

Vita
Dr. Barbara Gershon Ryder
J. Byron Maupin Professor Emerita of Engineering
ryder@cs.vt.edu
<http://people.cs.vt.edu/~ryder>
<http://prolang.cs.vt.edu/>

Education and Employment:

- 9/2016– J. Byron Maupin Professor Emerita of Engineering, Department of Computer Science, Virginia Tech, Blacksburg, VA.
- 8/2015-8/2016 J. Byron Maupin Professor of Engineering, Department of Computer Science, Virginia Tech, Blacksburg, VA.
- 8/2008-8/2015 J. Byron Maupin Professor of Engineering and Head, Department of Computer Science, Virginia Tech, Blacksburg, VA.
- 7/2004-12/2004 Visiting Researcher, Programming Technologies Department and Intelligent Application Analysis Department, IBM T.J. Watson Research Center, Hawthorne, NY. prof
- 7/2001-7/2008 Professor II, Department of Computer Science, Rutgers University, New Brunswick, New Jersey
- 6/2001 Visiting Researcher, L'Universite Polytechnique, Palaiseau, France.
- 5/2001 Visiting Researcher, Ecole Normale Superiere, Paris, France
- 7/2000-3/2001 Visiting Researcher, Advanced Programming Tools Department, IBM T.J. Watson Research Center, Hawthorne, NY.
- 1994-2001 Professor, Department of Computer Science, Rutgers University, New Brunswick, New Jersey.
- 1993-1994 Visiting Associate Professor, Department of Computer Science, Princeton University, Princeton, New Jersey.
- 1988-1994 Associate Professor, Department of Computer Science, Rutgers University, New Brunswick, New Jersey.
- 1982-1988 Assistant Professor, Department of Computer Science, Rutgers University, New Brunswick, New Jersey. (FASP leave 7/86-12/86)
- 1977-1982 Department of Computer Science, Rutgers University; Ph.D. August 1982; Dissertation: *Incremental Data Flow Analysis Based on a Unified Model of Elimination Algorithms.*
- 1971-1976 Associate Member of Technical Staff, Computing Mathematics Department, Computer Science Research Center, Bell Laboratories, Murray Hill, New Jersey.
- 1969-1971 Department of Computer Science, Stanford University; M.S. April 1971.

1965-1969 Department of Applied Mathematics, Brown University; A.B. *magna cum laude*, June 1969.

Honors:

Selected as a Fellow of the ACM, 1998.

Team leader for Department of Computer Science at Virginia Tech, which tied for 2nd place in the *2016 National Center for Women in Information Technology (NCWIT) Extension Services Transformation (NEXT) Awards*, and received a \$50,000 gift for continuing diversity activities.

Received *Rutgers School of Arts and Sciences Computer Science Distinguished Alumni Award*, 2016.

Received *ACM SIGSOFT Influential Educator Award*, 2015.

Received *College of Engineering Diversity Committee Award, Virginia Tech*, 2015.

Virginia AAUW Woman of Achievement Award, 2014.

Received *ACM Presidential Award*, 2008.

Elected member of Board of Directors of Computer Research Association (CRA), *July 2014-June 2017; May 1998-July 2001*.

Elected Vice President of ACM 2010-2012; Secretary-Treasurer of ACM, 2008-2010; Member-at-Large, ACM Council, *June 2000-2008*, Chair, Federated Conference on Research in Computing (FCRC), *June 2003*.

Leader in Diversity Award from Rutgers University, selected by President Richard McCormick, April 2006.

Recipient of *Distinguished Program Committee Member Award, FSE 2006*.

Selected as *CRA-W Distinguished Professor*, 2004.

Recipient of *ACM SIGPLAN Distinguished Service Award*, 2001.

Recipient of *Graduate School Teaching Award*, Rutgers University, New Brunswick, 2007.

Professor of the Year, Computer Science Graduate Students Society (CSGSS) Award for Excellence in Teaching, Rutgers University, 2003.

Landi-Ryder PLDI'92 paper selected for *Best of PLDI Collection, 1970-1996* (i.e., A Safe Approximate Algorithm for Interprocedural Pointer Aliasing), April 2003.

Invited keynote speaker, Asian Pacific Software Engineering Conference, Hong Kong, China, *December 2012*; ACM India Annual Conference, Hyderabad, India, *January 2011*; Twelfth Annual International Conference on Compiler Construction (CC'03), *April 2003*, Warsaw, Poland.

Invited speaker, Panels on *Impact of Software Engineering Research on Modern Programming Languages*, ICSE May 2002, OOPSLA October 2001; Fourth International Static Analysis Symposium (SAS'97), *September 1997*, Paris, France.

Grant Awards:¹

February 2015 *Detection of Malware Collusion with Static Dependence Analysis on Inter-App Communication*, DARPA, \$430,000, PI: Dr. Danfeng Yao, co-PI: Dr. Barbara G. Ryder.

July 2013 *Advanced Dependence Analysis for Android Malware Classification*, VeriSign, \$30,000, PI: Dr. Danfeng Yao.

February 2013 *Recruiting Female High School Students into Computer Science in VA/DC*, Northrop Grumman, \$5,000.

September 2012 *Supporting Women with Aspirations in Computing*, Boeing Corp., \$9,000.

September 2012 *Recruiting High School Women into Computing*, Boeing Corp., \$11,000.

March 2012 *Recruiting Female High School Students into Computer Science in VA/DC*, Northrop Grumman, \$5,000.

April 2010 *Professional Development and Networking Workshop for High School Teachers of Computer Science*, NCWIT and Microsoft Round 6 Seed Fund Award, \$15,000.

Sept 2009 *Recruiting High School Women and Minorities into Computer Science*, co-PIs: Libby Bradford, Cal Ribbens, Lockheed Martin, \$10,000.

Sept 2009 *Recruiting First-year Women and Minority College Students into Computer Science*, co-PIs: Libby Bradford, Manuel Perez-Quinones, Steve Harrison, Terry Arthur, Lockheed Martin, \$33,000.

2008-2011 *Blended Static/Dynamic Analyses for Performance Understanding and Improved Security of Framework-intensive Applications*, NSF CPA-SEL (\$255,500 with REU supplement)

2006-2007, 2007-2008 *IBM Open Collaboration Research Program Award*

2006-2007 *Student Travel Support to the ICSE 2007 Doctoral Symposium*, NSF, \$10,700

2005-2006 *Northeast Workshop on Integrative Computing Education and Research (ICER)*, NSF, (\$44,100) (PI-Prof Jim Kurose, University of Massachusetts; co-PI on proposal as workshop co-chair)

2005-2006 *Understanding the Performance of Framework-intensive Applications Through Combined Static and Dynamic Analysis*, IBM Faculty Award, (\$25,000)

2/2005-6/2006 *EXTest: An Eclipse Plugin for Testing and Understanding Exception Handling Code in Java Applications*, IBM Eclipse Innovation Grant 2005 Program, (\$20,000)

9/04-8/08 *ITWF: Collaborative Research: Increasing the Representation of Undergraduate Women and Minorities in Computer Science*, National Science Foundation CISE-ITWF, co-PI on proposal with 7 other institutions, PI: Dr. Susan Horwitz (Univ Wisconsin, Madison), (\$59,832 at Rutgers)

3/03-2/04 *Travel Grants for Faculty at Minority/Female Institutions to Travel to FCRC'03*, National Science Foundation, CISE-EIA Special Projects, (\$68,000)

¹PI unless otherwise noted.

10/02-10/03 *Travel Grants for Faculty at Minority/Female Institutions to Attend FCRC 2003*, ACM SIG Project Fund, (\$50,000).

8/02-8/05 *Change Impact Analysis of Object-oriented Software*, National Science Foundation, CISE-CCR Software Engineering and Languages, co-PI: Dr. Frank Tip (IBM TJ Watson Research Center), (\$360,000). *Research Experiences for Undergraduates* (REU) supplements (\$12,000.)

8/01-7/02 *IBM Support of University Research (SUR) Equipment Grant*, IBM T.J. Watson Research Center, co-PIs: Dr. Ulrich Kremer, Dr. Rich Martin, Dr. Thu Nguyen, Dr. Donald Smith (\$53,038.).

7/01-6/04 *System and Compiler Support for Component-Based Construction of Scalable Internet Services*, National Science Foundation, CISE-EIA Next Generation Software Program, PI: Dr. Thu Nguyen, co-PIs: Dr. Barbara Ryder, Dr. Rich Martin, (\$506,000.) NSF-ROA supplement for Dr. Dave Wonnacott, Haverford College, (\$41,541.)

7/99-6/02 *Component Data-flow Analysis for Large Software Systems*, National Science Foundation, CISE-CCR Software Engineering and Languages, (\$301,000). *Research Experiences for Undergraduates* (REU) supplements (\$10,000.)

6/99-11/00 *Tunable Compile-time Analyses for Large C and C++ Applications*, Siemens Corporate Research, (\$57,000)

5/99-12/99 *Group Travel Grant for Faculty at Minority Institutions to Travel to PLDI'99*, National Science Foundation, CISE-EIA Special Projects, (\$20,000)

8/98 *Program Analysis*, Microsoft Corporation, (\$10,000)

8/98 *Module-level Compile-time Analysis of Industrial-sized Software Systems*, NSF Software Engineering and Languages, (\$50,000)

8/98-7/01 *Effective Compilation in the Presence of Exceptions*, NSF Architectures, Compilers and Software Systems, co-PIs: Dr. Uli Kremer, Dr. Don Smith, (\$225,000)

2/97 *Data-flow Testing for Difficult-to-find Bugs*, NSF CISE Cross Disciplinary Area postdoctoral grant, (\$33,168)

2/97 *Integrating Internet Technology into Undergraduate Curricula*, AT&T Foundation Special Purpose Grant in Science and Engineering, co-PI, with PI: Dr. Don Smith, and co-PI Kate Goelz, (\$25,500)

6/96-6/98 *Virtual Function Resolution: A Foundation for Compile-time Optimization in C++*, Hewlett-Packard Company (\$185,000)

7/95-6/98 *Scalable Static Techniques for Exhaustive and Incremental Analyses of C Systems*, National Science Foundation, Computer Science - Software Engineering, with co-PI Dr. William Landi, (Siemens Corporate Research, Princeton, NJ) (\$280,000); 7/96-7/98 *Software Capitalization and Research Experiences for Undergraduates* (REU) supplements (\$25,000); 7/97-6/98 *Research Experiences for Undergraduates* supplement (\$10,000); 11/97-11/98 *Software Capitalization* (\$41,000).

5/94-12/94 *Group Travel Grant for Faculty at Minority Institutions to Travel to PLDI'94*, National Science Foundation, CISE Cross Disciplinary Activities, co-PI with Dr. Edith Schonberg (IBM T.J. Watson Laboratories, Yorktown Heights, NY) and Dr. Mary Lou Soffa (University of Pittsburgh), (\$20,000)

9/94 - 9/96 *Data Flow Analysis of C⁺⁺ Systems*, Siemens Corporate Research, Princeton, NJ (\$30,000)

3/93 - 8/96 *Compile-time Analysis Tools for Parallel Software Development Environments*, National Science Foundation, Computer Science - Programming Languages and Compilers, (\$108,050)

7/92 - 6/95 *Practical Compile-time Analyses for Evolving C Systems*, National Science Foundation, Computer Science - Software Engineering, (\$312,000)

7/92 - 9/96 *Practical Analysis of C Systems* Siemens Corporate Research, Princeton, NJ, (\$41,000)

11/91 - 11/96 *Faculty Awards for Women Scientists and Engineers*, National Science Foundation, Computer Science, (11 awarded in CISE) (\$250,000)

9/91 - 6/92 Undergraduate Research Internship, Provost's Office, Rutgers University (\$2000)

7/90-6/91 Research Fellowship for graduate student Bill Landi, Siemens Research Corporation, Princeton, NJ (\$20,000)

4/90-4/92 *Applying Incremental Data Flow Analysis to Large Software Systems*, National Science Foundation, Computer Science - Software Engineering (\$209,000); 7/91 - 6/91 *Research Experience for Undergraduates* supplement, (\$4200)

10/88 Equipment Award from AT&T Foundation (\$15,000)

9/88 *Efficient Analysis of Large Software Systems*, Siemens Research Corporation, Princeton, NJ (\$20,000)

2/86-7/88 *Incremental Analysis Algorithms for Software Systems*, National Science Foundation, Computer Science - Software Engineering (\$86,300)

9/85-6/91 *Algorithms Facilitating Analysis of Software Systems* Center for Computer Aids for Industrial Productivity (CAIP), Rutgers University (\$30,063 1985-1986; \$37,796 1986-1987; \$35,896 1987-1988; \$60,978 1988-1989; \$78,000 1989-1990; \$61,000 1990-1991)

Journals and Highly-selective, Refereed Conference Proceedings:²

1. Wei, Shiyi, Tripp, Omer, Ryder, Barbara G., and Dolby, Julien, "Revamping JavaScript Static Analysis via Localization and Remediation of Root Causes of Imprecision" in the Proceedings of the 2016 ACM SIGSOFT International Symposium on Foundations of Software Engineering (FSE), November 2016.
2. Xu, Kui, Tian, Ke, Yao, Danfeng and Ryder, Barbara G., "A Sharper Sense of Self: Probabilistic Reasoning of Program Behaviors for Anomaly Detection with Context Sensitivity", in the Proceedings of the IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), 2016.

²At these *highly selective* conferences, at most 27% of the submissions were accepted.

3. Shu, Xiaokui, Yao, Danfeng (Daphne), and Ryder, Barbara G., "A Formal Framework for Program Anomaly Detection", in the Proceedings of the 18th International Symposium on Research in Attacks, Intrusions and Defenses (RAID), November 2015, pp 270–292, DOI: 10.1007/978-3-319-26362-5_13.
4. Wei, Shiyi, Ryder, Barbara G., and Xhakaj, Franceska, "Empirical Study of the Dynamic Behavior of JavaScript Objects", *Software Practice and Experience*, 2015, published online May 29, 2015, DOI: 10.1002/spe.2334.
5. Wei, Shiyi and Ryder, Barbara G., "Adaptive Context-sensitive Analysis for JavaScript", in the Proceedings of the European Conference on Object-Oriented Programming (ECOOP) 2015.
6. Elish, Karim, Yao, Danfeng, and Ryder, Barbara G., "Profiling User-trigger Dependence for Android Malware Detection", *Computers and Society*, pp 255-273, published online Feb 20, 2015; DOI: 10.1016/j.cose.2014.11.00.
7. Wei, Shiyi and Ryder, Barbara G., "State-sensitive Points-to Analysis for the Dynamic Behavior of JavaScript Objects", in the Proceedings of the European Conference on Object-Oriented Programming (ECOOP), Lecture Notes in Computer Science, Vol 8586, pp 1-26, 2014, DOI: 10.1007/978-3-662-44202-9_1.
8. Wei, Shiyi and Ryder, Barbara G., "Practical Blended Taint Analysis for JavaScript", in *Proceedings of ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)*, pp 336-346, doi:10.1145/2483760.2483788, July 2013.
9. Ryder, Barbara G. and Wiedermann, Benjamin, "Language Design and Analyzability: A Retrospective", invited paper, *Software, Practice and Experience*, volume 42, pp 3–18, (published online 26 October 2011 in wileyonlinelibrary.com)
10. Wloka, Jan, Hoest, Einar and Ryder, Barbara G., "Tool Support for Change-centric Test Development", *IEEE Software*, volume 27, no 3, pp 66-71, May/June 2010.
11. Wloka, Jan, Ryder, Barbara G., Tip, Frank, and Ren, Xiaoxia, "Safe-Commit Analysis to Facilitate Team Software Development", in *Proceedings of the 31st International Conference on Software Engineering (ICSE)*, May 2009, pp 507-517.
12. Geay, Emmanuel, Pistoia, Marco, Tateishi, Taakaaki, Ryder, Barbara G., Dolby, Julian, "Modular String-sensitive Permission Analysis with Demand-driven Precision", in *Proceedings of the 31st International Conference on Software Engineering (ICSE)*, May 2009, pp 177-187.
13. Dufour, Bruno, Ryder, Barbara G, and Sevitsky, Gary, "A Scalable Technique for Characterizing the Usage of Temporaries in Framework-intensive Java Applications", *Proceedings of the 16th ACM SIGSOFT International Symposium on Foundations of Software Engineering (FSE)*, November 2008, pp 59-70.
14. Zhang, Weilei and Ryder, Barbara G., "Automatic Construction of Accurate Application Call Graph With Library Call Abstraction For Java", *Journal of Software Maintenance and Evolution: Research and Practice*, June 2007, pp 231-252.

15. Fu, Chen and Ryder, Barbara G., "Exception-chain Analysis: Revealing Exception Handling Architecture in Java Server Applications", in the *Proceedings of the 29th International Conference on Software Engineering (ICSE)*, May 2007, pp 230-239.
16. Stoerzer, Maximilian, Ryder, Barbara G., Ren, Xiaoxia, and Tip, Frank, "Finding Failure-Inducing Changes in Java Programs using Change Classification", in *Proceedings of the 14th SIGSOFT Conference on the Foundations of Software Engineering*, November 2006, pp 57-68, Nominated for *Best Paper Award*.
17. Ren, Xiaoxia, Chesley, Ophelia, and Ryder, Barbara G., "CRISP, A Debugging Tool for Java Programs", *IEEE Transactions on Software Engineering*, Volume 32, Number 9, September 2006, pp 1-16.
18. Ryder, Barbara G., Soffa, Mary Lou, and Burnett, Margaret, "The Impact of Software Engineering Research on Modern Programming Languages", *ACM Transactions on Software Engineering Methodologies*, Volume 14, Number 4, October 2005, pp 431-477.
19. Fu, Chen, Milanova, Ana, Ryder, Barbara G., Wonnacott, David, "Robustness Testing of Java Server Applications", extended version of ISSTA 2004 paper solicited for journal publication in *IEEE Transactions on Software Engineering*, Volume 31, Number 4, pp 292-312, April 2005.
20. Milanova, Ana, Rountev, Atanas, Ryder, Barbara G., "Parameterized Object Sensitivity for Points-to Analysis for Java", extended version of ISSTA 2002 paper solicited for journal publication in *ACM Transactions on Software Engineering Methodology*, Volume 14, Number 1, pp 1-41, January 2005.
21. Ren, Xiaoxia, Shah, Fenil, Tip, Frank, Ryder, Barbara G., and Chesley, Ophelia, "Chianti: A Tool for Practical Change Impact Analysis of Java Programs", in *Proceedings of the ACM SIGPLAN Conference on Object Oriented Programming, Systems and Applications (OOPSLA)*, pp 432-448, October 2004.
22. Rountev, Atanas, Milanova, Ana and Ryder, Barbara G., "Fragment Class Analysis for Testing Polymorphism in Java Software", extended version of ICSE 2003 paper solicited for special issue journal publication in *IEEE Transactions on Software Engineering*, Volume 30, Number 6, pages 372-387, June 2004.
23. Ana Milanova, Atanas Rountev, Barbara G. Ryder, "Precise Call Graphs for C Programs with Function Pointers", *Automated Software Engineering* special issue on *Source Code Analysis and Manipulation*, Volume 11, Issue 1, pages 7-26, January 2004
24. Ryder, Barbara G., "Dimensions of Precision in Reference Analysis of Object-oriented Programming Languages", invited paper in the *Proceedings of the Twelfth International Conference on Compiler Construction*, Warsaw, Poland, April 2003, pp 126-137.
25. Rountev, Atanas, Milanova, Ana and Ryder, Barbara G., "Fragment Class Analysis for Testing Polymorphism in Java Software", accepted for publication in *Proceedings of the 25th International Conference on Software Engineering*, Portland OR, May 2003, pp 210-220.
26. Arnold, Matthew, Hind, Michael, and Ryder, Barbara G., "Online Feedback-directed Optimization of Java", in *Proceedings of the Conference on Object Oriented Programming Languages, Systems and Applications*, November 2002, pp 111-129.

27. Rountev, Atanas, Milanova, Ana, Ryder, Barbara G., "Points-to Analysis for Java Using Annotated Inclusion Constraints", in the *Proceedings of the ACM SIGPLAN Conference on Object Oriented Programming Languages, Systems and Applications*, October 2001, pp 43-55.
28. Arnold, Matthew, Ryder, Barbara G., "Reducing the Cost of Instrumented Code via Sampling", in *Proceedings of the ACM SIGPLAN Conference on Programming Language Design and Implementation*, June 2001, pp 168-179.
29. Chatterjee, Ramkrishna, Ryder, Barbara G., and Landi, William A., "Complexity of Points-to Analysis of Java in the Presence of Exceptions", *IEEE Transactions on Software Engineering*, volume 27, number 6, June 2001, pp 481-512.
30. Arnold, Matthew, Hsiao, Michael, Kremer, Ulrich, Ryder, Barbara G., "Exploring the Interaction between Java's Runtime Exceptions and Instruction Scheduling", solicited for a special issue on LCPC'99, *International Journal on Parallel Programming*, Volume 29, Issue 2, April 2001, pp 111-137.
31. Ryder, Barbara G., Landi, William A., Stocks, Phil, Zhang, Sean, and Altucher, Rita, "A Schema for Interprocedural Modification Side Effects Analysis with Pointer Aliasing", *ACM Transactions on Programming Languages and Systems*, volume 23, issue 1, March 2001, pp 105-186.
32. Rountev, Atanas, Ryder, Barbara G., and Landi, William A., "Data-flow Analysis for Program Fragments", in *Proceedings of SIGSOFT'99: The Seventh Symposium on the Foundations of Software Engineering (FSE'99)*, September 1999, pp 235-253.
33. Yur, Jyh-shiarn, Ryder, Barbara G., and Landi, William A., "An Incremental Flow- and Context-sensitive Pointer Aliasing Analysis", in *Proceedings of the 21st International Conference on Software Engineering*, May 1999, pp 442-451.
34. Chatterjee, Ramkrishna, Ryder, Barbara G., and Landi, William A., "Relevant Context Inference", in *Proceedings of the 26th ACM SIGPLAN/SIGACT Symposium on Principles of Programming Languages*, January 1999, pp 133-146.
35. Yur, Jyh-shiarn, Ryder, Barbara G., Landi, William A., and Stocks, Phil, "Incremental Analysis of Side Effects for C Software Systems", in *Proceedings of the 19th International Conference of on Software Engineering*, May 1997, pp 422-432.
36. Ryder, Barbara G., "A Position Paper on Compile-time Program Analysis", *ACM Computing Surveys*, Volume 28A, Number 4 (December 1996), also appeared in the January 1997 issue of *ACM SIGPLAN Notices*; <http://www.acm.org.surveys/1996/RyderPosition>.
37. Zhang, Sean, Ryder, Barbara G., Landi, William, "Program Decomposition for Pointer Aliasing: A Step Toward Practical Analyses", *Proceedings of SIGSOFT'96: The Fourth Symposium on the Foundations of Software Engineering (FSE4)*, October 1996, pp 81-92.
38. Lee, Yong-fong, Ryder, Barbara G., Fiuczynski, Marc, "Region Analysis: A Parallel Elimination Method for Data Flow Analysis", *IEEE Transactions on Software Engineering*, Volume SE-21, Number 11, pp 913-926, November 1995.

39. Masticola, Steve, Marlowe, Thomas J. and Ryder, Barbara G., "Lattice Frameworks for Multi-Source and Bidirectional Data Flow Analysis Problems", *ACM Transactions on Programming Languages and Systems*, Volume 17, Number 5, September 1995, pp 777-803.
40. Lee, Yong-fong and Ryder, Barbara G., "Effectively Exploiting Parallelism in Data Flow Analysis", *The Journal of Supercomputing*, Volume 8, pp 233-262, 1994.
41. Pande, Hemant, Landi, William and Ryder, Barbara G., "Interprocedural Def-Use Associations for C Systems with Single Level Pointers", *IEEE Transactions on Software Engineering*, Volume 20, Number 5, May 1994, pp 385-403.
42. Landi, William, Ryder, Barbara G., and Sean Zhang, "Interprocedural Modification Side Effect Analysis With Pointer Aliasing", *Proceedings of the ACM SIGPLAN Conference on Programming Language Design and Implementation*, pages 56-67, June 1993.
43. Landi, William and Ryder, Barbara G., "A Safe Approximate Algorithm for Interprocedural Pointer Aliasing", *Proceedings of the ACM SIGPLAN Conference on Programming Language Design and Implementation*, June 1992, pp. 235-248.
44. Lee, Yong-fong, Marlowe, Thomas J. and Ryder, Barbara G., "Experiences with a Parallel Algorithm for Data Flow Analysis", *The Journal of Supercomputing*, Vol 5, No. 2, October 1991, pages 163-188.
45. Landi, William and Ryder, Barbara G., "Pointer-induced Aliasing: A Problem Taxonomy", *Proceedings of the Eighteenth Symposium on Principles of Programming Languages*, January 1991, pp. 93-103.
46. Marlowe, Thomas J. and Ryder, Barbara G., "Properties of Data Flow Frameworks: A Unified Model", *Acta Informatica*, Vol. 28, pp 121-163, 1990.
47. Berman, A. Michael, Paull, Marvin C. and Ryder, Barbara G., "Proving Relative Lower Bounds for Incremental Algorithms", *Acta Informatica*, Volume 27, July 1990, pp 665-683.
48. Burke, Michael and Ryder, Barbara G., "A Critical Analysis of Incremental Iterative Data Flow Analysis Algorithms", *IEEE Transactions on Software Engineering*, July 1990, pp. 723-728.
49. Ryder, Barbara G., Landi, William and Pande, Hemant, "Profiling the Performance of an Incremental Data Flow Analysis Algorithm", *IEEE Transactions on Software Engineering* (special issue of on Experimental Computer Science), February 1990, pp.129-140.
50. Marlowe, Thomas J. and Ryder, Barbara G., "An Efficient Hybrid Algorithm for Incremental Data Flow Analysis", *Proceedings of the Seventeenth Symposium on Principles of Programming Languages*, January 1990, pp 184-196.
51. Ryder, Barbara G., Marlowe, Thomas J. and Paull, Marvin C., "Conditions for Incremental Iteration: Examples and Counterexamples", *Science of Computer Programming*, Vol 11, October 1988, pp 1-15.
52. Ryder, Barbara G. and Pendergrast, J. Stephen, "Experiments in Optimizing FP", *IEEE Transactions on Software Engineering*, April 1988, Vol 14, No 4, pp 444-454.

53. Ryder, Barbara G. and Paull, Marvin C., "Incremental Data Flow Analysis Algorithms", *ACM Transactions on Programming Languages and Systems*, January 1988, Vol 10, No 1, pp 1-50.
54. Carroll, Martin and Ryder, Barbara G., "Incremental Data Flow Analysis Via Dominator and Attribute Updates", *Conference Record of the Fifteenth Annual ACM Symposium on Principles of Programming Languages*, January 1988, San Diego, CA., pp 274-284.
55. Ryder, Barbara G. and Paull, Marvin C., "Elimination Algorithms for Data Flow Analysis", *ACM Computing Surveys*, Volume 18, Number 3, September 1986, pp. 277-316.
56. Ryder, Barbara G. and Carroll, Martin D., "An Incremental Algorithm for Software Analysis", *Proceedings of ACM SIGPLAN/SIGSOFT Symposium on Practical Software Development Environments*, (P. Henderson ed.), December 1986, Palo Alto, California, pp. 171-179.
57. Ryder, Barbara G., "Incremental Data Flow Analysis", *Conference Record of the Tenth Annual ACM Symposium on the Principles of Programming Languages*, January 1983, Austin, Texas, pp. 167-176.
58. Ryder, Barbara G., "Constructing the Call Graph of a Program", *IEEE Transactions on Software Engineering*, Volume SE-3, Number 3, May 1979, pp. 216-225.
59. Ryder, Barbara G., "The PFORT Verifier", *Software Practice and Experience*, Volume 4, October-December 1974, pp. 359-377.

Refereed Conference Proceedings:

1. Tien, Ke, Yao, Danfeng, Ryder, Barbara G., and Tan, Gang, "Analysis of Internal Code Heterogeneity for High-Precision Classification of Repackaged Malware", in Proceedings of the Mobile Security Technologies Workshop (MoST16), Fall 2016.
2. Xu, Kui, Yao, Danfeng, Ryder, Barbara G., and Tian, Ke, "Probabilistic Program Modeling for High Precision Anomaly Classification", in Proceedings of the Computer Security Foundations Symposium, July 2015.
3. Elish, Karim O., Yao, Danfeng, and Ryder, Barbara G., "Static Characterization of Pairwise Android Inter-component Communications for Collusion Detection", Proceedings of the Mobile Security Technologies (MoST15) workshop, Fall 2015.
4. Wei, Shiyi and Ryder, Barbara G., poster: "Taming the Behavior of JavaScript", SPLASH 2014.
5. Xu, Kui, Yao, Danfeng and Ryder, Barbara G., poster: "System Anomaly Detection with Program Analysis and Machine Learning Assistance", IEEE Security and Privacy Conference, 2013.
6. Elish, Karim O., Yao, Danfeng and Ryder, Barbara G., "User-centric Dependence Analysis for Identifying Malicious Mobile Apps", Proceedings of the Mobile Security Technologies (MoST12) workshop, Fall 2012. 29
7. Fisher, Marc, Wloka, Jan, Tip, Frank, Ryder, Barbara G. and Luchansky, Alexander, "An Evaluation of Change-based Coverage Criteria", Proceedings of ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools, September 2011, pp 21-28, <http://doi.acm.org/10.1145/2024569.2024575>

8. Fisher, Marc, Marrs, Luke and Ryder, Barbara G., "HI-C: Diagnosing and Fixing Object Churn in Framework-based Applications", demo paper in *Proceedings of the 18th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2010)*, pp 379–380, November 2010.
9. Fisher, Marc, Dufour, Bruno, Basu, Shrutarshi, and Ryder, Barbara G., "Exploring the Impact of Context Sensitivity on Blended Analysis", in *Proceedings of the International Conference on Software Maintenance (ICSM)*, 2010.
10. Wloka, Jan, Ryder, Barbara G., Tip, Frank, "JUnitMX – A change-aware Unit Testing Tool", a selected demo with published abstract in the *Proceedings of the ACM SIGSOFT International Conference on Software Engineering (ICSE)*, May 2009, pp 567-570.
11. Horwitz, Susan, Rodger, Susan, Biggers, Maureen, Binkely, David, Franz, Colin K., Gundermann, Dawn, Hambruch, Susanne, Huss-Lederman, Steve, Munson, Ethan, and Ryder, Barbara G., "Using Peer-led Team Learning to Increase Participation and Success of Under-represented Groups in Introductory Computer Science", in the *Proceedings of the SIGCSE Technical Symposium on Computer Science Education 2009*.
12. Dufour, Bruno, Ryder, Barbara G., and Sevitsky, Gary, "Blended Analysis for Performance Understanding of Framework-based Applications", in the *Proceedings of the International Symposium on Software Testing and Analysis (ISSTA)*, July 2007, pp 118-128.
13. Ren, Xiaoxia and Ryder, Barbara G., "Heuristic Ranking of Java Program Edits for Fault Localization", in the *Proceedings of the International Symposium on Software Testing and Analysis (ISSTA)*, July 2007, pp 239-249.
14. Zhang, Weilei and Ryder, Barbara G., "Discovering Accurate Interclass Test Dependences", in the *Proceedings of the ACM SIGPLAN Workshop on Program Analysis for Software Tools and Engineering (PASTE)*, 2007, pp 55-62.
15. Chesley, Ophelia, Ren, Xiaoxia, Ryder, Barbara G., and Tip, Frank, "Crisp - A Fault Localization Tool for Java Programs", a selected demo with published abstract in the *Proceedings of the 29th International Conference on Software Engineering*, May 2007, pp 775-779.
16. Zhang, Weilei and Ryder, Barbara G., "Constructing Accurate Application Call Graph For Java To Model Library Callbacks", in the *Proceedings of 6th International Workshop on Source Code Analysis and Manipulation (SCAM)*, September 2006, pp 63-74.
17. Fu, Chen and Ryder, Barbara G., "Navigating Error Recovery Code in Java Applications", *Eclipse Technology Exchange Workshop*, held at *ACM SIGPLAN Conference on Object Oriented Programming Languages, Systems and Applications (OOPSLA)*, October 2005.
18. Milanova, Ana and Ryder, Barbara G., "A Framework for Context Sensitivity Using Annotated Inclusion Constraints for Flow Analysis of Object-oriented Programs", in the *Proceedings of the 21st International Conference on Software Maintenance (ICSM)*, Budapest, Hungary, September 2005.
19. Chesley, Ophelia, Ren, Xiaoxia, and Ryder, Barbara G., "Crisp: A Debugging Tool for Java Programs", in the *Proceedings of the 21st International Conference on Software Maintenance (ICSM)*, Budapest, Hungary, September 2005.

20. Fu, Chen, Ryder, Barbara G., Milanova, Ana, and Wonnacott, David, "Testing of Java Web Services for Robustness", in *Proceedings of the International Symposium on Software Testing and Analysis (ISSTA)*, July 2004, pp 23-33.
21. Fu, Chen, Naragan, Kiran, Nguyen, Thu, Martin, Rich, Ryder, Barbara G., Wonnacott, Dave, "Compiler-directed Program Fault Coverage for Highly Available Java Internet Services", in *Proceedings of the International Conference on Dependable Systems and Networks*, June 2003.
22. Milanova, Ana, Rountev, Atanas, and Ryder, Barbara G., "Constructing Precise Object Relation Diagrams", in *Proceedings of the IEEE International Conference on Software Maintenance*, Montreal, Canada, October 2002, pp 586-595.
23. Milanova, Ana, Rountev, Atanas, and Ryder, Barbara G., "Precise Call Graph Construction in the Presence of Function Pointers", in *Second IEEE International Workshop on Source Code Analysis and Manipulation (SCAM)*, Montreal, Canada, October 2002, pp 155-162.
24. Milanova, Ana, Rountev, Atanas and Ryder, Barbara G., "Parameterized Object Sensitivity for Points-to and Side-Effect Analyses for Java", in the *Proceedings of the International Symposium on Software Testing and Analysis (ISSTA)*, pp 1-11, July 2002.
25. Arnold, Matthew and Ryder, Barbara G., "Thin Guards - A Simple and Effective Technique for Reducing the Penalty of Dynamic Class Loading", in the *Proceedings of the European Conference on Object-oriented Programming (ECOOP)*, June 2002.
26. Ryder, Barbara G. and Tip, Frank, "Change Impact Analysis for Object-oriented Programs", in *Proceedings of the ACM SIGPLAN Workshop on Program Analysis for Software Tools and Engineering (PASTE)*, pp 46-53, June 2001.
27. Rountev, Atanas, Ryder, Barbara G., "Points-to Analysis and Side-effect Analysis for Programs Built with Precompiled Library Modules", in *Proceedings of the International Conference on Compiler Construction*, April 2001, pp 20-36.
28. Arnold, Matthew, Hind, Michael, and Ryder, Barbara G., "An Empirical Study of Selective Optimization", 15 pages, in *Proceedings of the Thirteenth Annual Workshop on Languages and Compilers For Parallel Computing*, Yorktown Heights, August 2000. Also to appear as a Springer-Verlag Lecture Notes in Computer Science volume.
29. Ryder, Barbara G., Smith, Donald, Kremer, Ulrich, Gordon, Michael, Shah, Nirav, "A Static Study of Java Exceptions Using JESP", *Proceedings of Ninth Annual International Conference on Compiler Construction*, Berlin, Germany, pp 67-81, March 2000. Also available as Springer-Verlag LNCS 1781.
30. Arnold, Matthew, Hsiao, Michael, Kremer, Ulrich, Ryder, Barbara G., "Instruction Scheduling in the Presence of Java's Runtime Exceptions", in *Proceedings of the Twelfth Annual Workshop on Languages and Compilers For Parallel Computing*, San Diego, August 1999, also Springer-Verlag LNCS 1863, pp 18-34.
31. Zhang, Sean, Ryder, Barbara G., and Landi, William A., "Experiments with Combined Analysis for Pointer Aliasing", in *Proceedings of ACM SIGPLAN Workshop on Program Analysis and Software Tools for Engineering*, June 1998, pp 11-18.

32. Chatterjee, Ramkrishna, Ryder, Barbara G., and Landi, William A., "Complexity of Concrete Type-inference in the Presence of Exceptions", in *Proceedings of ESOP'98*, March 1998, pp 57-74.
33. Stocks, Phil A., Ryder, Barbara G., Landi, William A., and Zhang, S., "A Comparison of Flow and Context- Sensitivity with respect to the Modification Side Effects Problem", *Proceedings of the International Symposium on Software Testing and Analysis*, pp. 21-31, March 1998. Also available as DCS-TR-335.
34. Pande, Hemant D. and Ryder, Barbara G., "Data-flow-based Virtual Function Resolution", *Proceedings of the Third International Symposium on Static Analysis (SAS'96)*, Aachen, Germany, September 1996, LNCS 1145, pp 238-254.
35. Sgro, Vincent and Ryder, Barbara G., "Differences in Algorithmic Parallelism in Control Flow and Call Multigraphs", *Proceedings of the Seventh Annual Workshop on Languages and Compilers For Parallel Computing*, pp 15.1-15.15, August 1994, Ithaca, NY. Also available as *Lecture Notes in Computer Science*, Volume 892, pp 217-233.
36. Lee, Yong-fong, Ryder, Barbara G., Fiuczynski, Marc, "Region Analysis: A Parallel Elimination Method for Data Flow Analysis", pp 31-42, *IEEE International Conference on Computer Languages*, May 1994, Toulouse, France.
37. Pande, Hemant and Ryder, Barbara G., "Static Type Determination in C⁺⁺", *Proceedings of the Sixth USENIX C⁺⁺ Technical Conference*, pp 85-97, April 1994, Cambridge, MA.
38. Masticola, Stephen and Ryder, Barbara G., "Non-concurrency Analysis", in *Proceedings of the ACM Conference on Principles and Practices of Parallel Programming*, pages 129-138, May 1993.
39. Lee, Yong-fong and Ryder, Barbara G., "Parallel Hybrid Data Flow Algorithms: A Case Study", in *Lecture Notes in Computer Science as Proceedings of Fifth Workshop on Languages and Compilers for Parallel Computing*, New Haven CN, August 1992, pp 296-310.
40. Lee, Yong-fong and Ryder, Barbara G., "A Comprehensive Approach to Parallel Data Flow Analysis", *Proceedings of the International Conference on Supercomputing*, July 1992, pp 236-247.
41. Schatz, Emmi and Ryder, Barbara G., "Directed Tracing of Race Conditions", *Proceedings of the International Conference on Parallel Processing*, August 1992, pp II-247:II-250.
42. Pande, Hemant, Ryder, Barbara G., and Landi, William, "Interprocedural Def-Use Associations for C Programs", *Proceedings of the ACM SIGSOFT Conference on Testing, Analysis and Validation*, October 1991, pages 139-153.
43. Masticola, Stephen and Ryder, Barbara G., "A Model of Ada Programs for Static Deadlock Detection in Polynomial Time", *Proceedings of 1991 ACM/ONR Workshop on Parallel and Distributed Debugging*, May 1991, pages 91-102.
44. Marlowe, Thomas J. and Ryder, Barbara G., "Hybrid Incremental Alias Algorithms", *Proceedings of Twenty-Fourth Hawaii International Conference on System Sciences*, January 1991, pp 428-437.
45. Lee, Yong-fong, Marlowe, Thomas J., and Ryder, Barbara G., "Performing Data Flow Analysis in Parallel", *Proceedings of ACM Supercomputing90*, November 1990, pp. 942-951.

46. Masticola, Steve and Ryder, Barbara G., “Static Infinite Wait Anomaly Detection in Polynomial Time”, *Proceedings of International Conference on Parallel Processing*, August 1990, pp II78-II87.
47. Ryder, Barbara G., “ISMM: The Incremental Software Maintenance Manager”, *Proceedings of IEEE Computer Society Conference on Software Maintenance*, October 1989, Miami FL, pp 142-165.
48. Ryder, Barbara G., “An Application of Static Program Analysis to Software Maintenance”, *Proceedings of Twentieth Hawaii International Conference on System Sciences*, Kona, Hawaii, January 1987, pp 82-91.
49. Ryder, Barbara G. and Pendergrast, J. Stephen, “FPOPT: A Globally Optimizing Compiler for FP”, *Proceedings of IEEE Computer Society International Conference on Computer Languages*, October 1986, Miami Beach, Florida, pp. 34-40.
50. Ryder, Barbara G., “A ‘Hands-on’ Approach to Computer Literacy”, *Papers of the Fifteenth SIGCSE Technical Symposium on Computer Science Education*, (SIGCSE Bulletin, vol. 16, no. 1), February 1984, Philadelphia, Pennsylvania, pp. 102-107.

Other Publications:

1. Ryder, Barbara G. and Zeller, Andreas, ”Introduction: The Best Papers of ISSTA 2009”. *IEEE Transactions on Software Engineering*, volmun 36, no 4, July/August 2010.
2. Ryder, Barbara G. and Hari, Pradip, *Introduction to Computer Science Modules*, Progressions: The Peer-Led Team Learning Project Newsletter, Vol 9, Issue 2, Fall 2007, (published in Spring 2009).
3. Ryder, Barbara G., *Forward* to the Third Edition of Michael Scott’s textbook **Programming Language Pragmatics**, Elsevier Publishers, 2009.
4. Ryder, Barbara G. and Soffa, Mary Lou, “Influences on the Design of Exception Handling, ACM SIGSOFT Project on the Impact of Software Engineering Research on Programming Language Design”, in *Software Engineering Notes and ACM SIGPLAN Notices*, 2003.
5. Marlowe, Thomas J., Landi, William A., Ryder, Barbara G., Burke, Michael, Choi, Jong-Deok, and Carini, Paul, “Pointer-induced Aliasing: A Clarification”, *ACM Sigplan Notices*, Volume 28, Number 9, September 1993, pp 67-70.
6. Ryder, Barbara G., “ A Career at the Forefront of Compiler Technology”, an interview with Frances E. Allen, *IEEE Software*, July 1990, pp. 90-91.

Patents:

1. *System, Method, and Apparatus for Modular, String-sensitive, Access Rights Analysis with Demand-driven Precision*, US Patent US 12/190,718 US20100043048 A1; Inventors: Emmanuel Geay, Julian Dolby, Marco Pistoia, Barbara Ryder, Takaaki Tateishi.

Professional Activities:

General Co-chair with Dr. Brent Hailpern of IBM Research of ACM SIGPLAN *History of Programming Languages-III (HOPL-III)* Conference held at FCRC 2007.

General Chair, *International Symposium on Software Testing and Analysis (ISSTA)*, July 2008.

General Chair, *ACM FCRC 2003*.

General Chair, ACM SIGPLAN PLDI'99: Conference on Programming Language Design and Implementation, *May 1999*; Also served on organizing committee of Federated Conference on Research in Computing, *May 1999*.

General Co-Chair, ACM SIGPLAN'94: Conference on Programming Language Design and Implementation, *June 1994*.

Recent ACM Professional society leadership: Member, ACM Task Force on ACM Fellows Academy, 2016; Member, ACM Search Committee for a new Editor-in-Chief for *Transactions on Programming Languages and Systems 2016*; Member, ACM SIGSOFT Selection Committee for the Influential Educator Award 2016; Member, ACM SIGSOFT Selection Committee for the Outstanding Researcher Award, 2012-2013; Member, ACM Search Committee for a new Editor-in-Chief for *Transactions on Software Engineering Methodology*, 2012;

Co-Chair (with Dr. David Rosenblum), Doctoral Dissertation Symposium, ACM SIGSOFT ICSE'07; Member, Doctoral Dissertation Symposium Committee, ACM SIGSOFT FSE'08, ISSTA'06; Member 2007-2015, **Chair** July 2008 - July 2009, ACM SIGSOFT ISSTA Steering Committee; Member, ACM SIGSOFT Impact Project Steering Committee, 2001-2009; Member, ACM SIGSOFT **Chair**, *ACM Membership Task Force 3- Researchers/Academics in North America*, August 2009-2011; Member, *ACM Task Force on Membership Strategy*, October 2008-2009; *ACM Executive Committee Liaison to MemberNet*, Nov 2008-2012; Member, *ACM Investments Committee*, July 2008-2010; Member, *ACM Presidential Committee on Gender Diversity*, 2007-2008; Member, *ACM-W Committee*, 2014, 2006-2009; Member of *ACM-W Athena Award Selection Committee*, 2005-2008; Member of *Organizing Committee of Federated Conference on Research in Computing (FCRC)*, 2007; Member, *ACM Transactions on Software Engineering Methodology* EIC Selection Committee, 2006; Selected member of *Outstanding Contribution to ACM* Award selection committee, 2004-2007; Chair, 2006; Elected immediate past Chair, ACM SIGPLAN *June 1997- June 1999*; **Chair**, ACM SIGPLAN *June 1995-1997*; Vice Chair of Conferences, ACM SIGPLAN *June 1993-1995*; Member-at-Large of ACM SIGPLAN Executive Committee 1989-1993; **Appointed Chair**, SIGPLAN Professional Activities Committee (PAC) 1989-1993

Organizer of the *State-of-the-Art in Analysis and Testing Workshop* at Rutgers in *March 2008*; Organizer of the *State-of-the-Art in Software Engineering Workshop* at Rutgers in *June 2006*; Organizer of the 2006 (and 1998) Mid-Atlantic Student Conference on Programming Languages and Systems (MASPLAS'06) at Rutgers in *April 2006 (1998)*.

Co-chair (with Dr. Jim Kurose), NSF Workshop on *Integrative Computing Education and Research: Preparing IT Graduates for 2010 and Beyond*, November 2005.

Co-organizer of *WOWinC - Work Opportunities for Women in Computing*, a conference for women at NYU, Princeton, Rutgers and Columbia, held at NYU, September 2005.

Organizer, Dahstuhl Seminar on *Understanding Program Dynamics*, with Drs. Jong-Doek Choi and Andreas Zeller, December 2003; Organizer, Dagstuhl Seminar on *Compiling Object-oriented Programming Languages*, with Drs. Uwe Assman, Laurie Hendren, Frank Tip, November 2000.

Fifth CRA-W Graduate Cohort Workshop, March 2008; *2007 Programming Languages Summer School at University of Texas at Austin*, May 2007, sponsored by CRA-W and CDC; *New Software Engineering Faculty Symposium*, at ICSE'03 May 2003, ICSE'05 May 2005, ICSE'06 May 2006, ICSE'08 May 2008; *CRA Career Mentoring Workshop* at FCRC 2003, San Diego, CA June 2003; *CRA Supermentoring Workshop* at Federated Conference on Research in Computer Science, Atlanta, GA May 1999; *CRA Workshop on Academic Careers for Women in Computer Science*, Computer Science Conference, Philadelphia, PA, February 1996; ACM Supercomputing, Washington DC, November 1994; Federated Conference on Research in Computer Science, San Diego, CA May 1993;

Member, NSF Advisory Committee for the CISE Office of Cross Disciplinary Activities, Fall 1990-Summer 1992

Invited Tutorial Speaker on *Program Analysis and Optimization* at SIGPLAN'90, June 1990.

Selected as National Lecturer for Association for Computing Machinery (ACM), 1985-1988.

Program Committees: Program (and General) co-chair with Dr. Brent Hailpern of IBM Research, of ACM SIGPLAN *History of Programming Languages-III (HOPL-III)* Conference held at FCRC 2007.

Program Chair, ACM SIGPLAN'91: Conference on Programming Language Design and Implementation, June 1990 - June 1991.

Program Chair, Program Review Committee - Language Features and Language Classes, ACM Second History of Programming Languages Conference, (i.e., HOPL-II) March 1990 - May 1993;

Recent Program Committee Member: Member, Technical Briefings Program Committee, International Conference on Software Engineering (ICSE16) May 2016; Member, Mentoring Committee for the International Conference on Software Engineering (ICSE13) May 2013; ACM SIGPLAN Conference on Programming Languages Design and Implementation, June 2012; International Symposium on Software Testing and Analysis (ISSTA10) July 2010; International Conference on Software Engineering (ICSE'09) May 2009; ACM SIGSOFT Conference on Foundations of Software Engineering (FSE), November 2008; 7th IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM), September 2007; ACM shiyi Conference on Foundations of Software Engineering (FSE), October 2006; International Conference on Software Engineering (ICSE'06) 2006; International Conference on Compiler Construction, April 2006;

Recent Editorships: Associate Editor, *ACM Transactions on Software Engineering Methodology*, 2012-present; Editorial Board Member, *Software, Practice and Experience*, January 2004-2016; Editorial Board Member, *Science of Programming*, January 2009-2014; Guest co-Editor, *IEEE Transactions on Software Engineering*, Special issue on ISSTA 2008, 2009; Associate Editor *IEEE Transactions on Software Engineering*, October 2003-August 2008; Associate Editor *ACM Transactions on Programming Languages and Systems*, August 2001-2007;

Professional Memberships: Association for Computing Machinery (ACM), Special Interest Groups in Programming Languages, Software Engineering and Computer Science Education; IEEE Computer Society; Association for Women in Science; AAUW;

Recent Invited Research Presentations:

Distinguished Lecture, SUNY Buffalo, *May 2017*;
Future of Software Engineering, Redmond, WA, *July 17, 2013*;
Keynote at Asian Pacific Software Engineering Conference, Hong Kong, China *December 2012*;
William Mong Distinguished Lecture at the Institute for Advanced Study, Hong Kong University of Science and Technology (HKUST), *December 2012*;
Distinguished Lecture, University of Delaware, *September 2011*;
Invited lecture at Lee Osterweil Festschrift, ICSE 2011;
Invited keynote at ACM India Annual Conference, Hyderabad, India, *January 2011*;

Invited Speaker in Community: *July 2015 Diversity Activities of CS@VT* at the Eastman Chemical Diversity Open House for Educators; *September 2011 An Academic Career* at Haverford College; *March 2011* Panelist in discussion after presentation of *Truth Values: One Girl's Romp Through MIT's Male Math Maze*, by Gioia De Cari; *December 2010 A Career in Computer Science*, Chantilly Academy, Chantilly, VA; Centreville High School, VA; *October 2008, A Career in Academia*, Association for Women In Computing (AWC), Virginia Tech; *March 2002 Computer Science Graduate School Panel*, Seton Hall University, South Orange, NJ; *December 2000 A Career in Academia*, invited by the Graduate Women in Science and Engineering, Princeton University, Princeton, NJ; *November 1999 Bunting-Cobb Residence Evening Program - Meet a Scientist*, Douglass College; *February 1998 Bunting-Cobb Residence Evening Program - Careers in Science*, Douglass College; *December 1996, American Women in Science* chapter, Douglass College; *October 1994, Women in Mathematics and Computer Science Conference*, Kean College, Union, NJ; *November 1993, Women in Science Program*, sponsored by the Pembroke Center, Brown University, Providence, RI.

Teaching:

Postdoctoral Advising: *8/2015-8/2016* Dr. Haipeng Cai, Notre Dame; (dissertation on dynamic change impact analysis); now at Washington State University, Pullmann WA; *9/2010-7/2011* Dr. Ben Wiederemann, University of Texas, Austin; (dissertation on providing practical modularity for programs accessing databases); now at Harvey Mudd College; *2008-2010* Dr. Marc Fisher II, University of Nebraska; (dissertation on probe testing of Web applications); now at Google; *2007-2008* Dr. Jan Wloka, Berlin University, Germany; (dissertation on aspect-oriented programming); now at IBM Zurich Lab; *1995-1997* Dr. Phil Stocks, University of Queensland, Australia; (dissertation in software testing from formal specifications in Z); now at Bond University, Brisbane, Australia.

Graduate Students Supervised: 1. Shiyi Wei, Ph.D., *August 2015*, dissertation: *Practical Analysis of the Dynamic Characteristics of JavaScript* (a new blended analysis framework for JavaScript code, state sensitivity, a new context-sensitive static analysis for JavaScript, and (method-level) adaptive context-sensitive analysis for JavaScript), postdoc at University of Maryland

2. Bruno Dufour, Ph.D., *December 2009*, dissertation: *Practical Analysis of Framework-intensive Applications* (blended static and dynamic analysis for performance diagnosis of web-based applications built on layers of libraries, middleware and packages); Amazon, Toronto
3. Chen Fu, Ph.D., *November 2007*, dissertation: *Improving Software Reliability Using Exception Analysis of Object-oriented Programs* (fault-injection testing of exception handling code in Java systems, using dataflow coverage metrics; testing enabled by compiler instrumentation using new static exception-flow analyses that discover infeasible call paths and detect sequences of exception re-throws); Microsoft, CA
4. Xiaoxia Ren, Ph.D., *August 2007*, dissertation: *Change Impact Analysis for Java Programs and Applications* (semantic change impact analysis able to associate parts of an edit with specific affected tests; Chianti prototype implemented in Eclipse); Morningstar
5. Ophelia Chesley, M.S., *July 2007*, dissertation: *CRISP: A Fault Localization Tool for Java Programs* (a semi-automatic (and automatic) constructor of intermediate versions of edited program, that lie between the original program and the fully edited program in order to find that part of the edit which causes a worsening test result); Micropact, Washington DC
6. Ana Milanova, Ph.D., *August 2003*. dissertation: *Precise and Practical Flow Analysis of Object-oriented Software* (a framework for flow-insensitive, context-sensitive flow analysis of object-oriented systems); Associate Professor of Computer Science at Rensselaer Polytechnic Institute
7. Matthew Arnold, Ph.D., *September 2002*, dissertation: *Online Profiling and Feedback-directed Optimization of Java* (a framework for low overhead instrumentation sampling and its use in feedback-directed optimization); Research staff member, IBM T.J. Watson Research Center
8. Atanas Rountev, Ph.D., *August 2002*, dissertation: *Dataflow Analysis of Software Fragments*, (a framework for separable analysis of incomplete programs, e.g., libraries); Professor of Computer Science and Engineering, Ohio State University
9. Ramkrishna Chatterjee, Ph.D., *October 1999*, dissertation: *Modular Data-flow Analysis of Object-oriented Programming Languages*, (work on developing analyses for points-to and def-use information for Java/C++ in the presence of exceptions); Oracle
10. Jyh-shiarn Yur, Ph.D., *July 1999*, dissertation: *Incremental Analysis for Flow- and Context-sensitive Data-flow Problems*, (work on developing and testing incremental side effect analysis for C programs); Synopsis, San Francisco Bay Area
11. Sean Zhang, Ph.D., *September 1998*, dissertation: *Practical Pointer Aliasing Analysis*, (work on developing a program decomposition technique which allows choice of alias analysis in different areas of a program)
12. Javier Elices, M.S., *April 1996*, thesis: *Refining the Parallel Hybrid Data Flow Analysis Algorithm* (work in widening the applicability of our parallel hybrid algorithm for data flow analysis to handle graphs whose largest strongly connected component contains at least 50% of the nodes); hdi2, Madrid, Spain
13. Hemant D. Pande, Ph.D., *February 1996*, dissertation; *Compile Time Analysis of C and C++ Systems*, (work on interprocedural def-use analysis of C programs and a combined type determination/flow sensitive aliasing algorithm for C++ programs); M.Phil. *October 1990*; Senior VP of KPIT Technologies Ltd. (in CTO organization)

14. Stephen Masticola, Ph.D. *May 1993*, dissertation: *Deadlock Detection in Explicitly Parallel Programs*, (work on static deadlock detection algorithms for Ada rendezvous, binary semaphores and Concurrent C rendezvous, coupled with empirical comparison to all-states methods on Ada programs); Siemens Research;
15. Yong-fong Lee, Ph.D. *May 1992*, dissertation: *Parallel Data Flow Analysis*, (work on developing a parallel compile-time analysis algorithm and profiling its performance on a distributed memory machine); Intel Corporation;
16. William A. Landi, Ph.D. *November 1991*, dissertation: *Interprocedural Aliasing through Pointers*, (work on developing an interprocedural approximation algorithm for pointer-induced aliasing); Director, Cerner Corporation, Malvern, PA
17. Thomas J. Marlowe, Ph.D. *August 1989*, dissertation: *Data Flow Analysis and Incremental Iteration*, (work on iteration-based incremental data flow analysis.); Professor of Mathematics and Computer Science, Seton Hall University
18. Martin D. Carroll, Ph.D. *May 1988*, dissertation: *Data Flow Update Via Dominator and Attribute Updates*, (work in developing incremental elimination algorithms to aid analysis of software systems). Bell Labs Research, Nokia
19. J. Stephen Pendergrast, M.S., *October 1986*, thesis: *FPOPT: A Globally Optimizing Compiler for FP*, (work in experimenting with the optimization of functional programming languages).

Additional Dissertation Committees: Ke Tien, Jing Pu (MS, VT, 2016); Xiaokui Shu (VT, 2016); Karim Elish (VT, 2015), Kui Xu (VT, 2014), MyoungKyu Song (VT, 2013), YoungWoo Kwon (VT, 2013), Josephine Micallof (Columbia, 1991), A. Michael Berman, (Rutgers, 1992), Tao Yang (Rutgers, 1992), Sesh Venagapol (Rutgers, 1993), Prem Devanbu (Rutgers, 1994), Chun Wai Liew (Rutgers, 1994), Valerie Barr (Rutgers, 1996), Girish Welling (Rutgers, 1999), Stanislav Tzolovski (Ecole Polytechnique, Palaiseau, France, 2002), Chung-hsing Hsu (Rutgers, 2003), Ravi Batchu (Rutgers, 2003), Martin Robillard (University of British Columbia, 2003), Mirko Streckenbach (University of Passau, 2005), Feng Qian (McGill University, 2005).

Undergraduates: At Virginia Tech: *2015* Supervised 2 undergraduate researchers; *2014* Supervised 2 undergraduate researchers *2013* Supervised 2 undergraduate researchers; *AY 2009-2010* Supervised 1 undergraduate researcher; *Summer 2009* Supervised 2 undergraduate researchers, one funded by NSF Research Experiences for Undergraduates;

At Rutgers: *1991-2007* Supervised 21 undergrad researchers, funded by NSF Research Experiences for Undergraduates Awards, CRA-W Mentoring for Women Awards, or Rutgers Research Internship Awards, or supported by the Rutgers University Honors Program. In addition:

2003-2004 Nicholas Amon, Henry Rutgers Scholar.

Summer 1999, 1999-2000 Supervised 2 undergraduate researchers, in part under auspices of NSF *Research Experiences for Undergraduates* award; The poster presentation of their project took 2nd place in the undergraduate/masters division at the AT&T Research Symposium on October 29, 1999. Their co-authored paper about this work appeared in the *Proceedings of the Ninth International Conference on Compiler Construction* in March 2000.

PROLANGS Reading Group: *Spring 2011* Led study group in program analysis for security and SE applications, met 1 hour weekly; *Fall 2010* Led study group in program analysis, met 1 hour

weekly; 2009-2010 at Virginia Tech, Led with Dr. Godmar Back and Dr. Eli Tilevitch, group that met for 1 hour weekly.

1988-2008 at Rutgers, Faculty advisor to *Programming Languages Reading Group*, which meets for 2 hours weekly (including summers) to discuss and present journal/conference articles and student research. Current group includes approximately 10 participants, including faculty from other departments at Rutgers and from nearby colleges.

<http://www.prolangs.rutgers.edu>

Courses taught: (at Virginia Tech 2015-16) CS Seminar in Program Analysis (CS 6304); Concepts of Programming Languages (CS 5314);

Courses Taught: (at Rutgers) (undergraduate courses indicated by *): Introduction to Computer Science*(111); Principles of Programming Languages*(314); Compilers*(315)(415); Computer Literacy*(110); Software Engineering*(431); Programming Languages and Compilers I, II(515,516); Non-numerical Algorithms(513); Seminar in Data Flow Analysis(594); Seminar in Software Techniques for Parallel Programming Environments(594); Seminar in Compiling Object-oriented Programming Languages (671); Seminar in Large, Modern Object-oriented Applications: Tools for Analyzing, Testing, Debugging and Program Understanding;

Curriculum Development: (at Rutgers) Fall 2005, Fall 2006, Spring 2006 With Dr. Pradip Hari, developed 2 hours a week course discussion materials for *Rutgers Emerging Scholars in Computer Science* course (198:293), a peer-led group study discussion supplement to 198:111 for selected students from groups underrepresented in computer science. (<http://rescs.rutgers.edu>); Spring 2006 in part with Dr. Lou Steinberg, preparing 2 hours a week course discussion materials for an RESCS section to be associated with 198:107 in Fall 2007.

Fall 1997 Developed new curriculum for *Introduction to Computer Science* in Java with Dr. Don Smith; Course co-ordinator (Spring 1998, Spring 2000). Spring 1997 Revised curriculum for *Programming Languages and Compilers II*(516) with Prof Uli Kremer; 1987-1988 Developed curriculum for *Programming Languages and Compilers I*(515), with Prof Alex Borgida.

1984-1988, 1990-1996, Fall 1999, Fall 2001 Curriculum developer and course co-ordinator for *Principles of Programming Languages*(314), which currently has an enrollment of 200 students. (Latest revised curriculum in Fall 1999 to add C pointers and Java event-driven programming.) All homeworks and tests are uniform in this class, which is now a requirement for our B.S. degree.

1982-1984 Curriculum developer and first course co-ordinator for a new computer literacy course (110) offered at Rutgers; Enrollment ranged from an initial 750 to a final 1200 per semester. Over these two initial years, staff grew from 3 instructors and 9 teaching assistants to 5 instructors and 15 teaching assistants. (A full-time non-tenure track person now is in charge of this course.)

Service:

Community: July 2014-present, Member, Board of Directors, Computing Research Association (CRA); member CRA ad hoc committee on strategic planning; CRA-E (Education) Committee 7/2015-present, Member, Snowbird 2016 Organizing Committee 7/2015-7/2016; Chair (2016-17), Member (2015-16), CRA-E Selection Committee for CRA Undergraduate Research Faculty Mentoring Award.

2011– 2016 Co-Chair (2014-2015, 2012-2013), Member (2011-2012, 2013-2014, 2015-2016) Organizing Committee of the NCWIT Regional VA/DC Aspirations in Computing Awards

Fall 2013 External Reviewer of Computer Science Program, Department of Computer Science, Notre Dame University, South Bend, IN.

2013– present Member, Advisory Board of CCICADA, a DHS Center of Excellence.

2011-present Member, Advisory Board for CRA-W/CDC Project on Measuring Outcomes for Students in Computing (the Data Buddy project);

2010 - 2014 Member, Advisory Board for NSF-funded Discovery Research K-12 project *The Value of Computational Thinking Across Grade Levels* at DIMACS, Rutgers University;

7/2009–7/2010 Member, organizing committee for CRA Workshop for New Department Chairs, at Snowbird Conference;

2009 – 2012, 2013- 2014 Executive Champion for CS@VT, NCWIT Pacesetters Program. 2011-2012 Cluster Leader, K-12 group;

2007, 2009-2014 Member, Scientific Committee of International Summer School in Software Engineering, University of Salerno, Italy.

Fall 2003 External Reviewer of Computer Science program, Department of Computer Science, University of Pittsburgh, Pittsburgh, PA.

April 2001 External Reviewer of Computer Science program, Department of Mathematics and Computer Science, Seton Hall University, South Orange, NJ.

University (at Virginia Tech): 2015-2016 Chair, CS@VT Diversity Committee; Mentor of junior faculty members; Member, CS Honorifics Committee;

2014- present Member, College of Engineering Task Force on Faculty Mentoring

2013-2014 Co-chair of University Committee on Computational and Quantitative Thinking

Spring 2013 Panelist in COE Workshop on Promotion to Full Professor

Fall 2012 Speaker, Workshop for Department Heads and P&T Committees, organized by Provost's Office

2012-2013 Appointed member of search committee for new department head of Electrical and Computer Engineering.

Fall 2012- 2015 Appointed member Stakeholders Committee of Hume Center.

Spring 2011 Appointed member of search committee for new department head of Aeronautical and Oceanographic Engineering.

Spring 2011 Appointed member of search for Director of Institute for Creative Arts and Technology (ICAT).

Fall 2010- Spring 2012 Appointed member of SBES (Virginia Tech - Wake Forest University School of Biomedical Engineering and Sciences) Governing Board.

Fall 2010 Panelist on College of Engineering Panel on Promotion to Associate Professor with Tenure.

Fall 2010 Speaker at VT-ADVANCE luncheon on *Being a Department Head*.

Spring 2010, Spring 2013, Panelist at College of Engineering Panel on Promotion to Full Professor.

2010 Member, Review Committee for Dr. Bob Walters, Vice President of Research;
2009-2010 Member, Provost's Committee on the Strategic Plan Team 6 : Innovative Technologies and Complex Systems;
10/2009 - 2015 Chair, College of Engineering High Performance Computing Committee;
5/2009 - 2015 Member, Virginia Tech High Performance Computing Infrastructure Investment Committee;
5/2009-5/2011 Elected representative of the College of Engineering, Department Heads Council Executive Committee;
2009-present Member, AdvanceVT Faculty Advisory Committee;
2008-present Member, ADVANCE Portal Website Advisory Committee, (www.advance-portal.net);

University (at Rutgers): 2008 Member of President's Council on Institutional Diversity and Equity,
2007-2008 Member of Committee on Academic Planning and Review (CAPR),
2006-2008 Member, Advisory Faculty Council on Women in Science, Engineering and Mathematics,
2006-2008 Member, Search Committee for Executive Dean of the School of Arts and Sciences.
2006 Member, Advisory Group (to the President) on the University Budget.
2006 Member, Committee on Technological Fluency and the Liberal Arts Curriculum.
2005-2008 Member, Rutgers University Computing Coordinating Committee;
2005-2006 Member, Advisory Committee for Appointments and Promotions to Professor II in the Mathematical and Natural Sciences;
1991-2005 Advisory Board, Douglass Project for Rutgers Women in Math, Science, and Engineering.
summer 2005 Presenter at *Discovery Days*, a program for prospective Rutgers attendees and their parents.
2001-2004 Elected member, Executive Committee of the Graduate School; 2004 Member, FAS Committee on Increasing Faculty Diversity; 2000-2003 Member, Information Science and Technology Council; 1999-2000 Faculty of Arts and Sciences Committee on Appointments and Promotions (Associate Professor); 1997-1999 Member, Information Sciences Council; 1995-97 Physical Sciences Area Committee, Graduate School; 1966 Committee for the Cluster Review of Computer Research and Education; 1995-96 University Strategic Planning Committee on Engineering; June 1995 Faculty presenter, Douglass Project for Rutgers Women in Math, Science, and Engineering Project SUPER Orientation; 1994-95 Faculty of Arts and Sciences Committee on Appointments and Promotions (Professor I); Fall 1992-Spring 1995 Elected Member, University Senate, representing the Graduate School, Serving on the Senate Educational Policy Committee. 1990-1992 Faculty of Arts and Sciences Committee on Appointments and Promotions (Associate Professor); 1990-present Douglass College Fellow; 1988-1989 University Pension Benefits Study Committee.
January-August 1996 Acting Director, Laboratory for Computer Science Research, Rutgers University.

Department: (at Rutgers) 1996-2000 Faculty advisor and founder, 2001-2008 Faculty co-advisor with Prof Richard Martin, **Women in Computer Science (WCS)** affinity group for women undergraduates, graduates and women faculty <http://remus.rutgers.edu/wcs>.

1989-1996, 1998-2000, 2003-2008 Elected Member, Executive Committee of Department of Computer Science.

2007- Chair Publicity/Awards committee; 2006-2007, 2004-2005 Chair, 2001-2002 Chair Systems Hiring Search, 1994-95 Chair, Fall 1997 Acting Chair, 1987-1993, 1995-1998, 1999-2000 Member, Hiring Committee; 2006- organizer of CS Career Night (one per semester); 2002-2003 Member, Responsibilities Committee; 1998-2003, 1983-1991 Member, Graduate Admissions and Financial Aid Committee; 1996-2004, 2005-2006 Member, Undergraduate Curriculum Committee; 1994-1996 Member, Graduate Academic, Educational, and Scholastic Standing Committee; 1990-1993 Member, Undergraduate Advising and Scholastic Standing Committee; 1989-1990 Acting Chair, Graduate Admissions and Financial Aid Committee;