compilation: A New Approach to Aggressive and Adaptive Code Transformation," *Proceedings of the International Parallel and Distributed Processing Symposium (IPDPS'03)*, Nice, 2003, 205.
- K. Scott, N. Kumar, S. Verlusamy, B. Childers, J. Davidson and Mary Lou Soffa, "Retargetable and Reconfigurable Software Dynamic Translation," *Conference on Code Generation and Optimization*, San Francisco, CA, March 2003, 36-47.
- Clara Jaramillo, Rajiv Gupta and Mary Lou Soffa, "Debugging and Testing Optimizers through Comparison Checking," *Compiler Optimization Meets Compiler Verification Workshop, joint with ETAPS*, Grenoble, France, April, 2002.
- Alessandro Orso, Mary Jean Harrold, David S. Rosenblum, Gregg Rothermel and Mary Lou Soffa, "Using Component Metacontent to Support the Regression Testing of Component-Based Software," *International Conference on Software Maintenance*, Florence, Italy, November, 2001, 716-725
- Atif Memon, Mary Lou Soffa and Martha E. Pollock, "Coverage Criteria for GUI Testing," *8<sup>th</sup> European Software Engineering Conference and 9<sup>th</sup> ACM SIGSOFT Symposium on the Foundations of Software Engineering*, Vienna, Austria, Sept. 2001, 256-276.
- 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 (FDDO)*, Monterey, December 2000.
- Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, "Automated Test Oracles for GUIs," *Eighth International Symposium on the Foundations of Software Engineering (FSE2000)*, San Diego, CA, November 6-10, 2000, 30-39.
- Neelam Gupta, Aditya Mathur and Mary Lou Soffa, "Generating Test Data for Branch Coverage," *15th IEEE International Conference on Automated Software Engineering (ASE'2000)*, Grenoble, France, September 2000, 219-228.
- Clara Jaramillo, Rajiv Gupta and Mary Lou Soffa, "FULLDOC: A Full Reporting Debugger for Optimized Code," *International Static Analysis Symposium, LNCS, Springer Verlag*, Santa Barbara, CA, June-July 2000, 240-259.
- Atif M. Memon, Martha E. Pollack, and Mary Lou Soffa, "A Planning-Based Approach to GUI Testing," *13<sup>th</sup> International Software/Internet Quality Week*, San Francisco, CA, May 2000.

- Atif M. Memon, Martha Pollack and Mary Lou Soffa, "Plan Generation for GUI Testing," *Fifth International Conference on Artificial Intelligence Planning and Scheduling*, Brackenridge, Co. April 14-19, 2000, 226-235.
- Neelam Gupta, Aditya Mathur and Mary Lou Soffa, "UNA Based Iterative Test Data Generation and its Evaluation," *The IEEE Automated Software Engineering Conference (ASE)*, Cocoa Beach, FL., October 1999.
- Clara Jaramillo, Rajiv Gupta and Mary Lou Soffa, "Comparison Checking: An Approach to Avoid Debugging of Optimized Code," *The Joint 7th European Software Engineering Conference (ESEC) and the ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE)*, Toulouse, France, September 1999, 268-284.
- Atif Memon, Martha Pollack and Mary Lou Soffa, "Using a Goal-driven Approach to Generate Test Cases for GUIs," *ACM/IEEE International Conference on Software Engineering (ICSE)*, Los Angeles, May 1999, 257-266. (Selected as a best paper).
- Rastislav Bodik, Rajiv Gupta and Mary Lou Soffa, "Load-Reuse Analysis: Design and Evaluation," *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Atlanta, Georgia, May 1999, 64-76.
- Tarun Nakra, Rajiv Gupta and Mary Lou Soffa, "Value Prediction in VLIW Machines," *ACM/IEEE 26<sup>th</sup> International Symposium on Computer Architectures (ISCA)*, Atlanta, Georgia, May 1999, 258-269.
- Tarun Nakra, Rajiv Gupta and Mary Lou Soffa, "Global Context-based Value Prediction," *Proceedings Fifth International Symposium on High Performance Computer Architecture (HPCA)*, January 1999, 4-12.
- Neelam Gupta, Aditya P. Mathur and Mary Lou Soffa, "Automated Test Data Generation Using an Iterative Relaxation Method," *ACM SIGSOFT Foundations of Software Engineering (FSE)*, November 1998, 231-244.
- Clara Jaramillo, Rajiv Gupta and Mary Lou Soffa, "Capturing the Effects of Code Improving Transformations," *Proceedings of International Conference on Parallel Architectures and Compilation Techniques (PACT)*, October 1998, 118-123.
- David A. Berson, Rajiv Gupta and Mary Lou Soffa, "Integrated Instruction Scheduling and Register Allocation Techniques," *International Workshop on Languages and Compilers for Parallel Computing (LCPC)*, Springer Verlag, Chapel Hill, North Carolina, August 1998, 247-262.
- Rastislav Bodik, Rajiv Gupta and Mary Lou Soffa, "Complete Removal of Redundant Expressions," *Proceedings of ACM/SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, June 1998, 1-15.
- Jodi Tims, Rajiv Gupta and Mary Lou Soffa, "Data flow Analysis Driven Dynamic Data Partitioning," *Fourth Workshop on Languages, Compilers, and Run-time Systems for Scalable Computers*, CMU, Pittsburgh, Pa. May 1998, 75-91.
- Rastislav Bodik, Rajiv Gupta and Mary Lou Soffa, "Refining Data Flow Information through Infeasible Path Detection and Tracing," *Proceeding Sixth European Software Engineering Conference and ACM SIGSOFT Foundations of Software Engineering*, Zurich, LNCS 1301, Springer Verlag, 1997 pages 361-377, 1997.
- Rastislav Bodik, Rajiv Gupta and Mary Lou Soffa, "Interprocedural Conditional Branch Elimination," *ACM/SIGPLAN 1997 Conference on Programming Languages Design and Implementation (PLDI)*, June 1997, 146-158.
- Evelyn Duesterwald, Rajiv Gupta and Mary Lou Soffa, "A Demand-Driven Analyzer for Data Flow Testing at the Integration Level," *International Conference on Software Engineering (ICSE)*, Berlin, Germany, March 1996, 575-584.
- David A. Berson, Pohua P. Chang, Rajiv Gupta and Mary Lou Soffa, "Integrating Program Optimizations and Transformations with the Scheduling of Instruction Level Parallelism," *Ninth Annual Workshop on Languages and Compilers for Parallel Computing*, Santa Jose,

- California, August 8-10, 1996, 207-221.
- Chyi-Ren Dow, Mary Lou Soffa and Shi-Kuo Chang, "A Unifying Framework for Undoing Code Transformations," *International Computer Symposium (ICS)*, Taiwan, December 1996.
- Rajiv Gupta and Mary Lou Soffa, "Priority Based Data Flow Testing," *IEEE-CS International Conference on Software Maintenance (ICSM)*, Nice, France, October 1995, 348-257.
- Rajiv Gupta and Mary Lou Soffa, "Hybrid Slicing: An Approach for Refining Static Slices using Dynamic Information," *ACM SIGSOFT Third Symposium on the Foundations of Software Engineering*, Washington, DC, October 1995, 29-40. (Selected as a best paper)
- Evelyn Duesterwald, Rajiv Gupta and Mary Lou Soffa, "Interprocedural Data Flow Analysis on Demand," *The 22nd Annual ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL)*, San Francisco, California, January 1995, 37-48.
- David A. Berson, Rajiv Gupta and Mary Lou Soffa, "GURRR: A Global Unified Resource Requirements Representation," *ACM SIGPLAN Workshop on Intermediate Representations*, San Francisco, California, January 1995, 23-34.
- Patricia P. Pineo and Mary Lou Soffa, "A Practical Approach to Single Assignment Code," *Conference on Parallel Architectures and Compiler Technologies (PACT '95)*, Greece, July 1995, 147-158.
- Chyi-Ren Dow, Mary Lou Soffa and S.K. Chang, "An Efficient Technique to Remove Transformations," *IEEE ICPADS 94: 1994 International Conference on Parallel and Distributed Systems*, Hsinchu, Taiwan, December 1994, 392-397
- Chyi-Ren Dow, Shi-Kuo Chang and Mary Lou Soffa, "An Overview of the PIVOT Environment for Program Restructuring," *IEEE 1994 International Computer Symposium*, Hsinchu, Taiwan, December 1994.
- Rajiv Gupta and Mary Lou Soffa, "A Framework for Partial Data Flow Analysis," *IEEE-CS International Conference on Software Maintenance (ICSM)*, Victoria, British Columbia, September 1994, 4-13.
- David A. Berson, Rajiv Gupta and Mary Lou Soffa, "Resource Spackling: A Framework for Integrating Register Allocation in Local and Global Schedulers," *International Conference on Parallel Architectures and Compilation Techniques*, IFIP Transactions A-50, Montreal, Canada, August 1994, 135-146.
- Chyi-Ren Dow, Mary Lou Soffa, and S.K. Chang, "Undoing Code Transformations in an Independent Order," *International Conference on Parallel Processing (ICPP)*, Chicago, Illinois, August 1994, 108-115.
- Patricia Prather Pineo and Mary Lou Soffa, "A Practical Approach to the Symbolic Debugging of Parallelized Code," *International Conference on Compiler Construction (CC)*, Edinburgh, Scotland, April 1994, 339-356.
- Evelyn Duesterwald, Rajiv Gupta and Mary Lou Soffa, "Reducing the Cost of Data Flow Analysis By Congruence Partitioning," *International Conference on Compiler Construction (CC)*, Edinburgh, Scotland, April 1994, 356-373.
- Chyi-Ren Dow, Shi-Kuo Chang and Mary Lou Soffa, "Program Visualization for Parallelized Code with the Aid of Visual Transformation Specifications," *Software Automation for Productivity Improvement Series on Software Engineering and Knowledge Engineering*, 1994.
- Lori Pollock, Mary Bivens and Mary Lou Soffa, "Debugging Optimized Code Via Tailoring," *ISSTA*, Seattle, Washington, August 1994.
- Debbie Whitfield and Mary Lou Soffa, "Investigating Properties of Code Transformations," *International Conference on Parallel Processing*, St. Charles, Illinois, August 1993, 156-160.
- Evelyn Duesterwald, Rajiv Gupta and Mary Lou Soffa, "A Practical Data Flow Framework for Array Reference Analysis and its Application in Optimizations," *ACM SIGPLAN'93 Conference on Programming Language Design and Implementation (PLDI)*, Albuquerque, New Mexico, June 1993, 68-77.

- David A. Berson, Rajiv Gupta and Mary Lou Soffa, "URSA: A Unified ReSource Allocator for Registers and Functional Units in VLIW Architectures," *Conference on Architectures and Compilation Techniques for Fine and Medium Grain Parallelism*, IFP Transactions A-23, Orlando, Florida, January 1993, 243-254.
- Chyi-Ren Dow, Shi-Kuo Chang and Mary Lou Soffa, "A Software System for the Visualization of Parallelizing Programs," *The International Computer Symposium*, Taiwan, December 1992, 768-775.
- Brian A. Malloy, Rajiv Gupta and Mary Lou Soffa, "A Shape Matching Approach for Scheduling Fine-Grained Parallelism," *The 25th Annual ACM/IEEE International Symposium on Microarchitecture (MICRO)*, Portland, Oregon, December 1992, 264-267.
- Rajiv Gupta, Mary Jean Harrold and Mary Lou Soffa, "An Approach to Regression Testing using Slicing," *IEEE-CS International Conference on Software Maintenance*, Orlando, Florida, November 1992, 299-308.
- Chyi-Ren Dow, Shi-Kuo Chang and Mary Lou Soffa, "A Visualization System for Parallelizing Programs," *ACM International Conference on Supercomputing '92*, Minneapolis, November 1992, 194-203.
- Tia Watts, Mary Lou Soffa and Rajiv Gupta, "Techniques for Integrating Parallelizing Transformations and Compiler Based Scheduling Methods," *International Conference on Supercomputing'92*, Minneapolis, Minnesota, November 1992, 830-839.
- Evelyn Duesterwald, Rajiv Gupta and Mary Lou Soffa, "Register Pipelining: An Integrated Approach to Register Allocation for Scalar and Subscripted Variables," *International Workshop on Compiler Construction (CC) LNCS 641 Springer Verlag, Paderborn, Germany*, October 1992, 192-206.
- Rajiv Gupta and Mary Lou Soffa, "Automatic Generation of a Compact Test Suite," *The Twelfth IFIP World Computer Congress*, Vol. I, Madrid, Spain, September 1992, 237-243.
- Evelyn Duesterwald, Rajiv Gupta and Mary Lou Soffa, "Distributed Slicing and Partial Re-execution for Distributed Programs," *Fifth Workshop on Languages and Compilers for Parallel Computing*, LNCS 757 Springer Verlag, Yale University, New Haven, Connecticut, August 1992, 497-511.
- Brian Malloy, and Errol L. Lloyd and Mary Lou Soffa, "A Fine Grained Approach to Scheduling Asynchronous Multiprocessors," *4th International Conference on Computing and Information*, Toronto, Canada, May 1992, 139-142.
- Chyi-Ren Dow, Shi-Kuo Chang and Mary Lou Soffa, "A Visual Optimization Specification Language," *Advanced Visual Interfaces Workshop*, Rome, Italy, World Scientific Series in Computer Science, Vol. 36, World Scientific Press, May 1992, 289-303.
- Shan Fan Liu and Mary Lou Soffa, "Parallel Task Assignment by Graph Partitioning," *PARLE '92*, Paris, France, June 1992, 965-966.
- Robert Kramer, Rajiv Gupta and Mary Lou Soffa, "The Combining DAG: A Technique for Parallel Data Flow Analysis," *The Sixth International Parallel Processing Symposium (IPPS)*, Beverly Hills, California, March 1992, 652-655.
- Evelyn Duesterwald, Rajiv Gupta and Mary Lou Soffa, "Vigorous Data Flow Testing through Output Influences," *The Second Irvine Software Symposium*, University of California, Irvine, California, March 1992, 131-145.
- Patricia Prather Pineo and Mary Lou Soffa, "The Symbolic Debugging of Code Transformed for Parallel Execution," *ACM/SIGPLAN Debugging Workshop '91*, Albuquerque, New Mexico, November 1991, 23-29.
- Evelyn Duesterwald and Mary Lou Soffa, "Concurrency Analysis in the Presence of Procedures using a Data Flow Framework," *ACM/IEEE Proceedings of Symposium on Testing, Analysis, and Verification*, Victoria, Canada, October 1991, 138-148.
- Ravi Sharma and Mary Lou Soffa, "Parallel Generational Garbage Collection," *Object-Oriented Programming Systems, Languages, and Applications (OOPSLA)*, October 1991, 16-32.

- Deborah Whitfield and Mary Lou Soffa, "Automatic Generation of Global Optimizations," *ACM SIGPLAN '91 Conference on Programming Language Design and Implementation*, Toronto, Canada, June 1991, 120-129.
- Patricia Prather Pineo and Mary Lou Soffa, "Debugging Parallelized Code Using Code Liberation Technique," *ACM SIGPLAN Workshop on Parallel and Distributed Debugging*, Santa Cruz, California, pp. 108-119, May, 1991.
- Ben Heggy and Mary Lou Soffa, "Architectural Support for Register Allocation in the Presence of Aliasing," *ACM International Conference on Supercomputing '90*, pp. 720-729, November 1990, 730-739.
- Mary Jean Harrold, Rajiv Gupta and Mary Lou Soffa, "A Methodology for Controlling the Size of a Test Suite," *IEEE-CS International Conference on Software Maintenance*, San Diego, California, November 1990, 302-310.
- Mary Jean Harrold, Rajiv Gupta and Mary Lou Soffa, "TBM: A Testbed Management Tool," *The Seventh International Conference on Testing Computer Software*, San Francisco, California, June 1990, 47-56.
- Rajiv Gupta, Lori L. Pollock and Mary Lou Soffa, "Parallelizing Data Flow Analysis," *Workshop on Parallel Compilation*, Kingston, Ontario, May 1990.
- Deborah Whitfield and Mary Lou Soffa, "An Approach to Ordering Optimizing Transformations," *Second ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)*, March 1990, 137-146.
- Mary Jean Harrold and Mary Lou Soffa, "Computation of Interprocedural Definition and Use Dependencies," *IEEE 1990 International Conference on Computer Languages*, March 1990, 297-306.
- Lori Pollock and Mary Lou Soffa, "Incremental Global Optimization for Faster Recompilations," *IEEE 1990 International Conference on Computer Languages*, New Orleans, La., March 1990, 281-290. (Selected as a best paper.)
- Mary Jean Harrold and Mary Lou Soffa, "Interprocedural Data Flow Testing," *ACM Software Testing, Analysis and Verification Symposium*, Key West, Florida, December 1989, 158-167.
- Rajiv Gupta, Mary Lou Soffa, and Tim Steele, "Register Allocation via Clique Separators," *ACM SIGPLAN'89 Conference on Programming Language Design and Implementation (PLDI)*, Portland, Oregon, June 1989, 264-275.
- Mary Jean Harrold and Mary Lou Soffa, "An Incremental Data Flow Testing Tool," *International Conference on Testing Computer Software*, May 1989.
- M. P. Bivens and M. L. Soffa, "Reuse of Compiler Analysis in a Programming Environment," *ACM 1989 Computer Science Conference* February 1989, 368-373.
- Mary Jean Harrold and Mary Lou Soffa, "An Incremental Approach to Unit Testing," *IEEE/ACM Conference on Software Maintenance (ICSM)*, October 1988, 362-367.
- Rajiv Gupta and Mary Lou Soffa, "Compile-time Techniques for Efficient Utilization of Parallel Memories," *ACM SIGPLAN Symposium on Parallel Programming: Experience with Applications, Languages and Systems*, New Haven, July 1988, 235-246.
- Rajiv Gupta and Mary Lou Soffa, "A Matching Approach to Utilizing Fine-Grained Parallelism," *The Twenty-first Annual Hawaii International Conference on System Sciences*, Vol. I, Kona, Hawaii, January 1988, 148-156.
- Lori Pollock and Mary Lou Soffa, "High-Level Debugging with the Aid of an Incremental Optimizers," *Proceedings of Hawaii International Conference on System Sciences*, January 1988, 524-532.
- Rajiv Gupta and Mary Lou Soffa, "A Reconfigurable LIW Architecture," *International Conference on Parallel Processing (ICPP)*, St. Charles, Illinois, August 1987, 893-900.
- M. P. Bivens and Mary Lou Soffa, "Incremental Generation of High-Quality Code," *ACM National Computer Conference*, Chicago, Illinois, June 1987, 189-197.
- Rajiv Gupta and Mary Lou Soffa, "Region Scheduling," *The Second ACM International*

- Conference on Supercomputing*, Vol. III, Santa Clara, May 1987, 141-148.
- Brain Malloy and Mary Lou Soffa, "An Efficient Implementation of SimCal," *International Conference on Modeling and Simulation*, Pittsburgh, Pennsylvania, April 1987.
- Rajiv Gupta and Mary Lou Soffa, "SHAPE: A Highly Adaptable and Parallel System," *ACM Computer Science Conference*, Cincinnati, Ohio, February 1986, 107-114.
- Brian Malloy and Mary Lou Soffa, "SimCal: The Merger of Simula and Pascal," *IEEE Winter Simulation Conference*, February 1986, 397-403.
- Lori Pollock and Mary Lou Soffa, "Incromint - An INCRemental Optimizer for Machine INdependent Transformations," *ACM SoftFair II*, San Francisco, California, December 1985, 162-171.
- Rajiv Gupta and Mary Lou Soffa, "The Efficiency of Storage Management Schemes for Ada Programs," *ACM/SIGAda Ada International Conference*, Paris, May 1985, 164-172. Also published in *Sigplan Notices*, Vol. 20, No. 11, November 1985, 30-38.
- Lori L. Pollock and Mary Lou Soffa, "Incremental Compilation of Locally Optimized Code," *ACM SIGPLAN Principles of Programming Languages (POPL) Symposium*, January 1985, 152-164.
- Ching-Chy Wang, Errol L. Lloyd and Mary Lou Soffa, "Feedback vertex sets in polynomial time - A new class," *Twenty-Second Annual Allerton Conference*, Illinois, October 1984, 291-298.
- John P. Kearns and Mary Lou Soffa, "A Laboratory for Experimental Work in the Efficient Implementation of Concurrent High Level Languages," *Workshop on Real-Time Operating Systems*, Niagara Falls, New York, August 1983. Also appeared in *Real-time Systems Newsletter*, 1984, 46-50.
- L. Cheng, Mary Lou Soffa and Y.H. Yang, "Simulation of an I/O Driven Requirements Language," *6th IEEE COMPSAC*, September 1982, 213-218.
- John P. Kearns and Mary Lou Soffa, "Performance Comparison of Copy-less Coroutine Implementations," *5th IEEE COMPSAC*, 1981, 213-218.
- S. Robinson and Mary Lou Soffa, "An Instructional Tool for Beginning Programming Students," *Eleventh SIGCSE Technical Symposium On Computer Science Education*, 12(1), February 1980.
- M. Lemon, Mary Lou Soffa and G. Lindstrom, "Control Separation in Programming Languages," *1977 Annual ACM Conference*, Washington, D.C., 1977.

## GRANTS

- Google Grant, *Adaptive Scheduling in the Heterogeneous Datacenter*, 2011
- Google Grant, *Contention-Aware Online Adaption*, 2010
- National Science Foundation, "Collaborative Research: *REEmact: A Robust Execution Environment for Fragile Multicore Systems*, Sept., 2008-August, 2011
- National Science Foundation, *Outreach and Pedagogy to Increase Undergraduate Diversity at Engineering Schools*, May, 2008 – April, 2011.
- Microsoft, "Testing for Security," 2004-2006
- National Science Foundation, "Adapting Program Code Continuously and Adaptively," (Co-PI: Bruce Childers), September 2003-March, 2006
- National Science Foundation, "Advance: From Associate Professor to Full with Distinguished Professors Leading the Way," (Co-PI: Jane Cunny), September 2003-March 2006, \$250K
- CRAW Graduate Student Cohort, Microsoft \$50K, ACM \$40K, (Co-PI: Jane Cunny), January 2004-January 2006
- National Science Foundation, "Continuous Compilation: A New Approach to Aggressive and Adaptive Code Transformations," (Co-PI: Bruce Childers), September 2002-March, 2004, \$180,000
- IBM Eclipse Project, "SoftTest: An Eclipse Plug-in for Scalable and Flexible Software Testing of Java Programs," November, 2002, \$28,000

National Science Foundation, “*Group Travel Grant for Faculty from Minority Institutions to Attend FSE-10*,” September 2002-September 2003, \$25,000

National Science Foundation, “*Learning Behaviors and Background Characteristics that Promote Retention of Women and Minorities in Undergraduate Computer Science Programs*,” (Co-PI: Sandra Katz), September 2000-December 2003, \$528,167

Commonwealth of Pennsylvania, Link to Learn – “*Increasing the participation of women and minorities in computer science*,” April 2000-March 2002. \$301,530

National Science Foundation, “*Presidential Award for Mentoring*,” September 1999-August, 2001, \$10,000.

National Science Foundation, “*A Framework for Path and Resource Sensitive Optimizations*,” Grant CCR-980859, (Co-PI: Rajiv Gupta), September 1998-August, 2002, \$360,000

National Science Foundation, “*Experimental Software Systems: Experimental Evaluation of Scalable Optimization Techniques*,” Grant EIA-9806525, (Co-PIs: Rajiv Gupta, Lori Pollock, David Whalley), October 1998-August 2002, \$400,000

Hewlett Packard Laboratories, Palo Alto, California, “*Optimizations Techniques for Superscalar/VLIW Architectures*,” (Co-PI: Rajiv Gupta), January 1996-December 1998, \$103,034

Hewlett Packard Laboratories, Palo Alto, California, “*Debugging of Optimized Code*,” (Co-PI: Rajiv Gupta), January 1996-December 1998, \$338,421

National Science Foundation, “*Demand Driven Computation of Partial Data Flow and its Application in Software Engineering*,” Grant CCR-9402226, (Co-PI: Rajiv Gupta), September 1995-May, 1999, \$240,000

National Science Foundation, “*Grant for Faculty at Minority and Women's Colleges and Universities*,” (Co-PI: Barbara Ryder and Edith Schonberg), February 1994-August 1995, \$20,000

National Science Foundation, “*Unifying Framework for Parallelizing Transformations*,” Grant CCR 9109089, July 1991-December 1994, \$283,265

National Science Foundation, “*Fine and Coarse Grain Incremental Compilation*,” CCR-8801104, Optimized Code, May 1988-January 1991, \$162,198

National Science Foundation, Research Instrumentation - *Hypercube*, (Co-PIs: R. Melhem and T. Znati), January 1990-December 1990, \$124,300

National Science Foundation Professorship for Women, “*Incremental Code Optimization and Generation*,” University of California, Berkeley, January 1987-December 1987, \$82,565

National Science Foundation, Grant MCS-8119341, “*Implementation of Concurrency*,” May 1982-June 1987, \$203,945

National Science Foundation, Grant MCS79-06102, “*Control Implementation in Programming Language*,” September 1979-February 1984, \$92,012

National Science Foundation, Computer Science and Computer Engineering Research Equipment, 1982, (Co-PI: P. Kearns), \$60,000

National Science Foundation, Computer Science Department Research Equipment, 1979, \$40,000

## **INVITED SPEAKER (selected)**

Temple University CIS Department Colloquium Series, Philadelphia 2009

Invited Speaker, Microsoft Research, Beijing, China, 2006

New Faculty Symposium at ICSE – May, 2006. Title: Mentoring and Advising Graduate Students

Mid-Atlantic Student Workshop on Programming Languages and Systems, 2005

Fifth International Conference on Quality Software, Melbourne, Australia, 2005

## **PROFESSIONAL ACTIVITIES**

### **Editorial Boards**

ACM Transactions on Software Engineering Methodology, 2003-2009

Computer Languages, 1987-2008  
South African Journal of Computing, 1996-present  
Journal of Empirical Software Engineering, 2003-present  
International Journal of Parallel Programming, 1995-2003  
ACM Transactions on Programming Languages and Systems, 1993-2001  
IEEE Transactions on Software Engineering, 1994-2000

### **Boards and Advisory Committees**

ACM Council, 2000 to present  
ACM Publications Board, 2005 to present  
Virginia Tech CS Advisory Board, 2006 to present  
CMU School of Computer Science Advisory Board, 2005  
Board of Directors, Computing Research Association (CRA), elected by CS & E Department  
Chairs of Ph.D. granting institutions (mostly); member: 1996-present; Vice Chair: 1997-2001  
Swedish Research Council, 2000-2005  
ACM SIGPLAN Programming Languages Design and Implementation (PLDI) Conference, 2001-2005  
NSF Advance Project, Georgia Tech, 2002-2006  
Software Tools and Technology Transfer, Springer, 1998-present

### **Steering Committees**

ASPLOS, 2009 to present  
IEEE/IFIPS International Conference on Parallel Architectures and Compilation Techniques (PACT), 2001-2003  
ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), 1998-present  
ACM SIGSOFT/SIGPLAN Program Analysis for Software Tools and Engineering (PASTE), 1998-present  
ACM/SIGPLAN Programming Languages Design and Implementation Conference (PLDI), 2001-2005

### **Conference/Program Chair**

Conference Chair for ASPLOS, Washington, DC 2009  
Conference Chair for Code Generation and Optimizations, Boston, 2008  
Chair of CRA-W Graduate Cohort Workshop – 200 junior graduate students meet for a weekend to discuss issues of being a women in a computer science and engineering department and skills needed to achieve goals, funded by Microsoft and Google  
Chair of CRA-W Cohort of Associate Professors, funded by NSF  
Co Chair of CRA Workshop for New Chairs, Snowbird Conference, 2006  
Program Co-Chair, IEEE TCSE/ACM SIGSOFT International Conference on Software Engineering (ICSE), Shanghai, China, 2006  
Chair, Emerging Technologies: Can Optimization Technology Meet the Demands? Dagstuhl Workshop, 2003  
Chair, Doctoral Workshop, IEEE TCSE/ACM SIGSOFT International Conference on Software Engineering, 2001 and 2003  
Conference Chair, ACM SIGSOFT Foundations of Software Engineering Conference (FSE) Sept. 2002  
Program Chair, ACM/SIGPLAN Programming Languages Design and Implementation Conference (PLDI), June 2001  
Program Chair, IEEE/IFIPS International Conference on Parallel Architectures and Compilation Techniques (PACT), October 2000

Chair, Recruitment and Retention of Women and Minorities Panel, CRA Snowbird Conference, July 2000  
Chair, Mentoring Senior Faculty for Career Options Panel, CRA Workshop on Careers for Women in Computer Science and Engineering, May 1999  
Conference Chair, ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), March 1998  
Conference Co-Chair, ACM SIGPLAN Programming Languages Design and Implementation, June 1994

**Program Committee Member (since 1990)**

PACT, 2011  
Code Generation and Optimization, 2011  
Workshop on Software Engineering for Sensor Network Applications, 2011  
International Conference on Software Testing, 2010, 2011  
Static Analysis Symposium, 2010  
ACM SIGPLAN Programming Language Design and Implementation, 2009, 2010  
Computer Conference, 2009  
The 2007 International Conference for High Performance Computing and Communications (SC07), Reno, Nevada, 2006  
Sixth International Conference on Aspect-Oriented Software Development, Vancouver, Canada, 2007  
Virtual Execution Environments, San Diego, 2007  
Sixth International Symposium on Automated and Analysis-Driven Debugging (AADEBUDG 2005)  
Virtual Execution Environments, 2005  
IEEE TCSE/ACM SIGSOFT International Conference on Software Engineering (ICSE), 2005  
ACM SIGARCH/SIGOPS/SIGPLAN, International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2004  
Static Analysis Symposium (SAS), Verona, Italy, May 2004  
Second Technology Exchange Workshop, held with ETAPS 2004  
Second Value-Prediction and Value-Based Optimization Workshop, held with ASPLOS 2004  
ACM SIGPLAN/SIGACT Principles of Programming Languages (POPL), 2004  
IEEE TCSE/ACM SIGSOFT International Conference on Software Engineering (ICSE), 2004  
ACM SIGPLAN, Conference on Languages, Compilers and Tools for Embedded Systems, LCTES, 2003  
Static Analysis Symposium (SAS), San Diego, California, 2003  
Compiler Optimization meets Compiler Verification (COCV), ETAPS, 2003  
ACM SIGPLAN International Symposium on Code Generation and Optimization (CGO), 2003  
IEEE/IFIPS International Conference on Parallel Architectures and Compilation Techniques (PACT), October 2002  
Second Workshop on Compilers and Operating Systems for Low Power (COLP01), 2001  
ACM SIGPLAN Conference on Programming Languages Design and Implementation (PLDI), June 2001  
Static Analysis Symposium (SAS), September 2001  
IEEE TCSE/ACM SIGSOFT International Conference on Software Engineering May 2001  
ACM SIGSOFT International Conference on Foundation of Software Engineering (FSE), November 2000  
ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA),

August 2000  
Static Analysis Symposium (SAS'99), September 1999  
IEEE/IFIPS International Conference on Parallel Architectures and Compilation Techniques (PACT), October 1999  
Static Analysis Symposium (SAS'98), September 1998  
IEEE International Conference on Parallel and Distributed Computing and Systems (PDCS'98), October 1998  
Grace Hopper Conference, September 1997  
IEEE International Conference on Distributed Computing Systems, 1996  
IEEE/IFIPS Fourth International Conference on Parallel Architectures and Compilation Techniques (PACT'96), 1996  
IEEE International Symposium on Microarchitectures (MICRO), 1995  
IEEE TCSE/ACM SIGSOFT International Conference on Software Engineering, 1994  
International Workshop on Automated and Algorithmic Debugging, 1993, 1994, 1996  
ACM SIGARCH/SIGOPS/SIGPLAN, Architectural Support for Programming Languages and Operating Systems (ASPLOS), 1992 and 1994  
ACM SIGPLAN/SIGACT Symposium on Principles of Programming Languages (POPL), 1992  
Second Conference on Parallel and Distributed Computing, 1990

#### **Member/Officer/Co-Chair**

Leadership Team, National Center for Women in Information Technology (NCWIT)  
Organizing Team of Grace Hopper Conference, San Diego, October 2006  
Computer Research Association (CRA) Committee on Status of Women in CSE, Co-chair, 1999-2002, member 1996-present  
CRA Committee on Government Affairs, 1998-2000  
ACM SIG Board Council Representative, 2000-2002  
ACM SIG Board, Member-at-Large, 1998-2000  
ACM/SIGPLAN Chair, 1997-1999  
ACM/SIGPLAN Executive Committee, 1991-2001  
ACM/SIGPLAN Vice Chair for Conferences, 1995-1997  
ACM/SIGPLAN Treasurer, 1991-1995  
ACM/SIGPLAN Professional Activities Committee (PAC), 1993-1995  
ACM/SIGSOFT Member-at-Large, 1993-1997  
Panel member in CRA Workshop for Women's Careers in Computer Science and Engineering, February 1996 and May 1996  
Expert adviser for faculty position, University of Linkoping, Sweden, 1997-98  
OOPSLA Doctoral Symposium Committee, 1996  
Advisory Committee, Department of Computer Science, University of Virginia, 1993- 1995  
Distinguished Visitor Program, University of Montana, April, 1993  
ACM, ACM/SIGPLAN, ACM/SIGSOFT, IEEE, IEEE Computer Society

#### **Ph.D. STUDENTS – advisor/co advisor**

##### **Graduated**

Wei Le, *Towards A Practical, Path-Based Framework for Detecting and Diagnosing Faults*, December 2010, Postdoc UVA 2010  
Apala Guha, *Memory Optimization of Dynamic Binary Translators for Embedded Systems*, August 2010, Intel, Santa Clara  
Greg Kapfhammer, *Testing Applications Using Databases*, August 2008, Associate Professor, Allegheny College  
Naveen Kumar, *Debugging Adaptive Code*, August 2008, Intel

Min Zhao, *Profit Driven Optimization*, August 2007, HP Labs

Atif Memon, *A Framework for Testing Graphical User Interfaces*, July 2001, Associate Professor, University of Maryland.

Tarun Nakra, *A Framework for Value Prediction in VLIW*, June 2001, Research Scientist, IBM Research

Clara Jaramillo, *Source Level Debugging Techniques and Tools of Optimized Code*, August 2000; Assistant Professor, Chatham College (first job)

Rastislav Bodik, *Code Optimizations for Fine-Grained Architectures*, December 1999, Recipient of 2000 SIGPLAN Dissertation Award, Associate Professor, University of California at Berkeley

Neelam Gupta: *Automated Test Data Generation using Relaxation Methods*, August 1999, Assistant Professor, University of Arizona

Jodi Tims, *Automatic Generation of Data Distributions for Distributed Memory Machines*, August 1998, Department Chair, St. Francis College

Tia Watts, *Integrating Parallelizing Transformations and Compiler-based Scheduling Methods*, December 1997, Associate Professor, Indiana University of Pennsylvania

David Berson, *Integrating Instruction Scheduling, Register Allocation, and Program Transformations for Fine-Grained Architectures*, November 1996, Senior Scientist, Motorola/Starcore

Evelyn Duesterwald, *A Demand Driven Approach for Efficient Interprocedural Data Flow Analysis*, May 1996, Research Scientist, IBM T.J. Watson Research Center

Chy-Ren Dow, *A Visualization System for Transformed Parallelized Programs*, August 1994, Associate Professor, Feng-Chia University, Taiwan

Pat Pineo, *Value Tracking in Code Transformed for Parallelism*, April 1993, Professor, Edinboro University, Pennsylvania

Deborah Whitfield, *A Unifying Framework for Optimizing Transformations*, August 1991, Professor, Slippery Rock College

Brian Malloy, *A Fine-Grained Approach to Scheduling Asynchronous Execution on Multiprocessors*, April, 1991 Associate Professor, Clemson University

Ravi Sharma, *Data Partitioning: An Approach to Parallel Storage Reclamation*, 1990, AT&T

Mary Jean Harrold, *An Approach to Incremental Testing*, 1988, Professor, Georgia Tech

Mary Bivens, *Generation of High-Quality Target Code*, August 1987, Professor, Allegheny College

Rajiv Gupta, *Design of a Highly Parallel System*, 1987, Professor, University of California, Riverside

Lori Pollock, *An Approach to Incremental Compilation of Optimized Code*, April 1986, Associate Professor, University of Delaware

George Logothetis, *On the Automatic Generation of Error-Repairing LL- and LR-based parsers*, April 1983, AT&T

Ching-Chy Wang, *An Axiomatic Approach to Control Description and Implementation*, August 1983, CEO, Leverage Design Acceleration Corporation

Fernando Lafora-Garcia, *The Design and Implementation of Debugging Systems for Languages with Advanced Control Structures*, August 1982, DEC Corporation, Spain

### **Current Ph.D. Students**

Jing Yang, Software Tools for Wireless Sensor Networks, expected graduation 2011

Kristen Walcott, Time Aware Testing, expected graduation 2011

Jason Mars, Virtual Execution Environments for Multi-Core Architecture, expected graduation 2011

Lingjia Tang, expected graduation 2012

Tanima Dey, expected graduation 2013

Wei Wang, expected graduation 2013

**External Member Ph.D. committees**

Manos Renieris, Brown University, 2006

David Lacey, Oxford University, 2003

Bruno Blanchet, Ecole Polytechnique, Paris France, 2000

Nahid Shahmehri, University of Linkoping, Sweden, 1991

**M.S. STUDENTS**

Adviser on 60 M.S. students' projects

**CONSULTING**

Zymark

Corporation Mellon Institute - Carnegie Mellon

University Bell Laboratories

Westinghouse

Airbrake Company

Westinghouse Electric Corporation

**UNIVERSITY/DEPARTMENT ACTIVITIES (SELECTED)**

**University Activities**

University of Virginia

Search Committee, SEAS Associate Dean for Development

BACS Committee

University of Pittsburgh

Chancellor's Committee on Diversity, 2000-2004

Faculty Sponsor and helped organize: Organization of Women in Science (OWIS), 1997-2004

University of Pittsburgh Board of Trustees' Committee on Diversity, 2001-2003

Member of 3 team internal review committee of the Department of Biological Sciences, 1997

Member, Provost Committee on Sexual Harassment, 1995-1998

Member, Provost Committee on Internet, 1995-2000

Chair, Search Committee for Provost, 1993-94

University Research Council, 1991-1996

University Council on Graduate Studies, 1991-1996

Provost's Subcommittee for the Evaluation of Academic Programs (SEAP), 1991-1996

Conference for Women Graduate Students, workshop leader, November, 1990

Provost's Advisory Committee for Undergraduate Programs, 1990-1991

Provost's Advisory Committee for Women's Concerns, 1989-1991

College of Arts and Science Committee on Quantitative and Formal Reasoning, 1989-1991

Provost Development Fund, reviewer, 1989, 1995

Affirmative Action Committee, 1988-1990

Conference for Women Graduate Students, workshop leader, October, 1988

FAS Tenure Council, 1985-1989

Member, Department of Electrical Engineering Chair Search Committee, 1985

Computer Center Executive Committee, 1977-1984

"Computer Science and Engineering," NSF Sponsored Conference, U. of Pittsburgh, June

1981: Workshop Leader in 2 sessions

"Careers for Women in Computers, Engineering and Science," NSF Sponsored Conference,

University of Pittsburgh, June 1982: Workshop Leader

**Department Activities**

## University of Pittsburgh

- Organized first CS Day, held annually 2000-2003
- Chair, Graduate Program Committee, 2001-2003
- Developed and editor for first departmental newsletter, Links, 1997-2000
- Member, Graduate Admissions and Financial Aid, 1977-1990, 1996-2002
- Member, Faculty Search Committee, 1980-1984, 1990-1996
- Chair, Undergraduate Curriculum, 1989-1991
- Chair, Faculty Search Committee, 1988-89
- Member, Graduate Curriculum, 1986-1988
- Member, EE/CS Committee, 1988
- Chair, Department Chairperson Search Committee, 1984
- Chair, Undergraduate Curriculum, 1982-1983
- Course Scheduler, 1978-1983
- TA/TF Coordinator, 1978-1982
- Member, Publications Committee, 1977-1978

## TEACHING

### Graduate Courses/Seminars

#### University of Virginia

- Computer Science Perspectives CS696/CS6190

#### University of Pittsburgh

- Advanced Program Analysis
- Compiler Design
- Advanced Compiler Design Compiling
- Techniques for Parallel Systems
- Seminar on Programming Languages
- Seminar on Programming Languages Control Structures

### Undergraduate Courses

#### University of Pittsburgh

- Programming Languages for the Web
- Survey of Programming Languages
- Assembly Languages
- Introduction to Computer Programming
- Structure and Design of Programming Languages
- Introduction to Compiler Design
- Operating Systems
- Introduction to Information Structures