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EDUCATIONAL BACKGROUND

Degree	Year	University	Field
Ph.D.	1999	Politecnico di Milano, Italy	Computer Science
M.S. and B.S.	1995	Politecnico di Milano, Italy	Electrical Engineering (I.T.)

EMPLOYMENT HISTORY

Title	Organization	Years
Associate Dean	College of Computing Georgia Institute of Technology	11/2020–present
Professor	College of Computing Georgia Institute of Technology	08/2014–present
Professor and Associate School Chair	College of Computing Georgia Institute of Technology	01/2015–12/2017
Associate Professor	College of Computing Georgia Institute of Technology	08/2008–07/2014
Assistant Professor	College of Computing Georgia Institute of Technology	08/2004–07/2008
Research Scientist II	College of Computing Georgia Institute of Technology	01/2001–08/2004
Postdoctoral Fellow	College of Computing Georgia Institute of Technology	03/2000–01/2001
Visiting Researcher	EECS Department University of Illinois at Chicago	07/1999–10/1999
Research and Teaching Assistant	Department of Electronics and Informatics Politecnico di Milano, Italy	02/1996–07/1999

CURRENT FIELDS OF INTEREST

Software Engineering

My area of research is software engineering, with emphasis on software testing and program analysis. My interests include the development of techniques for improving software reliability, security, and trustworthiness, and the validation of such techniques on real-world systems.

I. TEACHING

A. Courses Taught

Semester/Year	Course	Number of Students	Comments
Spring 2021	CS 6300 Software Development Process	717	Offered as part of Georgia Tech's OMS-CS/CY
Fall 2021	CS 6301 Advanced Topics in Software Engineering	39	
Fall 2021	CS 6300 Software Development Process	761	Offered as part of Georgia Tech's OMS-CS/CY
Summer 2020	CS 6300 Software Development Process	516	Offered as part of Georgia Tech's OMS-CS/CY
Spring 2021	CS 6300 Software Development Process	689	Offered as part of Georgia Tech's OMS-CS/CY
Fall 2020	CS 6300 Software Development Process	558	Offered as part of Georgia Tech's OMS-CS/CY
Summer 2020	CS 6300 Software Development Process	406	Offered as part of Georgia Tech's OMS-CS/CY
Spring 2020	CS 6301 Advanced Topics in Software Engineering	56	
Spring 2020	CS 6300 Software Development Process	475	Offered as part of Georgia Tech's OMS-CS/CY
Fall 2019	CS 6300 Software Development Process	461	Offered as part of Georgia Tech's OMS-CS
Summer 2019	CS 6300 Software Development Process	354	Offered as part of Georgia Tech's OMS-CS
Spring 2019	CS 6301 Advanced Topics in Software Engineering	56	
Spring 2019	CS 6300 Software Development Process	426	Offered as part of Georgia Tech's OMS-CS
Fall 2018	CS 6300 Software Development Process	450	Offered as part of Georgia Tech's OMS-CS
Summer 2018	CS 6300 Software Development Process	200	Offered as part of Georgia Tech's OMS-CS
Spring 2018	CS 6301 Advanced Topics in Software Engineering	40	
Spring 2018	CS 6300 Software Development Process	356	Offered as part of Georgia Tech's OMS-CS
Fall 2017	CS 6300 Software Development Process	361	Offered as part of Georgia Tech's OMS-CS
Summer 2017	CS 6300 Software Development Process	200	Offered as part of Georgia Tech's OMS-CS
Spring 2017	CS 8803 Advanced Software Engineering	32	
Spring 2017	CS 6300 Software Development Process	362	Offered as part of Georgia Tech's OMS-CS
Fall 2016	CS 6300 Software Development Process	361	Offered as part of Georgia Tech's OMS-CS
Summer 2016	CS 6300 Software Development Process	200	Offered as part of Georgia Tech's OMS-CS
Spring 2016	CS 6300 Software Development Process	366	Offered as part of Georgia Tech's OMS-CS
Fall 2015	CS 8803 Advanced Software Engineering	43	
Fall 2015	CS 6300 Software Development Process	317	Offered as part of Georgia Tech's OMS-CS

Semester/Year	Course	Number of Students	Comments
Summer 2015	CS 6300 Software Development Process	219	Offered as part of Georgia Tech's OMS-CS
Spring 2015	CS 6300 Software Development Process	318	Offered as part of Georgia Tech's OMS-CS
Spring 2015	CS 6300 Software Development Process	16	Offered as part of Georgia Tech's GTPE
Fall 2014	CS 8803 Advanced Software Engineering	17	
Fall 2014	CS 6300 Software Development Process	236	Offered as part of Georgia Tech's OMS-CS
Fall 2014	CS 6300 Software Development Process	46	Offered as part of Georgia Tech's GTPE
Summer 2014	CS 6300 Software Development Process	209	Offered as part of Georgia Tech's OMS-CS
Spring 2014	CS 6300 Software Development Process	49 (10 DL)	
Spring 2014	CS 6300 Software Development Process	132	Offered as part of Georgia Tech's OMS-CS
Fall 2012	CS 6300 Software Development Process	43 (6 DL)	
Fall 2011	Testing y Análisis de Software (in Castilian) (Escuela Regional en Tecnologías de la Información y Comunicaciones (ERTIC), Facultad Politécnica de la Universidad Nacional de Asunción (FP-UNA))	36	
Spring 2012	CS 3300 Introduction to Software Engineering	21	
Spring 2012	CS 6300 Software Development Process	43	
Spring 2011	Software Testing and Analysis (Ph.D. course at Università della Svizzera Italiana, Switzerland)	18	
Spring 2011	Software Testing and Analysis (Ph.D. course at Politecnico di Milano, Italy)	14	
Fall 2010	CS 6300 Software Development Process	40	
Fall 2009	CS 4001 Computing and Society	38	
Fall 2009	CS 6300 Software Development Process / CS 4320 Introduction to Software Processes	44	
Fall 2008	CS 3300 Introduction to Software Engineering	25	
Fall 2008	CS 4001 Computing and Society	28	
Summer 2008	CS 3300 Introduction to Software Engineering	13	
Summer 2008	CS 4001 Computing and Society	31	
Summer 2008	Testing y Análisis de Software (in Castilian) (summer school at the University of Buenos Aires, Argentina)	162	
Fall 2007	CS 3300 Introduction to Software Engineering	32	
Fall 2007	CS 6300 Software Development Process / CS 4320 Introduction to Software Processes	58	
Fall 2006	CS 3300 Introduction to Software Engineering	27	
Fall 2006	CS 8803 Software Testing and Analysis	9	Now a regular 6000-level class (CS 6340)
Fall 2005	CS 1322 Computer Science II	165	Sections A1, A2, and A3
Fall 2005	CS 8803 Software Testing and Analysis	25	Now a regular 6000-level class (CS 6340)
Spring 2005	CS 1322 Computer Science II	150	Breakout Sections
Spring 2003	CS 8803 Software Analysis and Testing	9	Co-taught

In addition, prepared and taught lab sections at Politecnico di Milano, Italy, between 1996 and 1999, for the following undergraduate classes: Software Engineering, Foundations of Computer Science I, Foundations of Computer Science II, and Information-Processing Systems. I also developed and taught, from 1997 to 2002, a course on software testing for companies targeted at test managers.

B. Continuing Education

None

C. Curriculum Development

CS 6301 (Advanced Topics in Software Engineering): This is a graduate course in which students study the way software is developed, verified, and deployed in modern companies. Students will get exposed to and become familiar with new tools and technologies used in today's development organizations. The course will also cover cutting edge research techniques to develop better quality software and include guest lecturers from industry that can provide a view from the trenches on what it means to develop software today. Finally, the course involves a semester long project in which teams of students develop the different modules (i.e., web client, mobile client, server, and backend database) of a multi-tier application. By the end of the semester, the students are able to automatically build, deploy, and integrate their modules.

OMS CS 6300 (Software Development Process): This is the OMS version of my CS 6300 on-campus class. Although this class covers the same topics that I cover in my regular CS 6300 course, I had to develop the class from scratch to make is suitable for online delivery. More specifically, the class is based on a "whiteboard animation" paradigm, in which most of the content is presented by writing and sketching on a virtual whiteboard. Moreover, the class content is presented in short segments followed by frequent quizzes, which required me to rethink the whole structure of the course and add a considerable amount of new material. Finally, I had to find creative solutions for presenting topics that require a high level of (synchronous) interaction with the students. I normally teach my lectures on software design, for instance, by having some students design an actual system at the whiteboard and commenting on it as they go, which is clearly not possible in an online, asynchronous setting. What I did was therefore to record, with the help of a colleague, a 45-minute video "skit". In the video, I pretend to help a librarian friend to design an IT system for his library, and my friend makes all the typical mistakes that students tend to make in class. By watching the video, the students can get a similar experience to the one they would get in class doing the exercise themselves.

CS 6340 (Advanced Topics in Software Analysis and Testing): This is a graduate course in which students are exposed to various topics in static and dynamic program analysis and in software testing. The material presented ranges from fundamental principles to the most advanced research topics. Half way through the semester, students pick a project based on one of the topics presented and work on the project until the end of the semester. Projects can be either theoretical or applied and provide students with invaluable research and engineering experience. The course ends with a mini-conference in which students present papers that describe the results of their projects. In 2003, I have co-developed the part of the course on dynamic analysis and developed the part of the course on testing. In 2005, I have revamped the whole class, including updating the topics covered, adding new material, and preparing an extensive set of supporting slides for the course. I have further updated the course with new material in 2006. I presented the course to the CoC Graduate Committee and to the Institute Graduate Committee, which approved it in Summer 2007.

CS 3300 (Introduction to Software Engineering) and CS 6300 (Software Development Process): In 2007 I started teaching CS 3300 and 6300 on a regular basis, and shortly thereafter I took ownership of both classes. I considerably revamped both courses by making a number of changes to their syllabi. First, I removed obsolete material and added new material. For example, the classes now cover test-driven and agile development, which are practices widely used in industry (e.g., at Google) and which were totally neglected in the earlier syllabi. Second, I added a whole new part on novel technologies, in which students are exposed to widely used technologies, such as cloud computing platforms, web application frameworks, configuration management tools, and mobile development environments. (A number of students gave me feedback on how useful they found this part to be when they went for interviews or, more generally, in their job.) Finally, I modified the class projects to make them more stimulating and practically useful. For example, I now have the instructor and the TAs acting as real customers, so that students

can better learn what it means to elicit requirements through interaction with actual project stakeholders. For another example, projects now involve the new technologies that we study in class. Also in this case, many students reported that they enjoyed the projects and felt like they learned a good deal by doing them.

D. Individual Student Guidance

1. Ph.D. Students Graduated

Farnaz Behrang: Graduated in Fall 2020 and is currently on the job market

Mattia Fazzini: Graduated in Summer 2019, Assistant Professor in the Department of Computer Science & Engineering at University of Minnesota

Qianqian Wang: Graduated in Summer 2019, Software Engineer at Manhattan Associates

Wei Jin: Graduated in Summer 2015, Software Engineer at Google

Shauvik Roy Choudhary: Graduated in Summer 2015, CEO and Co-Founder of MoQuality

James Clause: Graduated in Spring 2011, Associate Professor in the Computer and Information Sciences Department at the University of Delaware, US

William Halfond: Graduated in Spring 2010, Associate Professor with tenure in the Computer Science Department at the University of Southern California, US

Taweesup Apiwattanapong: Graduated in Fall 2007 (co–advised), Researcher at the National Electronics and Computer Technology Center (NECTEC), Thailand

2. Research Scientists and Tech Temp Supervised

Mattia Fazzini: Fall 2012, Spring 2013

Matteo Miraz: Spring 2012

James Clause: Summer 2005

Arjan Seesing: Summer 2005, Fall 2005

3. Ph.D. Students Supervised

Xinyu Liu: Fall 2019–Present

Myeongsoo Kim: Fall 2019–Present

Robin Guzniczak: Fall 2018–Spring 2019

Ravi Mangal: Spring 2017–Present

Loren Klingman: Spring 2017–Fall 2018

Richard Rutledge: Fall 2016–Present

Xiangyu Li: Fall 2013–Present

Juyuan Yang: Spring 2013–Fall 2014

Ikpeme Erete: Fall 2009–Fall 2010

Shauvik Roy Choudhary: Fall 2009–Summer 2015

Dan Zhao: Fall 2009–Fall 2011 (visiting from Hunan University, China)

Saswat Anand: Fall 2004–Fall 2010 (co–advised)

Wei Jin: Fall 2008–Summer 2015

Sarah Clark: Summer 2008–Fall 2008

Hwa-You Hsu: Fall 2006–Fall 2009

James Clause: Summer 2005–Spring 2011
William Halfond: Fall 2004–Fall 2009
Taweesup Apiwattanapong: Spring 2002–Fall 2007 (co–advised)
Yi Zhang: Fall 2003–Fall 2004 (co–advised)
Nanjuan Shi: Fall 2003–Spring 2004 (co–advised)

4. M.S. Projects and Special Problems Students

Harshit Sharma: Spring 2016
Jie Lu: Fall 2013–Fall 2014
Juyuan Yang: Spring 2014–Fall 2014
Niranjanaa Ragupathy: Spring 2013
Noel Go: Spring 2013
Shunmugam Murugan: Fall 2012
Lokesh Balakrishnan: Fall 2012
Jeremy Duvall: Fall 2010–Fall 2013
Romain Jobredeaux: Fall 2010
Hersh Iyer: Spring 2010, Fall 2010
Kunal Thakar: Spring 2009
Satvir Bhatia: Spring 2008, Fall 2008
Mijung Kim: Fall 2008
Pranav Kuber: Fall 2008
Sarang Ozarde: Fall 2008
Shauvik Roy Choudhary: Spring 2008, Fall 2008, Spring 2009
Kunal Thakar: Spring 2008
Farhana Aleen: Fall 2007
Yimin Zhang: Fall 2007
Jeremy Viegas: Spring 2006
Shrinivas Balkrishna Joshi: Fall 2004, Spring 2005, Fall 2005, Spring 2006
Bryan Kennedy: Fall 2003, Spring 2004
Manas Tungare: Fall 2002, Spring 2003

5. Undergraduate Special Problems Students

Shaowei Zhu: Spring 2016
Tommaso Pieroncini: Spring 2016
Jing Hong: Fall 2015
Zixiang Zhu: Spring 2015–Spring 2016
Brian Edmonds: Spring 2014
Crystal Lo: Spring 2014
Nirav Bathia: Spring 2013, Fal 2013
Michael Sambol: Spring 2013

Jorge Villasmil: Fall 2009

Husayn Versee: Spring 2009, Fall 2009, Spring 2010, Fall 2010

Petar Tsankov: Spring 2009, Fall 2009

Quinn Cone: Spring 2009

Jonathan Loesch: Spring 2009

Thomas Smith: Spring 2009

Stephan Prockow: Fall 2007, Spring 2008, Spring 2009
(Supported by a President's Undergraduate Research Award in Spring 2008)

William Cray: Fall 2007, Spring 2008
(Supported by a President's Undergraduate Research Award in Spring 2008)

Conroy Whitney: Fall 2007

Matthew Wood: Fall 2006, Spring 2007
(Supported by a President's Undergraduate Research Award in Spring 2007 and winner of the 2007 UROC Research Symposium)

Matthew Ordonez: Fall 2004, Spring 2005, Summer 2005
(Supported by a President's Undergraduate Research Award in Spring 2005)

Carlo Tambuatco: Spring 2005

Anil Jagdish Chawla: Spring 2003, Fall 2003, Spring 2004

Mahesh Balakrishnan: Fall 2002, Spring 2003
(Supported by a President's Undergraduate Research Award in Fall 2002)

Anup Rao: Spring 2002

Rebecca Hutchinson: Summer 2001 (co-advised)
(CRA-W Distributed Mentor Project)

Kathleen Repine: Summer 2001 (co-advised)
(CRA-W Distributed Mentor Project)

E. Teaching Honors and Awards

1. Hesburgh Award Teaching Fellow, Georgia Tech, 2017
2. Class of 1940 Course Survey Teaching Effectiveness Award, Georgia Tech, 2015.
3. Most Influential Faculty Member, selected by Anil Jagdish Chawla, Dean's Honor Graduate, 2004.

F. Other Academic and Teaching Activities

1. Attended the invitational Dagstuhl seminar on Program Repair. Dagstuhl, Germany, January 2017.
2. Attended several IFIP WG 2.4 Meetings (Stellenbosch, South Africa; Victoria, Canada; Vadstena, Sweden).
3. Attended the invitational Workshop on the Future of Debugging. Mysore, India, February-March 2012.
4. Attended the invitational Dagstuhl seminar on Fault Prediction, Localization, and Repair. Dagstuhl, Germany, February 2013.
5. Panelist at the IEEE International Conference on Software Testing for a panel on the future of software testing, March 2011.

6. Attended the invitational Dagstuhl seminar on Self-Repairing Programs. Dagstuhl, Germany, February 2011.
7. Attended the invitational Microsoft Think Tank meeting at Microsoft Research, Bellevue, WA, November 2009.
8. Attended, as a member of the Independent Evaluation Team, the site visit for the DARPA Application Community program, Phase II. Boston, MA, September 2009.
9. Visited IBM Research, New Delhi, India, August 2009.
10. Attended the invitational Dagstuhl seminar on Web Application Security. Dagstuhl, Germany, March 2009.
11. Attended, as a member of the Independent Evaluation Team, the site visit for the DARPA Application Community program, Phase II. Boston, MA, March 2009.
12. Attended, as a member of the Independent Evaluation Team, the Kick-off Meeting for the DARPA Application Community program, Phase II. Boston, MA, December 2008.
13. Attended, as a member of the Independent Evaluation Team, the Red Team Exercises for the DARPA Application Community program. Menlo Park, CA and Boston, MA, February 2008.
14. Panelist at the ASE International Workshop on Living with Uncertainties (IWLU 2007).
15. Attended, as a member of the Independent Evaluation Team, the site visits for the DARPA Application Community program. Boston, MA and Menlo Park, CA, March 2007.
16. Attended, as a member of the Independent Evaluation Team, the PI meeting of the DARPA Application Community program. Arlington, VA, January 2007.
17. Attended, as a member of the Independent Evaluation Team, the kick-off meeting of the DARPA Application Community program. Arlington, VA, July 2006.
18. Attended DHS-ARPA Cyber Security PI meeting. Washington, D.C., August 2006.
19. Attended, as a member of the Independent Evaluation Team, the kick-off meeting of the DARPA Application Community program. Arlington, VA, July 2006.
20. Attended the 2nd DARPA-sponsored Information Science and Technology (ISAT) invitational study on "Trustable Deployed Adaptive Systems." SRI International, Menlo Park, CA, March 2006.
21. Attended the 1st DARPA-sponsored Information Science and Technology (ISAT) invitational study on "Trustable Deployed Adaptive Systems." Carnegie Mellon University, Pittsburgh, PA, February 2006.
22. Attended DHS-ARPA Cyber Security PI meeting. SRI International, Menlo Park, CA, January 2006.
23. Volunteered for the CoCeasar Palace initiative at Georgia Tech. Spring 2006.
24. Attended the ARO-HS ARPA invitational Malware Detection Workshop. SRI International, Arlington, VA, August 2005.
25. Attended DHS-ARPA Cyber Security PI meeting. SRI International, Arlington, VA, August 2005.
26. Session chair and session organizer for Georgia Tech's Technology Symposium. February 2005.
27. Given a presentation about opportunities in CS for high-school minority students in the context of Cool Computing@GT's Diversity Fair. February 2005.
28. Volunteered for the CoCeasar Palace initiative at Georgia Tech. Spring 2005.
29. Attended the DARPA invitational Application Communities Workshop. Schafer Corporation, Arlington, VA, October 2004.

30. Attended the 2004 NSF Information Technology Research Grantee Meeting (ITR PI Meeting). Crystal City, VA, June 2004.

31. Attended the New Software Engineering Faculty Symposium (NSEFS). Portland, OR, May 2003.

32. Member of the jury for the UROC (Undergraduate Research Opportunities in Computing) contest, to award the best undergraduate research project, 2002–2004.

33. Instructor for bi-annual tutorial on software testing and analysis (which I developed) for industrial developers and quality-assurance managers, 1996–2002.

II. RESEARCH AND CREATIVE SCHOLARSHIP

A. Theses

Ph.D. Thesis

Integration Testing of Object-Oriented Software
Date Completed: February 1999
Advisor: Mauro Pezzè
Tutor: Carlo Ghezzi
University: Politecnico di Milano, Italy

Master's Thesis

Customizable Notations for Kernel Formalisms
Date Completed: May 1995
Advisors: Mauro Pezzè
University: Politecnico di Milano, Italy

B. Published Journal Papers (refereed)

1. M. Fazzini, K. Moran, C.B. Cardenas, T. Wendland, A. Orso, and D. Poshyvanyk. Enhancing Mobile App Bug Reporting via Real-time Understanding of Reproduction Steps. *IEEE Transactions on Software Engineering (TSE)*, 2022, To Appear.

2. W. Jin and A. Orso. Automated Support for Reproducing and Debugging Field Failures. *ACM Transactions on Software Engineering and Methodology (TOSEM)*, 2015, Volume 24, Issue 4, pages 1–35.

3. D. Zhao, S. Roy Choudhary, and A. Orso. Developing Analysis and Testing Plug-ins for Modern IDEs: An Experience Report. *Software: Practice and Experience*, 2013, Volume 43, Issue 4, pages 465–478.

4. I. Doudalis, J. Clause, G. Venkataramani, M. Prvulovic, and A. Orso. Effective and Efficient Memory Protection Using Dynamic Tainting. *IEEE Transactions on Computers*, 2012, Volume 61, Number 1, pages 87–100.

5. W. Halfond, S. Roy Choudhary, and A. Orso. Improving Penetration Testing through Static and Dynamic Analysis. *Journal of Software Testing, Verification and Reliability (JSTVR)*, 2011, Volume 21, Number 3, pages 195–214.

6. M. Last, G. Luta, A. Orso, A. Porter and S. Young, Pooled ANOVA, *Computational Statistics & Data Analysis*, 2008, Volume 52, Issue 12, pages 5215–5228.

7. W. Halfond, A. Orso, and P. Manolios. WASP: Protecting Web Applications Using Positive Tainting and Syntax-Aware Evaluation. *IEEE Transactions on Software Engineering (TSE)*, 2008, Volume 34, Number 1, pages 65–81.

8. M. Haran, A. Karr, M. Last, A. Orso, A. Porter, A. Sanil, and S. Fouché. Techniques for Classifying Executions of Deployed Software to Support Software Engineering Tasks. *IEEE Transactions on Software Engineering (TSE)*, 2007, Volume 33, Number 5, pages 287–304.

9. A. Orso, H. Do, G. Rothermel, M. J. Harrold and D. Rosenblum Using Component Metadata to Regression Test Component–based Software. *Journal of Software Testing, Verification and Reliability (JSTVR)*, 2007, Volume 17, Number 2, pages 61–94.

10. T. Apiwattanapong, A. Orso and M. J. Harrold JDiff: A Differencing Technique and Tool for Object–Oriented Programs. *Automated Software Engineering: An International Journal*, 2007, Volume 14, Number 1, pages 3–36.

11. A. Orso, S. Sinha, and M.J. Harrold. Classifying Data Dependence in the Presence of Pointers for Program Comprehension, Testing, and Debugging. *ACM Transactions on Software Engineering and Methodology (TOSEM)*, 2004, Volume 13, Number 2, pages 199–239.

12. J. Jones, A. Orso, and M.J. Harrold. Gammatella: Visualizing Program-Execution Data for Deployed Software. *Information Visualization*, 2004, Volume 3, Number 3, pages 173–188.

C. Published Books and Parts of Books

1. A. Orso. Don't Forget the Developers! (and Be Careful with Your Assumptions). *Perspectives on Data Science for Software Engineering (Book Chapter)*, T. Menzies, L. Williams, and T. Zimmermann (Eds.)
   (invited paper)

2. N. Medvidovic and A. Orso. Software Analytics Under the Lamppost (or What Star Trek Teaches Us About the Importance of Asking the Right Questions). *Perspectives on Data Science for Software Engineering (Book Chapter)*, T. Menzies, L. Williams, and T. Zimmermann (Eds.)
   (invited paper)

3. A. Orso. SQL Injection Attacks. *Encyclopedia of Cryptography and Security,* Springer Science and Business Media LLC, 2010.
   (invited paper)

4. W. Halfond and A. Orso. Detection and Prevention of SQL Injection Attacks. *Malware Detection*, Series: Advances in Information Security, Springer, Vol. 27, M. Christodorescu, S. Jha, D. Maughan, D. Song, C. Wang (Eds.), 2007, XII.
   (invited paper)

D. Edited Proceedings

1. Proceedings of the ACM-SIGSOFT and IEEE International Conference on Software Engineering (ICSE 2017), Buenos Aires, Argentina, May 2017.

2. Proceedings of the ACM-SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2014), Hong Kong, China, November 2014.

3. Proceedings of the IEEE International Conference on Software Testing, Verification and Validation (ICST 2013), Luxembourg, April 2013.

4. Proceedings of the ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2010). Trento, Italy, July 2010.

5. Proceedings of the Fifth ICSE *Workshop on Dynamic Analysis (WODA 2007)*. Minneapolis, MN, USA, May 2007.

6. Proceedings of the Fifth ICSE *Workshop on Dynamic Analysis (WODA 2007)*. Minneapolis, MN, USA, May 2007.

7. Proceedings of the Second ICSE Workshop on *Remote Analysis and Measurement of Software Systems (RAMSS 04)*. Edinburgh, Scotland, May 2004.

E. Conference Presentations

E.1. Invited Keynote Addresses

1. Software Debugging: Past, Present, and Future. Distinguished lecture in the Department of Computer Science at Virginia Tech, November 2018.
2. Invited talk for the ISSTA 2017 Impact Paper Award, Santa Barbara, CA, USA, July 2017.
3. Software Debugging: Past, Present, and Future. Distinguished lecture in the Special Lecture Series of the Computing Colloquium Seminars, at Imperial College London, UK, June 2017.
4. Software Debugging: Past, Present, and Future. Invited lecture at Politecnico di Milano, Italy, June 2017.
5. Software Debugging: Past, Present, and Future. Distinguished lecture in the ISR Distinguished Speaker Series, University of California, Irvine, March 2017.
6. Software Debugging: Past, Present, and Future. Invited lecture at the Department of Computing at Imperial College London, UK, December 2016.
7. Automated Debugging: Are We There Yet? Distinguished lecture in the Distinguished Lectures Series in Cybersecurity at TU Darmstadt, April 2106.
8. Automated Debugging: Are We There Yet? Invited talk at the CHOOSE forum (yearly meeting of the Swiss Group for Original and Outside-the-box Software Engineering), October 2015.
9. Automated Support for Reproducing and Debugging Field Failures. Distinguished Lecturer at the College of Information and Computer Sciences of UMass Amherst, January 2015.
10. "Automated Debugging: Are We There Yet?". Distinguished Lecture at the University of Luxembourg, Luxembourg, June 2014.
11. Automated Debugging: Are We There Yet? Opening talk at the Dagstuhl Seminar on Fault Prediction, Localization, and Repair, February 2013.
12. In-house Debugging of Field Failures. Keynote talk at the ISSTA Workshop on Dynamic Analysis (WODA 2012), Minneapolis, MN, USA July 2012.
13. Automated Debugging: Are We There Yet? Keynote talk at the ICST Workshop on Testing and Debugging (TeBug 2011), Berlin, Germany, March 2011.
14. Repository Mining and Program Analysis & Testing: Better Together? Keynote talk at the Mining Software Archives workshop, Ascona, Switzerland, March 2010.
15. Improving Application Security through Program Analysis. Invited keynote at the 5th ICSE Workshop on Software Engineering for Secure Systems (SESS 2009), Vancouver, Canada, May 2009.
16. Using Program Analysis to Improve Web Application Security and Reliability. Invited keynote at the ISSTA Workshop on Testing, Analysis and Verification of Web Software (TAV-WEB 2008), Seattle, WA, USA, July 2008.

E.2. Conference Presentations with Proceedings (refereed)

(Note: ASE, ESEC/FSE, FSE, ICSE, ICST, and ISSTA are all top-tier conferences.)

1. Q. Xin, Q. Zhang, and A. Orso. Studying and Understanding the Tradeoffs Between Generality and Reduction in Software Debloating. *Proceedings of the 37th IEEE/ACM International Conference on Automated Software Engineering (ASE 2022)*, Rochester, MI, October 2022.
   (116 of 527 papers accepted – 22%)

2. M. Kim, Q. Xin, S. Sinha, and A. Orso. Automated Test Generation for REST APIs: No Time to Rest Yet. *Proceedings of the 31st ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2022)*, Online.
(61 of the 250 papers accepted – 24%)

3. X. Liu, Q. Zhou, J. Arulraj, and A. Orso. Automatic Detection of Performance Bugs in Database Systems using Equivalent Queries. *Proceedings of the 44th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2022)*, Pittsburgh, PA, May 2022.
(197 of the 751 papers accepted – 26%)

4. M. Fazzini, C. Choi, J.M. Copia, G. Lee, Y. Kakehi, A. Gorla, and A. Orso. Use of Test Doubles in Android Testing: An In-Depth Investigation. *Proceedings of the 44th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2022)*, Pittsburgh, PA, May 2022.
(197 of the 751 papers accepted – 26%)

5. R. Rutledge and A. Orso. Automating Differential Testing with Overapproximate Symbolic Execution. *Proceedings of the 15th IEEE International Conference on Software Testing, Verification and Validation (ICST 2022)*, Virtual, April 2022.
(acceptance rate not provided)

6. Q. Wang and A. Orso. Improving Testing by Mimicking User Behavior. *Proceedings of the 36th IEEE International Conference on Software Maintenance and Evolution (ICSME 2020)*, Adelaide, Australia, September-October 2020.
(50 of the 201 submissions accepted – 24.9%)

7. F. Behrang and A. Orso. Seven Reasons Why: An In-Depth Study of the Limitations of Random Test Input Generation for Android. *Proceedings of the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE 2020)*, Melbourne, Australia, September 2020.
(93 of the 414 submissions accepted – 22.5%)

8. Q. Xin, M. Kim, Q. Zhang, and A. Orso. Subdomain-Based Generality-Aware Debloating. *Proceedings of the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE 2020)*, Melbourne, Australia, September 2020.
(93 of the 414 submissions accepted – 22.5%)

9. M. Fazzini and A. Orso. Managing App Testing Device Clouds: Issues and Opportunities. *Proceedings of the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE 2020) – Late Breaking Results Track*, Melbourne, Australia, September 2020.
(9 of the 15 submissions accepted – 60%)

10. R. Mangal, K. Sarangmath, A. Nori and A. Orso. Probabilistic Lipschitz Analysis of Neural Networks. *Proceedings of the 27th Static Analysis Symposium (SAS 2020)*, November 2020.
(14 of the 34 submissions accepted – 41%)

11. M. Fazzini, A. Gorla, and A. Orso. A Framework for Automated Test Mocking of Mobile Apps. *Proceedings of the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE 2020) – NIER track*, Melbourne, Australia, September 2020.

12. M. Fazzini, Q. Xin, and A. Orso. APIMigrator: An API-Usage Migration Tool for Android Apps. *Proceedings of the 7th IEEE/ACM International Conference on Mobile Software Engineering and Systems (MobileSoft 2020) – Tool Demos and Mobile Apps*, Seoul, South Korea, October 2020.

13. Q. Xin, M. Kim, Q. Zhang, and A. Orso. Program Debloating via Stochastic Optimization. *Proceedings of the 42nd IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2020) – NIER Track*, Seoul, South Korea, October 2020.
(29 of the 93 submissions accepted – 31%)

14. F. Behrang and A. Orso. AppTestMigrator: A Tool for Automated Test Migration for Android Apps. *Proceedings of the 42nd IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2020) – Demo Track*, Seoul, South Korea, October 2020.
(25 of 75 submissions accepted – 33%)

15. R. Rutledge and A. Orso. PG-KLEE: Trading Soundness for Coverage. *Proceedings of the 42nd IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2020) – Demo Track*, Seoul, South Korea, October 2020.
(25 of 75 submissions accepted – 33%)

16. X. Li and A. Orso. More Accurate Dynamic Slicing for Better Supporting Software Debugging. *Proceedings of the 13th IEEE International Conference on Software Testing, Verification and Validation (ICST 2020)*, Porto, Portugal, October 2020.
(27 of the 114 submissions accepted – 24%)

17. F. Behrang and A. Orso. Test Migration Between Mobile Apps with Similar Functionality. *Proceedings of the 34th IEEE/ACM International Conference on Automated Software Engineering (ASE 2019)*, San Diego, CA, USA, November 2019.
(91 of the 445 submissions accepted – 20%)

18. M. Fazzini, Q. Xin, and A. Orso. Automated API-Usage Update for Android Apps. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2019)*, Beijing, China, July 2019.
(29 of the 145 submissions accepted – 20%)

19. R. Rutledge, S. Park, H. Khan, A. Orso, M. Prvulovic and A. Zajic. Zero-Overhead Path Prediction with Progressive Symbolic Execution. *Proceedings of the 41st IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2019)*, Montreal, Canada, May 2019.
(109 of the 529 submissions accepted – 21%)

20. Q. Wang and A. Orso. [Poster] Mimicking User Behavior to Improve In-House Test Suites. *Poster track of the 41st IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE-Poster 2019)*, Montreal, Canada, May 2019.
(Invited)

21. R. Mangal, A. Nori, and A. Orso. Checking Probabilistic Properties of Neural Networks via Symbolic Methods and Sampling. *Proceedings of the First ICSE Workshop on Testing for Deep Learning and Deep Learning for Testing (DeepTest 2019)*, Montreal, Canada, May 2019.

22. R. Mangal, A. Nori, A. Orso. Robustness of Neural Networks: A Probabilistic and Practical Perspective. *Proceedings of the 41st IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2019) – NIER Track*, Montreal, Canada, May 2019.
(25 of the 92 submissions accepted – 27%)

23. X. Li, M. d'Amorim, and A. Orso. Intent-Preserving Test Repair. *Proceedings of the 12th IEEE International Conference on Software Testing, Verification and Validation (ICST 2019)*
(31 of the 110 submissions accepted – 28%)

24. Y. Ji, S. Lee, M. Fazzini, J. Allen, E. Downing, T. Kim, A. Orso, and W. Lee. Enabling Refinable Cross-Host Attack Investigation with Efficient Data Flow Tagging and Tracking. *Proceedings of the 27th USENIX Security Symposium (USENIX Security 2018)*, Baltimore, MD, USA, August 2018.
(100 of the 524 submissions accepted – 19%)

25. M. Fazzini, M. Prammer, M. d'Amorim, and A. Orso. Automatically Translating Bug Reports into Test Cases for Mobile Apps. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2018)*, Amsterdam, Netherlands, July 2018.
(31 of the 130 submissions accepted – 24%)

26. F. Behrang and A. Orso. Test Migration for Efficient Large-Scale Assessment of Mobile App Coding Assignments. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2018)*, Amsterdam, Netherlands, July 2018.
(31 of the 130 submissions accepted – 24%)

27. F. Behrang, S. Reiss and A. Orso. GUIFetch: Supporting App Design and Development through GUI Search. *Proceedings of the 5th IEEE/ACM International Conference on Mobile Software Engineering and Systems (MobileSoft 2018)*, Gothenburg, Sweden, May 2018. (This paper was presented with an **ACM-SIGSOFT Distinguished Paper Award**.)

28. F. Behrang and A. Orso. [Poster] Automated Test Migration for Mobile Apps. *Poster track of the 40th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE-Poster 2018).* , Gothenburg, Sweden, June 2018.
(Invited)

29. X. Li, S. Zhu, M. d'Amorim, and A. Orso. Enlightened Debugging. *Proceedings of the 40th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2018)*, Gothenburg, Sweden, June 2018.
(105 of the 502 submissions accepted – 21%)

30. Y. Ji, S. Lee, E. Downing, W. Wang, M. Fazzini, T. Kim, A. Orso, and W. Lee. RAIN: Refinable Attack Investigation with On-demand Inter-Process Information Flow Tracking. *Proceedings of the ACM-SIGSAC Conference on Computer and Communications Security (CCS 2017)*
(151 of the 836 submissions accepted – 18%)

31. M. Fazzini and A. Orso. Automated Cross-Platform Inconsistency Detection for Mobile Apps. *Proceedings of the 32nd IEEE/ACM International Conference on Automated Software Engineering (ASE 2017)*
(88 of the 314 submissions accepted – 28%)

32. M. Fazzini, E. Noronha de A. Freitas, S. Roy Choudhary, and A. Orso. Barista: A Technique for Recording, Encoding, and Running Platform Independent Android Tests. *Proceedings of the 10th IEEE International Conference on Software Testing, Verification and Validation (ICST 2017)*
(36 of the 135 submissions accepted – 27%)

33. Behavioral Execution Comparison: Are Tests Representative of Field Behavior? Q. Wang, Y. Brun, and A. Orso. *Proceedings of the 10th IEEE International Conference on Software Testing, Verification and Validation (ICST 2017)*
(36 of the 135 submissions accepted – 27%)

34. W. Jin and A. Orso. Improving Efficiency and Accuracy of Formula-based Debugging. *Proceedings of the 12th Haifa Verification Conference (HVC 2016)*

35. X. Li, M. d'Amorim, and A. Orso. Iterative User-Driven Fault Localization. *Proceedings of the 12th Haifa Verification Conference (HVC 2016)*

36. R. Callan, F. Behrang, M. Prvulovic, A. Zajic, and A. Orso. Zero-Overhead Profiling via EM Emanations. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2016)*
(37 of the 147 submissions accepted – 25%)

37. S. Roy Choudhary, A. Gorla, and A. Orso. Automated Test Input Generation for Android: Are We There Yet?. *Proceedings of the 29th IEEE/ACM International Conference on Automated Software Engineering (ASE 2015)*, Lincoln, NE, USA, 2015.
(60 of the 289 submissions accepted – 21%)

38. F. Behrang, M. Cohen, and A. Orso. Users Beware: Preference Inconsistencies Ahead. *Proceedings of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2015)*, Bergamo, Italy, 2015. (This paper was presented with an **ACM-SIGSOFT**

Distinguished Paper Award.)
(74 of the 291 submissions accepted – 25%)

39. Q. Wang, C. Parnin, and A. Orso . An In-Depth Study of IR-Based Fault Localization Techniques. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2015)*, Baltimore, MD, USA, 2015.
(33 of the 119 submissions accepted – 28%)

40. M. Fazzini, P. Saxena, and A. Orso. AutoCSP: Automatically Retrofitting CSP to Web Applications. *Proceedings of the 37th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2015)*, Florence, Italy, May 2015.
(84 of the 452 submissions accepted – 19%)

41. D. Zuddas, W. Jin, F. Pastore, L. Mariani, and A. Orso. Mimic: Locating and Understanding Bugs by Analyzing Mimicked Executions. *Proceedings of the 29th IEEE/ACM International Conference on Automated Software Engineering (ASE 2014)*, Västerås, Sweden, September 2014.

42. A. Orso and G. Rothermel. Software Testing: A Research Travelogue (2000-2014). *Proceedings of the 36th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2014) – FOSE Track*, Hyderabad, India, June 2014.
(invited paper)

43. S. Roy Choudhary, M. Prasad, and A. Orso. Cross-Platform Feature Matching for Web Applications. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2014)*, San Jose, CA, USA, July 2014.
(36 of the 128 submissions accepted – 28%)

44. S. Roy Choudhary, M. Prasad, and A. Orso. X-PERT: A Web Application Testing Tool for Cross-Browser Inconsistency Detection. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2014) – Tool Demonstraction track*, San Jose, CA, USA, July 2014.
(acceptance rate unknown)

45. S. Kaleeswaran, V. Tulsian, A. Kanade, and A. Orso. MintHint: Automated Synthesis of Repair Hints. *Proceedings of the 36th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2014)*, Hyderabad, India, June 2014.
(99 of the 495 submissions accepted – 20%)

46. F. Meshesha Kifetew, W. Jin, R. Tiella, A. Orso, and P. Tonella. Reproducing Field Failures for Programs with Complex Grammar Based Input. *Proceedings of the 7th IEEE International Conference on Software Testing, Verification and Validation (ICST 2014)*, Cleveland, OH, USA, April 2014.
(40 of the 131 submissions accepted – 28%)

47. F. Meshesha Kifetew, W. Jin, R. Tiella, A. Orso, and P. Tonella. SBFR: A Search Based Approach for Reproducing Failures of Programs with Grammar Based Input. `Proceedings of the 28th IEEE/ACM International Conference on Automated Software Engineering (ASE 2013)` [short paper], Palo Alto, CA, USA, November 2013.
(74 of the 317 submissions accepted – 23%)

48. W. Jin and A. Orso. F^3: Fault localization for Field Failures. `Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2013)`, Lugano, Switzerland, July 2013.
(32 of the 124 submissions accepted – 25.8%)

49. S. Roy Choudhary, M. Prasad, and A. Orso. X-PERT: Accurate Identification of Cross-Browser Issues in Web Applications. *Proceedings of the 35th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2013)*, San Francisco, CA, USA, May 2013.
(85 of the 461 submissions accepted – 18%)

50. L. Sales Pinto, S. Sinha, and A. Orso. TestEvol: A Tool for Analyzing Test-Suite Evolution. *Proceedings of the 35th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2013) – Formal research demonstration*, San Francisco, CA, USA, May 2013.
(16 of the 52 submissions accepted – 30%)

51. L. Sales Pinto, S. Sinha, and A. Orso. Understanding Myths and Realities of Test-suite Evolution. *Proceedings of the ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2012)*, Research Triangle Park, NC, USA, November 2012.
(35 of the 196 submissions accepted – 18%)

52. M. Alkhalaf, T. Bultan, S. Roy Choudhary, M. Fazzini, A. Orso and C. Kruegel. ViewPoints: Differential String Analysis for Discovering Client and Server-Side Input Validation Inconsistencies. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2012)*, Minneapolis, MN, USA, July 2012.
(31 of the 108 submissions accepted – 29%)

53. J. Rößler, G. Fraser, A. Zeller and A. Orso, Isolating Failure Causes through Test Case Generation. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2012)*, Minneapolis, MN, USA, July 2012.
(31 of the 108 submissions accepted – 29%)

54. M. Kim, J. Cobb, M.J. Harrold, T. Kurc, A. Orso, J. Saltz, A. Post, K. Malhotra and S. Navathe. Efficient Regression Testing of Ontology-Driven Systems. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2012)*, Minneapolis, MN, USA, July 2012.
(31 of the 108 submissions accepted – 29%)

55. W. Jin and A. Orso. BugRedux: Reproducing Field Failures for In-house Debugging. *Proceedings of the 34th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2012)*, Zurich, Switzerland, June 2012.
(87 of the 408 submissions accepted – 21%)

56. S. Roy Choudhary, M. Prasad, and A. Orso. CrossCheck: Combining Crawling and Differencing to Better Detect Cross-browser Incompatibilities in Web Applications. *Proceedings of the 5th IEEE International Conference on Software Testing, Verification and Validation (ICST 2012)*, Montreal, Canada, April 2012.
(39 of the 145 submissions accepted – 27%)

57. W. Halfond, S. Roy Choudhary, and A. Orso. Improving Penetration Testing through Static and Dynamic Analysis. *Journal of Software Testing, Verification and Reliability (JSTVR)*, 2011, Volume 21, Issue 3, pages 195–214.

58. C. Parnin, A. Orso. Are Automated Debugging Techniques Actually Helping Programmers? *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2011)*, Toronto, Canada, July 2010. (This paper was presented with an **Haifa Verification Conference 2013 Award for the most significant contribution to verification in the past 5 years**.)
(34 of the 121 submissions accepted – 28%)

59. M. Kim, T. Kurc, A. Orso, J. Cobb, M.J. Harrold, A. Post, A. Sharma, and J. Saltz. An Informatics Framework for Testing Data Integrity and Correctness of Federated Biomedical Databases. *Proceedings of the 2011 AMIA Summit on Clinical Research Informatics (CRI 2011)*, San Francisco, CA, USA, March 2011.

60. P. Tsankov, W. Jin, A. Orso, and S. Sinha. Execution Hijacking: Improving Dynamic Analysis by Flying off Course. *Proceedings of the 4th IEEE International Conference on Software Testing, Verification and Validation (ICST 2011)*, Berlin, Germany, March 2011.
(35 of the 166 submissions accepted – 21%)

61. A. Nanda, S. Mani, S. Sinha, M.J. Harrold, and A. Orso. Regression Testing in the Presence of Non-code Changes. *Proceedings of the 4th IEEE International Conference on Software Testing, Verification and Validation (ICST 2011)*, Berlin, Germany, March 2011.
(35 of the 166 submissions accepted – 21%)

62. J. Clause and A. Orso. Camouflage: Automated Anonymization of Field Data. *Proceedings of the 33rd IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2011)*, Waikiki, Honolulu, Hawaii, May 2011.
(52 of the 380 submissions accepted – 14%)

63. A. Orso. Monitoring, Analysis, and Testing of Deployed Software. *Proceedings of the Foundations of Software Engineering (FSE) and NITR&D/SPD Working Conference on the Future of Software Engineering Research (FoSER 2010)*, Santa Fe, NM, USA, November 2010.
(87 of the 139 submissions accepted – 63%)

64. M. Grechanik, J. Jones, A. Orso, and A. van der Hoek. Bridging Gaps between Developers and Testers in Globally-distributed Software Development. *Proceedings of the Foundations of Software Engineering (FSE) and NITR&D/SPD Working Conference on the Future of Software Engineering Research (FoSER 2010)*, Santa Fe, NM, USA, November 2010.
(87 of the 139 submissions accepted – 63%)

65. W. Jin, A. Orso, and T. Xie. BERT: A Tool for Behavioral Regression Testing. *Proceedings of the 18th European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2010) – Formal research demonstration*, Santa Fe, NM, USA, November 2010.
(6 of the 28 submissions accepted – 21%)

66. S. Roy Choudhary, and A. Orso. WebDiff: Automated Identification of Cross-browser Issues in Web Applications. *Proceedings of the 26th IEEE International Conference on Software Maintenance (ICSM 2010)*, Timisoara, Romania, September 2010.
(36 of the 133 submissions accepted – 27%)

67. S. Roy Choudhary, H. Versee, and A. Orso. A Cross-browser Web Application Testing Tool. *26th IEEE International Conference on Software Maintenance (ICSM 2010) – Formal research demonstration*, Timisoara, Romania, September 2010.
(8 of the 11 submissions accepted – 73%)

68. J. Clause and A. Orso. Leakpoint: Pinpointing the Causes of Memory Leaks. *Proceedings of the 32nd IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2010)*, Cape Town, South Africa, May 2010.
(52 of the 380 submissions accepted – 14%)

69. W. Jin, A. Orso, and T. Xie. Automated Behavioral Regression Testing. *Proceedings of the 3rd IEEE International Conference on Software Testing, Verification and Validation (ICST 2010)*, Paris, France, April 2010.
(41 of the 154 submissions accepted – 27%)

70. R. Santelices, A. Orso, and M.J. Harrold. Precisely Detecting Runtime Change Interactions for Evolving Software. *Proceedings of the 3rd IEEE International Conference on Software Testing, Verification and Validation (ICST 2010)*, Paris, France, April 2010.
(41 of the 154 submissions accepted – 27%)

71. J. Clause and A. Orso. PENUMBRA: Automatically Identifying Failure-Relevant Inputs Using Dynamic Tainting. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2009)*, Chicago, Illinois, USA, July 2009, pages 249–260.
(25 of the 93 submissions accepted – 27%)

72. W. Halfond, S. Anand, and A. Orso. Precise Interface Identification to Improve Testing and Analysis of Web Applications. *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2009)*, Chicago, Illinois, USA, July 2009, pages 285–296. (This paper was presented with an **ACM-SIGSOFT Distinguished Paper Award**.)
(25 of the 93 submissions accepted – 27%)

73. W. Halfond, S.R. Choudhary, and A. Orso. Penetration Testing with Improved Input Vector Identification. *Proceedings of 2nd IEEE International Conference on Software Testing, Verification and Validation (ICST 2009)*, Denver, Colorado, USA, April 2009, pages 346–355. (My student William Halfond was awarded a **Best Presentation Award** at the conference for the presentation of this paper.)
(45 of the 141 submissions accepted – 32%)

74. H.-Y. Hsu and A. Orso. MINTS: A General Framework and Tool for Supporting Test-suite Minimization. *Proceedings of the 31st IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2009)*, Vancouver, Canada, May 2009, pages 419–429.
(50 of the 405 submissions accepted – 12%)

75. W. Halfond and A. Orso. Automated Identification of Interface Mismatches in Web Applications. *Proceedings of the ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2008)*, Atlanta, Georgia, USA, November 2008, pages 181–191. (My student William Halfond was awarded a **Best Student Presentation Award** at the conference for the presentation of this paper.)
(31 of the 152 submissions accepted – 20%)

76. Raul Santelices, Pavan Kumar Chittimalli, Taweesup Apiwattanapong, Alessandro Orso, and Mary Jean Harrold. Test-suite Augmentation for Evolving Software. `Proceedings of the 23rd IEEE/ACM International Conference on Automated Software Engineering (ASE 2008)`, L'Aquila, Italy, September 2008. (This paper was presented with the **Best Paper Award** and an **ACM-SIGSOFT Distinguished Paper Award**.)
(34 of 280 submissions accepted – 12%)

77. Hwa-You Hsu, James Jones, and Alessandro Orso. Rapid: Identifying Bug Signatures to Support Debugging Activities. `Proceedings of the 23rd IEEE/ACM International Conference on Automated Software Engineering (ASE 2008)` [short paper], L'Aquila, Italy, September 2008.

78. J. Clause, I. Doudalis, A. Orso, and M. Prvulovic. Effective Memory Protection Using Dynamic Tainting. *Proceedings of the 22nd IEEE and ACM International Conference on Automated Software Engineering (ASE 2007)*, Atlanta, Georgia, USA, November 2007, pages 283–292.
(37 of 270 submissions accepted – 14%)

79. W. Halfond and A. Orso. Improving Test Case Generation for Web Applications Using Automated Interface Discovery. *Proceedings of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2007)*, Dubrovnik, Croatia, September 2007, pages 145–154.
(43 of 251 submissions accepted – 17%)

80. S. Joshi and A. Orso. SCARPE: A Technique and Tool for Selective Record and Replay of Program Executions. *Proceedings of the 23rd IEEE International Conference on Software Maintenance (ICSM 2007)*, Paris, France, October 2007, pages 234–243.
(46 of 214 submission accepted – 21%)

81. J. Clause, W. Li, and A. Orso. Dytan: A Generic Dynamic Taint Analysis Framework. *Proceedings of The ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2007)*, London, United Kingdom, pages 196–206. (This paper was presented with the 2017 **ISSTA Impact Paper Award**.)
(22 of 101 submissions accepted – 22%)

82. J. Clause and A. Orso. A Technique for Enabling and Supporting Debugging of Field Failures. *Proceedings of the 29th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2007)*, Minneapolis, Minnesota, USA, pages 261–270.
(50 of 334 submissions accepted – 15%)

83. S. Anand, A. Orso, and M.J. Harrold. Type-dependence Analysis and Program Transformation for Symbolic Execution. *Proceedings of the 29th IEEE and ACM SIGSOFT International Conference on Software Engineering (TACAS 2007)*, Braga, Portugal, pages 117–133.
(54 of 204 submissions accepted – 26%)

84. W. Halfond, A. Orso, and P. Manolios. Using Positive Tainting and Syntax-Aware Evaluation to Protect Web Applications. *Proceedings of the 14th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2006)*, Portland, Oregon, USA, November 2006, pages 175–185.
(25 of 125 submissions accepted – 20%)

85. W. Halfond and A. Orso. Command-Form Coverage for Testing Database Applications. *Proceedings of the IEEE and ACM International Conference on Automated Software Engineering (ASE 2006)*, Tokyo, Japan, September 2006, pages 69–78.
(22 of 121 submissions accepted – 18%)

86. T. Apiwattanapong, R. Santelices, P. Kumar Chittimalli, A. Orso, and M.J. Harrold. MaTRIX: Maintenance-Oriented Testing Requirements Identifier and Examiner. *Proceedings of the IEEE Conference on "Testing: Academic & Industrial Conference, Practice and Research Techniques" (TAIC PART 2006)*, London, United Kingdom, August 2006, pages 137–146.

87. W. Halfond and A. Orso. Preventing SQL Injection Attacks Using AMNESIA. *Proceedings of the 28th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2006) – Formal Demos track*, Shanghai, China, May 2006, pages 795-798.
(9 of 40 submissions accepted – 22%)

88. J. Viegas, W. Halfond, and A. Orso. A Classification of SQL Injection Attacks and Prevention Techniques. *Proceedings of the IEEE International Symposium on Secure Software Engineering (ISSSE 2006)*, Washington, D.C., USA, March 2006, pages 12–23.

89. W. Halfond and A. Orso. AMNESIA: Analysis and Monitoring for NEutralizing SQL-Injection Attacks. *Proceedings of the IEEE and ACM International Conference on Automated Software Engineering (ASE 2005)*, Long Beach, California, USA, November 2005, pages 174–183. (This paper was presented with the ASE 2020 **Most Influential (MIP) Paper Award**.)
(28 of 291 submissions accepted – 10%)

90. M. Haran and A. Karr and A. Orso and A. Porter and A. Sanil. Applying Classification Techniques to Remotely-Collected Program Execution Data. *Proceedings of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2005)*, Lisbon, Portugal, September 2005, pages 146–155.
(32 of 201 submissions accepted – 16%)

91. T. Apiwattanapong, A. Orso, and M.J. Harrold. Efficient and Precise Dynamic Impact Analysis Using Execute-After Sequences. *Proceedings of the 27th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2005)*, St. Louis, MO, USA, May 2005, pages 432–441.
(44 of 313 submissions accepted – 14%)

92. A. Orso, N. Shi, and M.J. Harrold. Scaling Regression Testing to Large Software Systems. *Proceedings of the 12th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2004)*, Newport Beach, CA, USA, November 2004, pages 241–252.
(25 of 169 submissions accepted – 15%)

93. T. Apiwattanapong, A. Orso, and M.J. Harrold. A Differencing Algorithm for Object-oriented Programs. *Proceedings of the 19th IEEE International Conference on Automated Software Engineering (ASE 2004)*, Linz, Austria, September 2004, pages 2–13. (This paper was presented with the **Best Paper Award** and an **ACM-SIGSOFT Distinguished Paper Award**.)
(26 of 183 submissions accepted – 14%)

94. A. Orso, T. Apiwattanapong, J. Law, G. Rothermel, and M.J. Harrold. An Empirical Comparison of Dynamic Impact Analysis Algorithms. *Proceedings of the 26th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2004)*, Edimburgh, Scotland, May 2004.
(59 of 436 submissions accepted – 14%)

95. S. Sinha, A. Orso, and M.J. Harrold. Automated Support for Development, Maintenance, and Testing in the Presence of Implicit Control Flow. *Proceedings of the 26th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2004)*, Edimburgh, Scotland, May 2004.
(59 of 436 submissions accepted – 14%)

96. A. Orso, J. Jones, M.J. Harrold, and J. Stasko. GAMMATELLA: Visualization of Program-Execution Data for Deployed Software. *26th IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2004) – Formal Demos track*, Edinburgh, Scotland, May 2004.

97. A. Orso, T. Apiwattanapong, and M.J. Harrold. Leveraging Field Data for Impact Analysis and Regression Testing. *Proceedings of the 4th European Software Engineering Conference and 10th ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC-FSE 2003)*, Helsinki, Finland, September 2003, pages 128–137.
(33 of 168 submissions accepted – 20%)

98. A. Orso, J. Jones, and M.J. Harrold. Visualization of Program-Execution Data for Deployed Software. *Proceedings of the ACM Symposium on Software Visualization*, San Diego, CA, USA, June 2003, pages 67–76. (This paper was presented with an ACM SIGSOFT Distinguished Paper Award.)
(20 of 63 submissions accepted – 29%)

99. V. Martena, A. Orso, and M. Pezzè. Interclass Testing of Object Oriented Software. *Proceedings of the IEEE International Conference on Engineering of Complex Computer Systems (ICECCS 2002)*, IEEE Computer Society, Greenbelt, MD, USA, December 2002, pages 145–154.

100. A. Orso, A. Rao, and M.J. Harrold. A Technique for Dynamic Updating of Java Software. *Proceedings of the IEEE International Conference on Software Maintenance (ICSM 2002)*, IEEE Computer Society, Montreal, Canada, October 2002, pages 649–658.
(129 of 61 submissions accepted – 47%)

101. A. Orso, D. Liang, M.J. Harrold, and R. Lipton. Gamma System: Continuous Evolution of Software after Deployment. *Proceedings of the ACM International Symposium on Software Testing and Analysis (ISSTA 2002)*, Rome, Italy, July 2002, pages 65–69.
(25 of 97 submissions accepted – 26%)

102. A. Orso, M.J. Harrold, D. Rosenblum, G. Rothermel, M.L. Soffa, and H. Do. Using Component Metacontents to Support the Regression Testing of Component-Based Software. *Proceedings of the IEEE International Conference on Software Maintenance (ICSM 2001)*, Florence, Italy, November 2001, pages 716–725.
(68 of 161 submissions accepted – 42%)

103. A. Orso, S. Sinha, and M.J. Harrold. Incremental Slicing Based on Data-Dependences Types. *Proceedings of the IEEE International Conference on Software Maintenance (ICSM 2001)*, Florence, Italy, November 2001, pages 158–167.
(68 of 161 submissions accepted – 42%)

104. M.J. Harrold, J. Jones, T. Li, D. Liang, A. Orso, M. Pennings, S. Sinha, S. Spoon, and A. Gujarathi. Regression Test Selection for Java Software. *Proceedings of the ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2001)*, Tampa Bay, FL, USA, October 2001, pages 312–326. (27 of 145 submissions accepted – 19%)

105. U. Buy, A. Orso and M. Pezzè. Automated Testing of Classes. *Proceedings of the ACM International Symposium on Software Testing and Analysis (ISSTA 2000)*, Portland, OR, USA, August 2000, pages 39–48. (17 of 73 submissions accepted – 23%)

106. A. Orso and M. Pezzè. Integration Testing of Procedural Object-Oriented Languages with Polymorphism. *Proceedings of the International Conference on Testing Computer Software (TCS 1999)*, Washington, D.C., USA, June 1999.

107. A. Orso and S. Silva. Open Issues and Research Directions in Object-Oriented Testing. *Proceedings of the Fourth International Conference on Achieving Quality in Software (AQUIS 1998)*, Venice, Italy, January 1998.

108. L. Baresi, A. Orso, and M. Pezzè. Introducing Formal Specification Methods in Industrial Practice. *Proceedings of the Nineteenth IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 1997)*, Boston, MA, USA, May 1997, pages 56–66.

109. L. Baresi, A. Orso, and M. Pezzè. Customizable Notations for Kernel Formalisms. *Proceedings of the IEEE International Conference on Engineering of Complex Computer Systems (ICECCS 1995)*, IEEE Computer Society, Fort Lauderdale, FL, USA, November 1995, pages 43–52.

E.3. Workshop Presentations with Proceedings (refereed)

1. S. Shamshiri, G. Fraser, P. McMinn, and A. Orso. Search-Based Propagation of Regression Faults in Automated Regression Testing. *Proceedings of the 3rd ICST International Workshop on Regression Testing (Regression 2013)*, Luxembourg, March 2013.

2. I. Erete and A. Orso. Optimizing Constraint Solving to Better Support Symbolic Execution. *Proceedings of the 3rd ICST Workshop on Constraints in Software Testing, Verification, and Analysis (CSTVA 2011)*, Berlin, Germany, March 2011. (This paper was presented with the **Best Paper Award**.)

3. J. Rößler, A. Orso, and A. Zeller. When does my program fail? *Proceedings of the 3rd ICST Workshop on Constraints in Software Testing, Verification, and Analysis (CSTVA 2011)*, Berlin, Germany, March 2011.

4. S.R. Choudhary, and A. Orso. Automated Client-side Monitoring for Web Applications. *Proceedings of the 1st International Workshop on Web Applications Testing (WEBTEST 2009)*, Denver, CO, USA, April 2009.

5. A. Orso and Tao Xie. BERT: BEhavioral Regression Testing. *Proceedings of the Sixth International ISSTA Workshop on Dynamic Analysis (WODA 2008)*, Seattle, WA, USA, July 2008, pages 36–42. (11 of 23 submissions accepted – 48%)

6. A. Orso, S. Joshi, M. Burger, and A. Zeller. Isolating relevant Component Interactions with JINSI. *Proceedings of the Fourth International ICSE Workshop on Dynamic Analysis (WODA 2006)*, Shanghai, China, May 2006, pages 3–9. (11 of 18 submissions accepted – 60%)

7. L. Wendehals and A. Orso. Recognizing Behavioral Patterns at Runtime using Finite Automata. *Proceedings of the Fourth International ICSE Workshop on Dynamic Analysis (WODA 2006)*, Shanghai, China, May 2006, pages 33-39. (11 of 18 submissions accepted – 60%)

8. A. Seesing and A. Orso. InsECTJ: A Generic Instrumentation Framework for Collecting Dynamic Information within Eclipse. *Proceedings of the eclipse Technology eXchange (eTX) Workshop at OOPSLA 2005*, San Diego, USA, October 2005.

9. J. Cook and A. Orso. MonDe: Safe Updating through Monitored Deployment of New Component Versions. *Proceedings of the ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering (PASTE 2005)*, Lisbon, Portugal, September 2005, pages 43–46.

10. Alessandro Orso and Bryan Kennedy. Selective Capture and Replay of Program Executions. *Proceedings of the Third International ICSE Workshop on Dynamic Analysis (WODA 2005)*, St. Louis, MO, USA, May, 2005.

11. William G.J. Halfond and Alessandro Orso. Combining Static Analysis and Runtime Monitoring to Counter SQL-Injection Attacks. *Proceedings of the Third International ICSE Workshop on Dynamic Analysis (WODA 2005)*, St. Louis, MO, USA, May 2005.

12. A. Chawla and A. Orso. A Generic Instrumentation Framework for Collecting Dynamic Information. *Proceedings of the ISSTA Workshop on Empirical Research in Software Testing*.

13. A. Carzaniga and A. Orso. Continuous Remote Analysis for Improving Distributed Systems Performance. *Proceedings of the First ICSE Workshop on Remote Analysis and Measurement of Software Systems (RAMSS 03)*, Portland, OR, USA, May 2003, pages 47–50.

14. J. Bowring, A. Orso, and M.J. Harrold. Monitoring Deployed Software Using Software Tomography. *Proceedings of the ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering (PASTE 2002)*, Charleston, SC, USA, November 2002, pages 2–8.

15. A. Orso, G. Vigna, and M.J. Harrold. MASSA: Mobile Agents Security through Static/Dynamic Analysis. *Proceedings of the ICSE Workshop on Software Engineering and Mobility*, Toronto, Canada, May 2001.

16. A. Orso, S. Sinha, and M.J. Harrold. Effects of Pointers on Data Dependences. *Proceedings of the International Workshop on Program Comprehension (IWPC 2001)*, Toronto, Canada, May 2001, pages 39–49.

17. A. Orso, M.J. Harrold, and D. Rosenblum. Component Metadata for Software Engineering Tasks. *Proceedings of the International Workshop on Engineering Distributed Objects (EDO 2000)*, LNCS Vol. 1999, Springer-Verlag, Davis, CA, USA, November 2000, pages 129–144.

18. U. Buy, C. Ghezzi, A. Orso, M. Pezzè, and M. Valsasna. A Framework for Testing Object-Oriented Components. *Proceedings of the ICSE Workshop on Testing Distributed Component-Based Systems*, Los Angeles, CA, USA, May 1999.

F. Other

F.1. Research Posters

1. M. Kim, J. Cobb, T. Kurc, A. Orso, M.J. Harrold, A. Post, A. Sharma, and J. Saltz. Informatics Support for Data Integrity Testing in Heterogeneous and Dynamic Database Environments. *Proceedings of the 2012 AMIA Summit on Clinical Research Informatics (CRI 2012)*, San Francisco, CA, USA, March 2011.

2. A. Orso, J. Jones, and M.J. Harrold. Visualization of Program-Execution Data for Deployed Software, at the *ACM Symposium on Software Visualization (SOFTVIS 2003)*, San Diego, CA, USA, June 2003.

3. J. Bowring, A. Orso, and M.J. Harrold. Software Tomography – Enabling Continuous Improvement in Software Development, at the *ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2002)*, Charleston, SC, USA, November 2002.

4. M. Balakrishnan, A. Orso, and M.J. Harrold. Dynamic Update of Java Software, at the *Yamacraw Industrial Advisory Board Workshop*, Atlanta, GA, USA, October 2002.

5. A. Orso, D. Liang, and M.J. Harrold. DejaVOO: A Regression Testing Tool for Java Software, at the *ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2001)*, Tampa Bay, Florida, USA, October 2001.

F.1. Submitted Journal Papers

F.3. Software

MintHint: MINTHINT is a novel technique and tool for program repair that is a departure from most of today's approaches. Instead of trying to fully automate program repair, which is often an unachievable goal, MINTHINT performs statistical correlation analysis to identify expressions that are likely to occur in the repaired code and generates, using pattern-matching based synthesis, repair hints from these expressions. Intuitively, these hints suggest how to rectify a faulty statement and help developers find a complete, actual repair. MINTHINT has been released in May 2014 and is freely available from my web page.

F^3: F^3 (Fault localization for Field Failures) is a tool that builds on BUGREDUX (see below) and extends it with automated debugging capabilities. F^3 can thus help developers not only recreate, but also debug field failures. Given an observed field failure, F^3 can synthesize a number of failing and passing executions similar to the observed failure and use these executions, in conjunction with automated fault localization approaches, to help developers identify likely causes of such failure. F^3 has been released in July 2013 and is freely available from my web page.

TestEvol: TESTEVOL is a tool for analyzing test-suite evolution. More precisely, TestEvol facilitates the systematic study of test-suite evolution for Java programs and JUnit test suites. The tool analyzes a sequence of versions of a software system, where a system consists of an application together with its test suite, and allows for studying how the test cases in the test suite evolved when going from one version to the next. TESTEVOL has been released in November 2012 and is freely available from my web page.

BugRedux: BUGREDUX is a general tool for enabling in-house debugging of field failures. BUGREDUX works by (1) collecting data about failing program executions in the field, (2) extracting from the collected execution data sequences of intermediate goals (i.e., statements in the program), and (3) using a symbolic execution technique to synthesize, in house, executions that reach such goals, mimic the observed executions, and reproduce the corresponding failures. The current implementation of BUGREDUX can collect four types of increasingly rich execution data: points of failure, call stacks, call sequences, and complete program traces. To perform symbolic execution, BUGREDUX relies on a suitably modified version of KLEE (`http://klee.llvm.org/`). BUGREDUX has been released in August 2011 and is freely available from my web page.

NIONKA: NIONKA is a tool for execution hijacking. Given a program P and an input I for P, execution hijacking allows for running P with I as input and following a specific path that P would normally not follow under I. By doing so, execution hijacking can expose additional behaviors and benefit different kinds of dynamica analysis. Two versions of the tool are available, one for hijacking of Java programs, and the other for x86 programs. These tools have been released in March 2011 and are freely available from my web page.

BERT: BERT (BEhavioral Regression Testing) is an Eclipse plug-in that implements our automated behavioral regression testing approach. Every time a new version of a program is saved, BERT (1) analyzes the changes between the new and the old version, (2) generates tests for the changed parts, (3) runs the tests on the old and new versions, (4) analyzes and reports to the developers the behavioral differences between the two versions. This tool has been released in November 2010 and is freely available from my web page.

MINTS: MINTS (MINimizer for Test Suites) is a generic framework for supporting test-suite minimization that allows for (1) easily encoding a wide range of test-suite minimization problems, (2) handling problems that involve any number of minimization criteria, and (3) computing optimal solutions to minimization problems by leveraging a number of integer linear programming solvers. This tool has been released in February 2008 and is freely available from my web page.

DYTAN: DYTAN is a general framework for dynamic taint analysis (also known as dynamic information flow analysis) that operates on X86 binaries. DYTAN is flexible and easy to use because it allows for instantiating different flavors of dynamic taint analysis by simply specifying a set of pre-defined options in a configuration file. Although we have not officially released the tool yet, we have pre-released it to several researchers in universities and research labs in the US and in Europe, including researchers at Columbia University, UC Berkeley, and Politecnico di Milano, Italy.

WASP: WASP (Web Application SQL-injection Preventer) is a highly-automated tool against SQL-injection attacks. Unlike AMNESIA, WASP does not require any complex static analysis of the code and provides both conceptual and practical advantages. The conceptual advantages are in the use of (1) positive tainting, which focuses on the identification and marking of trusted, rather than untrusted data, and (2) flexible syntax-aware evaluation, which provides developers with a mechanism to regulate the usage of strings based not only on their source, but also on the syntactical role they play in the final query string. From a practical standpoint, WASP is accurate, efficient, and has only minimal deployment requirements. WASP also incorporates MetaStrings, a library that we developed and that tracks taint information at the character level and accurately maintains markings during string manipulations. *In April 2007, we signed a contract with Reflective for the commercialization of WASP.*

SCARPE: SCARPE is a tool for Selective CApture and Replay of Program Executions. Given a program, the tool lets users (1) select a subsystem, (2) capture at runtime all the interactions between such subsystem and the rest of the program, and (3) replay the recorded interactions on the subsystem in isolation. SCARPE can be used for various applications, including post-mortem dynamic analysis of users' executions, regression testing, and debugging. Although we have not officially released the tool yet, we have pre-released it to several researchers in universities and research labs in the US and in Europe.

AMNESIA: AMNESIA is a tool to detect and prevent SQL-injection attacks. The tool combines conservative static analysis and runtime monitoring to detect and stop illegal queries before they are executed on a database underlying a web application. In its static part, the tool builds a conservative model of the legitimate queries that could be generated by the application. In its dynamic part, the tool inspects the dynamically generated queries for compliance with the statically-built model. Queries that do not comply with the model are stopped and suitably reported. AMNESIA has been evaluated extensively and is currently available on a per-request basis. *So far, we distributed the tool to more than 20 universities and research labs.*

JDiff: JDIFF is a tool for comparing different versions of object-oriented programs that identifies both differences and correspondences between two versions. The technique implemented in the tool is based on a representation that handles object-oriented features and, thus, can capture the behavior of object-oriented programs. In this way, JDIFF can outperform existing tools based on purely syntactic differencing. The tool is currently available on a per-request basis.

DejaVOO: DEJAVOO, developed at Georgia Tech, is a regression test selection tool for Java software. The tool inputs a program P, a set of test cases for P T, and a new version of the program P', and outputs a subset of T T' that contains the test cases to be rerun on P'. T' is computed using static and dynamic program analysis techniques. P and P' are provided in bytecode format and are analyzed using the Java Architecture for Bytecode Analysis (JABA), developed at Georgia Tech. Test cases can be provided in the form of JUnit tests. *The tool is currently available on a per-request basis and is being used by TATA Consulting Services in the context of a funded research project.*

InsECT: INSECT (Instrumentation, Execution, and Coverage Tool) is an infrastructure for selective instrumentation of Java software developed at Georgia Tech. InsECT inputs a program and an instrumentation policy and outputs an instrumented version of the program, generated through bytecode rewriting. The instrumentation policy specifies what parts of the program must be instrumented and what kinds of dynamic information must be collected. Currently, InsECT is integrated into Eclipse and can instrument for statement, edge, call, and exception (throw and catch) coverage, and for statement and call profiling. Dynamic information can be analyzed using the InsECT API or visualized using the InsECT GUI. *Insect is available on the SourceForge site and has been downloaded more than a thousand times.*

Older Software

DUSC: DUSC (Dynamic Updating through Swapping of Classes) is an infrastructure for dynamic, remote updating of Java software developed at Georgia Tech. DUSC produces, for each class C in the system to be updated, a wrapper and an implementation. All interaction of C with the rest of the application occur through the wrapper, so that the implementation of C can be updated with a new version without having to stop the system. DUSC transforms Java systems in updateable systems automatically, without requiring any interaction with the developer and without any support from the Java Virtual Machine. Moreover, DUSC allows for the updates to be sent through the network, so enabling remote, on-line updating of systems.

CabJava: CABJAVA, developed at Politecnico di Milano, is an editor, analyzer, and simulator for High-Level Time Petri Nets (HLTPNs). The tools consists of three main JavaBeans components connected through a C2 architecture: (1) the graphical editor, in which the user can easily create and edit Petri nets, define and modify their temporal properties, and visualize their simulation; (2) the kernel, which implements the HLTPN semantics; and (3) the executor, which lets the user simulate the behavior of the generated Petri nets. CabJava is available and can be downloaded from my web page.

MeTaeDitor (MTD): MTD, developed at Politecnico di Milano, is a tool that allows for defining high-level semi-formal graphical specification notations in terms of an underlying formal kernel. The tool consists of three modules: (1) the mapping generator, which is a graphical editor that lets the user define the mapping from the high-level notation to the underlying kernel in terms of graph-grammar productions; (2) the translator, which, given a specification in the high-level notation and the user-defined mapping, generates the corresponding kernel-level executable model; and (3) the simulator, which executes the kernel-level model step by step and maps the results of each step back to the high-level specification.

G. Research Proposals and Grants (Principal Investigator)

a. Approved and Funded

1. **Proof-driven Refinement of Infrastructure Software Modules (PRISM)**
   DARPA
   PI: Brendan Saltaformaggio (Georgia Tech)
   Co-PIs:

   - *Georgia Tech:* Taesoo Kim, Wenke Lee, Yisroel Mirsky, Alessandro Orso, Qirun Zhang
   - *Siege Technologies, LLC:* Jason Li, Martin Osterloh
   - *GTRI:* Michael Brown, Sukarno Mertoguno
   - *University of Texas at Dallas:* Kevin Hamlen
   - *Trusted Science and Technology:* Nicholas Evancich

   Selected for a potential contract award in January 2021, $10,647,759 (requested)

2. **Collaborative Research: SHF: Medium: A General Framework for Automated Test Transfer**
   NSF CCF/SHF Program
   PI: Alessandro Orso
   Co-PIs: Nenad Medvidovic (USC) and Sam Malek (UCI)
   Awarded in June 2021, $400,000 (GT part)

3. **WebGamma: Post-deployment Quality Assurance for Web Applications**
   Facebook Testing and Verification Research Award
   PI: Alessandro Orso Co-PIs: Mattia Fazzini (University of Minnesota), Alessandra Gorla (IMDEA Software Institute) Awarded in October 2019, $49,838

4. **Comprehensive System Debloating via Path-Based Learning and Late-Stage OS Composition**
   ONR
   PI: Wenke Lee
   Co-PIs: William Harris (Galois, Inc.), Taesoo Kim (Georgia Tech), Alessandro Orso, Santosh Pande (Georgia Tech)
   Awarded in December 2017, $7,500,000

5. **Creating an Interprocedural Analyst Oriented Data Flow Representation**
   Research contract with Sandia National Labs/Sandia Corporation.
   PI: Alessandro Orso
   Co-PIs: None
   Awarded in December 2017, $48,500

6. **SHF: Medium: Spectral Profiling: Understanding Software Performance without Code Instrumentation**
   NSF CCF/SHF Program
   PI: Alessandro Orso
   Co-PIs: Milos Prvulovic (Georgia Tech) and Alenka Zajic (Georgia Tech)
   Awarded in June 2016, $850,000

7. **CAMELIA: Computational Activity Monitoring by Externally Leveraging Involuntary Analog Signals**
   DARPA
   PI: Alenka Zajic
   Co-PIs: Alessandro Orso and Milos Prvulovic (Georgia Tech)
   Subcontractor: Matthew Welborn (Northrop Grumman Information Systems)
   Awarded in May 2016, $9,440,000

8. **EAGER: Collaborative Research: Leveraging Graph Databases for Incremental and Scalable Symbolic Analysis and Verification of Web Applications**
   NSF CCF/SHF Program
   PI: Alessandro Orso
   Co-PIs: Wenke Lee (Georgia Tech), Tevfik Bultan (UCSB), Xifeng Yan (UCSB), Corina Pasareanu (CMU Silicon Valley)
   Awarded in September 2015, $249,990 (Georgia Tech's part: $100,000)

9. **THEIA: Tagging and Tracking of Multi-level Host Events for Transparent Computing and Information Assurance**
   DARPA
   PI: Wenke Lee
   Co-PIs: Taesoo Kim (Georgia Tech), Alessandro Orso (Georgia Tech), Simon Chung (Georgia Tech), Albert Brzeczko (GTRI)
   Awarded in March 2015, $4,253,126

10. **Capturing Field Data for Mobile Applications**
    NSF I-Corps Program
    PI: Alessandro Orso
    Co-PIs: None
    Awarded in January 2015, $50,000

11. **CheckDroid: Mobile Application Testing**
    Georgia Research Alliance
    PI: Alessandro Orso
    Co-PIs: None
    Awarded in October 2014, $24,877.29

12. **Quantitative Analysis and Reporting of Potential Covert- and Side-Channel Attacks**
    Air Force Office of Scientific Research
    PI: Milos Prvulovic
    Co-PIs: Alessandro Orso and Alenka Zajic
    Awarded in July 2014, $993,031

13. **Teaching Software Engineering To the Masses with TouchDevelop**
    Microsoft Research Software Engineering Innovation Foundation (SEIF) Award
    PI: Alessandro Orso
    Co-PIs: None
    Awarded in March 2014, $40,000

14. **WebGamma: Post-deployment Quality Assurance for Web Applications**
    Google Research Award
    PI: Alessandro Orso
    Co-PIs: None
    Awarded in August 2013, $49,545

15. **SHF:Small: BugX: In-house Debugging of Field Failures to Improve Software Quality**
    NSF CCF/SHF Program
    PI: Alessandro Orso
    Co-PIs: None
    September 2013–August 2016, $434,999

16. **Differential Cross-Platform Testing of Web Applications**
    Research contract with Fujitsu Laboratories of America, Inc.
    PI: Alessandro Orso
    Co-PIs: None
    Awarded in December 2012, $20,000

17. **SHF: Medium: Collaborative Research: Regression Testing Techniques for Real-world Software Systems**
    NSF CCF/SHF Program
    PI: Alessandro Orso
    Co-PIs: Mary Jean Harrold, Myra Cohen (University of Nebraska, Lincoln)
    July 2012–June 2016, $875,065

18. **Viewpoints: Discovering Client- and Server-side Input Validation Inconsistencies to Improve Web Application Security**
    NSF CNS/TC Program
    PI: Alessandro Orso
    Co-PIs: Tevfik Bultan (UCSB), Christopher Krugel (UCSB)
    October 2011–September 2013, $199,994.

19. **Testing of Biomedical Federated Databases**
    ACTSI's Biomedical Informatics Program
    PI: Alessandro Orso
    Co-PI: Mary Jean Harrold
    June 2010–May 2013, $340,000.

20. **MEDITA - Multi-layer Enterprise-wide Dynamic Information-flow Tracking & Assurance**
    NSF CCF Program
    PI: Alessandro Orso
    Co-PIs: Nicholas Feamster, Milos Prvulovic
    June 2010–May 2013, $969,141.

21. **BERT – BEhavioral Regression Testing**
    Microsoft Research Software Engineering Innovation Foundation (SEIF) Award
    PI: Alessandro Orso
    Co-PIs: None
    Awarded in May 2010, $25,000

22. **Designing Tests for Evolving Software Systems (supplemental funding request)**
    NSF CCF Program
    PI: Alessandro Orso
    Co-PIs: None
    May 2010–December 2011, $68,086.

23. **Automated Debugging Techniques for Modern Software Systems**
    NSF, Software and Hardware Foundations (SHF) Program
    PI: Alessandro Orso
    Co-PIs: None
    July 2009–June 2012, $445,000.

24. **Designing Tests for Evolving Software Systems**
    NSF, Science of Design (SoD) Program
    PI: Alessandro Orso
    Co-PIs: Mary Jean Harrold (Georgia Tech)
    Collaborative project with Tao Xie (North Carolina State University)
    January 2008–December 2010, $342,000.

25. **Software and Hardware Support for Efficient Monitoring of Program Behavior**
    National Science Foundation Award CCF-0541080, Computing Processes and Artifacts (CPA) Program
    PI: Alessandro Orso
    Co-PIs: Milos Prvulovic (Georgia Tech)
    Collaborative project with Yan Solihin (North Carolina State University) and Jonathan Cook (New Mexico State University).
    September 2006–August 2009, $350,000.

26. **Preventing SQL Code Injection by Combining Static and Runtime Analysis**
    Homeland Security Advanced Research Projects Agency (HSARPA) Contract FA8750-05-2-0214
    PI: Alessandro Orso
    Co-PIs: Wenke Lee (Georgia Tech)
    May 2005–October 2007, $387,069.

27. **REU Extension** for project: GAMMA: Acquiring Accurate Dynamic Field Data Using Lightweight Instrumentation
    Extension to National Science Foundation Award CCR-0205422
    PI: Alessandro Orso
    Co-PIs: None
    June 2005–August 2006, $12,000.

28. **DejaVOO – Cost-Effective Regression Testing of Java Software**
    IBM Eclipse Innovation Grant and Faculty Award
    PI: Alessandro Orso
    Co-PIs: None
    Awarded in March 2005, $26,700.

29. **Scalable Integration Testing of Object-Oriented Software: An Empirical Research Program**
    National Science Foundation Award CCR-0306372, Information Technology Research Program

PI: Mary Jean Harrold (Georgia Tech) Co-PIs: Alessandro Orso
Collaborative project with Gregg Rothermel (Oregon State University).
June 2003–May 2007, $201,146.

30. **GAMMA: Acquiring Accurate Dynamic Field Data Using Lightweight Instrumentation**
National Science Foundation Award CCR-0205422, Information Technology Research Program
PI: Mary Jean Harrold (Georgia Tech)
Co-PIs: Alessandro Orso, Richard Lipton (Georgia Tech), John Stasko (Georgia Tech)
Joint project with Alan F. Karr (National Institute of Statistical Sciences), David S. Notkin (University of Washington), Adam A. Porter (University of Maryland, College Park), and Douglas C. Schmidt (Vanderbilt University).
September 2002–August 2007, $412,000.

H. Research Honors and Awards

1. ISSTA 2021 Impact Paper Award, for the ISSTA 2011 paper "Are Automated Debugging Techniques Actually Helping Programmers?."
2. Distinguished PC Member Award at ASE 2021.
3. Most Influential Paper (MIP) Award at the IEEE/ACM International Conference on Automated Software Engineering (ASE 2020), for the ASE 2005 paper "AMNESIA: Analysis and Monitoring for NEutralizing SQL-Injection Attacks."
4. ISSTA 2017 Impact Paper Award, for the ISSTA 2007 paper "Dytan: A Generic Dynamic Taint Analysis Framework."
5. IBM Haifa Verification Conference 2013 Award for the most significant contribution to testing and verification in the past 5 years, for the ISSTA 2011 paper "Are Automated Debugging Techniques Actually Helping Programmers?" (`https://www.research.ibm.com/haifa/conferences/hvc2013/award.shtml`)
6. 2013 Google Research Award for the project "WebGamma: Post-deployment Quality Assurance for Web Applications".
7. 2014 Microsoft Research Software Engineering Innovation Foundation (SEIF) Award for the project "Teaching Software Engineering To the Masses with TouchDevelop".
8. Nomination for ACM-SIGSOFT Distinguished Paper Award at the *IEEE and ACM SIGSOFT International Conference on Software Engineering (ICSE 2013)*, for paper "X-PERT: Accurate Identification of Cross-Browser Issues in Web Applications." Co-authors: S. Roy Choudhary and M. Prasad. May 2013. (461 submissions.)
9. Nomination for ACM-SIGSOFT Distinguished Paper Award at the *ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2012)*, for paper "Efficient Regression Testing of Ontology-Driven Systems." Co-authors: M. Kim, J. Cobb, M.J. Harrold, T. Kurc, J. Saltz, A. Post, K. Malhotra and S. Navathe. (108 submissions.)
10. Nomination for ACM-SIGSOFT Distinguished Paper Award at the *ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2011)*, for paper "Are Automated Debugging Techniques Actually Helping Programmers?" Co-author: C. Parnin. (121 submissions.)
11. Best Paper Award at the *ICST Workshop on Constraints in Software Testing, Verification and Analysis (CSTVA 2011)*, for paper "Optimizing Constraint Solving to Better Support Symbolic Execution." Co-author: I. Erete. March 2011.
12. 2010 Microsoft Research Software Engineering Innovation Foundation (SEIF) Award for the project "BERT – BEhavioral Regression Testing".

13. ACM-SIGSOFT Distinguished Paper Award at the *ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2009)*, for paper "Precise Interface Identification to Improve Testing and Analysis of Web Applications." Co-authors: W. Halfond and S. Anand. July 2009. (93 submissions.)

14. Best Paper Award at the *23rd IEEE International Conference on Automated Software Engineering (ASE 2008)*, for paper "Test-suite Augmentation for Evolving Software." Co-authors: R. Santelices, P. Kumar Chittimalli, T. Apiwattanapong, A. Orso, and M.J. Harrold. September 2008. (280 submissions.)

15. ACM-SIGSOFT Distinguished Paper Award at the *23rd IEEE International Conference on Automated Software Engineering (ASE 2008)*, for paper "Test-suite Augmentation for Evolving Software." Co-authors: R. Santelices, P. Kumar Chittimalli, T. Apiwattanapong, A. Orso, and M.J. Harrold. September 2008. (280 submissions.)

16. Georgia Institute of Technology College of Computing Outstanding Research Scientist Research Award, 2004.

17. Best Paper Award at the *19th IEEE International Conference on Automated Software Engineering (ASE 2004)*, for paper "A Differencing Algorithm for Object-oriented Programs." Co-authors: T. Apiwattanapong and M.J. Harrold. September 2004. (183 submissions.)

18. ACM-SIGSOFT Distinguished Paper Award at the *19th IEEE International Conference on Automated Software Engineering (ASE 2004)*, for paper "A Differencing Algorithm for Object-oriented Programs." Co-authors: T. Apiwattanapong and M.J. Harrold. September 2004. (183 submissions.)

19. ACM-SIGSOFT Distinguished Paper Award at the *ACM Symposium on Software Visualization*, for paper "Visualization of Program-Execution Data for Deployed Software." Co-authors: J. Jones, and M.J. Harrold. June 2003. (63 submissions.)

III. SERVICE

A. Professional Activities

A.1 Membership and Activities in Professional Societies

1. Distinguished Member, Association for Computing Machinery (ACM) (also SIGSOFT).
2. Fellow, Institute of Electrical and Electronics Engineers (IEEE) Computer Society.

A.2 Conference Committee Activities

1. Program Committee Member, 45th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2023), Melbourne, Australia, May 2023.
2. Program Committee Member, 30th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2022), November 2022, Singapore.
3. Selection Committee Member for the 2022 ACM SIGSOFT Impact Paper Award.
4. Program Committee Member, 31st ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2022), Daejeon, South Korea, July 2022.
5. Program Committee Member, 37th IEEE/ACM International Conference on Automated Software Engineering (ASE 2021), Melbourne, Australia, November 2021.
6. Member of the Program Committee tasked to select the ICSE Most Influential Paper ICSE N-10, 2021
7. Program Committee Member, 29th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2021), Athens, Greece, August 2021.
8. Program Committee Member, 30th ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2021), Aarhus, Denmark, July 2021.
9. Program Committee Member, 30th ACM SIGSOFT Symposium on the Foundations of Software Engineering Visions and Reflections Track (FSE-V&R 2021), Sacramento, CA, USA, November 2020.
10. Program Committee Member, 29th ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2020), Los Angeles, CA, USA, July 2020.
11. Program Committee Member, 42nd IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2020), Seoul, South Korea, May 2020.
12. Program Committee Member, 41st IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2019), Montreal, Canada, May 2019.
13. Program Committee Member, 27th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2019), Tallinn, Estonia, August 2019.
14. Program Committee Member, 26th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2018), Lake Buena Vista, Florida, USA, November 2018.
15. Program Committee Member, 27th ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2018), Amsterdam, Netherlands, July 2018.
16. Program Board Member, 40th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2018), Gothenburg, Sweden, May-June 2018.

17. Program Committee Member, Doctoral Symposium of the 26th ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2017), Santa Barbara, CA, USA, July 2017.

18. Program Committee Member, International Symposium on Engineering Secure Software and Systems (ESSoS 2017), July 2017, Bonn, Germany.

19. Program Co-Chair, 39th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2017), Buenos Aires, Argentina, May 2017.

20. Program Board Member, 38th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2016), Austin, Texas, USA, May 2016.

21. Steering Committee Member, ACM and IEEE International Conference on Software Engineering (ICSE), July 2014 to date.

22. Program Committee Member, 35th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2014), Hyderabad, India, June 2013.

23. Member of the Expert Review Panel, 28th IEEE/ACM International Conference on Automated Software Engineering (ASE 2013), Palo Alto, California, USA, November 2013.

24. Program Committee Member, 8th joint meeting of the European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC-FSE 2013), Saint Petersburg, Russia, August 2013.

25. Program Committee Member, ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2013), Lugano, Switzerland, July 2013.

26. Program Committee Member, Doctoral Symposium of the 35th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2013), San Francisco, California, USA, May 2013.

27. Program Committee Member, 35th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2013), San Francisco, California, USA, May 2013.

28. Steering Committee Member, IEEE International Conference on Software Testing, Verification and Validation (ICST), April 2013 to date.

29. Program Committee Member, 2nd ETAPS Workshop on Validation Strategies for Software Evolution (VSSE 2013), Rome, Italy, March 2013.

30. Program Committee Member, 20th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2012), Research Triangle Park, North Carolina, USA, November 2012.

31. Program Committee Member, 2nd International ISSTA Workshop on End-to-end Test Script Engineering (ETSE 2012), July 2012.

32. Program Committee Member, 4th ICST International Workshop on Constraints in Software Testing, Verification and Analysis (CSTVA 2012), Montreal, Canada, April 2012.

33. Member of the External Review Committee, ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2012), Tucson, Arizona, USA, October 2012.

34. Member of the Expert Review Panel, 27th IEEE/ACM International Conference on Automated Software Engineering (ASE 2012), Essen, Germany, September 2012.

35. Program Committee Member, International ICSE Workshop on Recommendation Systems for Software Engineering (RSSE 2012), Zurich, Switzerland, June 2012.

36. Program Committee Member, 34th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2012), Zurich, Switzerland, June 2012.

37. Program Committee Member, 50th International Conference on Objects, Models, Components and Patterns (TOOLS Europe 2012), May 2012.

38. Program Committee Member, 50th International Conference on Objects, Models, Components, Patterns. Prague, Czech Republic, May 2012.

39. Program Committee Member, ESEC/FSE 2011 Workshop on Verification, Analysis, and Testing of Service Systems (VATSS 2011), September 2011.

40. Member of the Expert Review Panel, 26th IEEE/ACM International Conference on Automated Software Engineering (ASE 2011), Oread, Lawrence, Kansas, USA, November 2011.

41. Program Committee Member, 2nd International Workshop on Software Engineering for Sensor Network Applications (SESENA 2011), Waikiki, Honolulu, Hawaii, May 2011.

42. Program Committee Member, 1st International Workshop on Developing Tools as Plug-ins (TOPI 2011), Waikiki, Honolulu, Hawaii, May 2011.

43. Judge for the ACM Student Research Competition at ICSE 2011, Waikiki, Honolulu, Hawaii, May 2011.

44. Program Committee Member, ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2011), Toronto, Canada, July 2011.

45. Program Committee Member, 4th IEEE International Conference on Software Testing Verification and Validation (ICST), Berlin, Germany, March 2011.

46. Program Committee Member, 32nd International IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2011), Waikiki, Honolulu, Hawaii, May 2011.

47. Program Committee Member, 24th IEEE/ACM International Conference on Automated Software Engineering (ASE 2010), Antwerp, Belgium, September 2010.

48. Program Committee Member, 18th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2010), Santa Fe, New Mexico, USA, November 2010.

49. Program Committee Member, 32nd International IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2010), Cape Town, South Africa, May 2010.

50. Program Committee Member, 24th IEEE/ACM International Conference on Automated Software Engineering (ASE 2009), Auckland, New Zealand, November 2009.

51. Steering Committee Member, Workshop on Software Engineering for Secure Systems (SESS), August 2009 to date.

52. Program Committee Member, ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2009), Chicago, Illinois, USA, July 2009.

53. Steering Committee Member, ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), July 2009 to date.

54. Program Committee Member, 7th International Workshop on Dynamic Analysis (WODA 2009), Chicago, IL, USA, July 2009.

55. Program Committee Member, IEEE International Conference on Program Comprehension (ICPC 2009), Vancouver, British Columbia, Canada, May 2009.

56. Program Committee Member, 1st International ICST Workshop on Web Testing, Denver, Colorado, USA, April 2009.

57. Program Committee Member, 2nd India Software Engineering Conference (ISEC 2009), Pune, India, February 2009.

58. Program Committee Member, 2nd IEEE International Conference on Software Testing Verification and Validation (ICST), Denver, Colorado, USA, April 2009.

59. Program Committee Member, Doctoral Symposium of 16th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2008), Atlanta, Georgia, USA, September 2008.

60. Program Committee Member, International FSE Workshop on Recommendation Systems for Software Engineering (RSSE 2008), Atlanta, Georgia, USA, November 2008.

61. Program Committee Member, 16th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2008), Atlanta, Georgia, USA, September 2008.

62. Program Committee Member, 1st Working Conference on Mining Software Repositories (MSR 2008), Leipzig, Germany, May 2008.

63. Program Committee Member for the Research Demonstrations track of the 30th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2008), Leipzig, Germany, May 2008.

64. Program Committee Member, 1st IEEE International Conference on Software Testing Verification and Validation (ICST 2008), Lillehammer, Norway, April 2008.

65. Program Committee Member, 22nd IEEE International Conference on Automated Software Engineering (ASE 2007), Atlanta, Georgia, USA, November 2007.

66. Program Committee Member, Joint 11th European Software Engineering Conference and 15th ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC-FSE 2007), Dubrovnik, Croatia, September 2007.

67. Program Committee Member, 4th ICSE International Workshop on Dynamic Analysis (WODA 2006), Shanghai, China, May 2006.

68. Program Committee Member, 21th IEEE International Conference on Automated Software Engineering (ASE 2006), Tokyo, Japan, September 2006.

69. Program Committee Member, ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2006), Portland, Maine, USA, July 2006.

70. Program Committee Member for the Research Demonstrations track of the 28th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2006), Shanghai, China, May 2006.

71. Program Committee Member for the 4th eclipse Technology eXchange Workshop at OOPSLA 2005 (eTX 2005), San Diego, CA, USA, October 2005.

72. Program Committee Member, 20th IEEE International Conference on Automated Software Engineering (ASE 2005), Long Beach, CA, USA, November 2005.

73. Program Committee Member, Joint 5th European Software Engineering Conference and 13th ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC-FSE 2005), Lisbon, Portugal, September 2005.

74. Workshops Committee Member, 27th International IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2005), St. Louis, MO, USA, May 2005.

75. Program Committee Member, ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2004), Boston, MA, USA, July 2004.

76. Program Committee Member, 26th International IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2004), Edinburgh, Scotland, May 2004.

77. Program Committee Member, 6th IEEE International Conference on Engineering of Complex Computer Systems (ICECCS 2000), Tokyo, Japan, September 2000.

78. Program Committee Member, 5th IEEE International Conference on Engineering of Complex Computer Systems (ICECCS 1999), Las Vegas, NV, USA, October 1999.

A.3 Conferences, Workshops, and External Courses

1. Awards Chair, 42nd IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2020), Seoul, South Korea, May 2020.

2. Program Co-Chair, 39th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2017), Buenos Aires, Argentina, May 2017.

3. Chair, Doctoral Symposium of the 37th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2015), May 2015.

4. Program Co-Chair, ACM-SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2014), November 2014.

5. Co-organizer, Second Workshop on the Future of Debugging, at the ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2013), July 2013.

6. Co-organizer, 2nd Web Quality Security and Testing (WebQUeST) workshop at the 20th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2012), November 2012.

7. Program Co-Chair, IEEE International Conference on Software Testing, Verification and Validation (ICST 2013), April 2013.

8. Workshop Co-chair for the 34th IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2012), June 2012.

9. Chair, Doctoral Symposium of the 18th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2010), November 2010.

10. Program Chair, ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2010), July 2010.

11. Workshop Co-chair for the joint 12th European Software Engineering Conference and 17th ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC-FSE 2009), August 2009.

12. Co-chair, New Ideas and Emerging Results Track at the 31st IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2009), May 2009.

13. Co-organizer, ASE International Workshop on Living with Uncertainties (IWLU 2007), with Marsha Chechik (University of Toronto, Canada), Betty H.C. Cheng (Michigan State University, USA), Alexander Egyed (Teknowledge Corporation, USA), and Kevin Sullivan (University of Virginia, USA).

14. Co-organizer, OOPSLA Eclipse Technology eXchange Workshop (ETX 2007), with Martin Robillard (McGill University, Canada) and Li-Te Cheng (IBM T J Watson Research Center, USA).

15. Co-organizer, ICSE Workshop on Dynamic Analysis (WODA 2007), with Andreas Zeller (Saarland University, Germany), 2007.
16. Program co-chair, ICSE 2007 Posters and Demonstrations track, with Elisabetta Di Nitto (Politecnico di Milano, Italy).
17. Co-organizer, OOPSLA Eclipse Technology eXchange Workshop (ETX 2006), with Martin Robillard (McGill University, Canada) and Michael Burke (IBM T J Watson Research Center, USA).
18. Co-organizer, ISSTA Workshop on Testing and Analysis of Evolving and Deployed Software (TAEDS 2006), with Tao Xie (North Carolina State University, USA), 2006.
19. Co-organizer, Second ICSE Workshop on *Remote Analysis and Measurement of Software Systems (RAMSS)*, with Adam A. Porter (University of Maryland, USA), 2004.
20. Co-organizer, First ICSE Workshop on *Remote Analysis and Measurement of Software Systems (RAMSS)*, with Adam A. Porter (University of Maryland, USA), 2003.
21. Local Arrangements Chair, Third IEEE International Conference on Engineering of Complex Computer Systems (ICECCS 1997), sponsored by IEEE, September 1997, Lake Como, Italy.

B. On-campus Georgia Tech Committees

1. Member, Georgia Tech's Strategic Planning Steering Committee, 2019–2020.
2. Chair, Search Committee for the Chair of the School of Computational Science and Engineering in the College of Computing, 2019–2020.
3. GT Research Advisory Committee: 2019–to date.
4. Chair, Faculty Recruiting Committee, School of Computer Science, College of Computing. Academic Years 2013 and 2014.
5. Software Engineering/Embedded Software professional Master's working group, Georgia Tech. Academic Year 2013.
6. MOOMS working group, College of Computing. Academic Year 2013. Chair: Kishore Ramachandran.
7. SCS representatives to the CS PhD program committee (with Carsten Schwan). Academic Years 2011 and 2012.
8. CS Ph.D. Program Committee, College of Computing. Academic Year 2010.
9. School Advisory Committee, School of Computer Science, College of Computing. Academic Year 2010.
10. Faculty Recruiting Committee, School of Computer Science, College of Computing. Academic Year 2009.
11. Chair, PhD Task Force, College of Computing. Fall 2008–Spring 2009.
12. Threads Implementation Committee, College of Computing. Academic Years 2004–2005 and 2005–2006.
13. Steering Committee, Core Computing Division (observer), College of Computing. Academic Years 2004–2005.
14. Steering Committee, Computing & Networking Services (CNS), College of Computing. Academic Year 2004–2005.

C. Special Assignments at Georgia Tech

1. School Associate Chair, School of Computer Science, College of Computing, January 2015–December 2017.

2. Co-chair of UROC (Undergraduate Research Opportunities in Computing), College of Computing, 2004–present.
3. Area Coordinator, Software Methodology & Engineering, College of Computing, 2004–2007.

D. Member of Ph.D. Examining Committees

Ph.D. Qualifiers Committees – Georgia Tech

This section is not updated

Sangmin Park
College of Computing
Advisor(s): Mary Jean Harrold

Raul Santelices
College of Computing
Advisor(s): Mary Jean Harrold

Chris Parnin
College of Computing
Advisor(s): Spencer Rugaber

George Baah
College of Computing
Advisor(s): Mary Jean Harrold

William Halfond
College of Computing
Advisor(s): Alessandro Orso

Saswat Anand
College of Computing
Advisor(s): Mary Jean Harrold and Alessandro Orso

Christoph Csallner
College of Computing
Advisor: Yannis Smaragdakis

Yi Zhang
College of Computing
Co-advisors: Mary Jean Harrold and Alessandro Orso

Ph.D. Examining Committees – Internal

Insu Yun
College of Computing
Advisor(s): Taesoo Kim

Alireza Nazari
College of Computing
Advisor(s): Milos Prvulovic and Alenka Zajic

Yang Ji
College of Computing
Advisor(s): David Devecsery and Wenke Lee

Byoungyoung Lee
College of Computing
Advisor(s): Taesoo Kim and Wenke Lee

Sangho Lee
College of Computing
Advisor(s): Santosh Pande

Hina Shah
College of Computing
Advisor(s): Mary Jean Harrold and Nancy Nersessian

Chris Parnin
College of Computing
Advisor(s): Spencer Rugaber

George Baah
College of Computing
Advisor(s): Mary Jean Harrold

Saswat Anand
College of Computing
Advisor(s): Mary Jean Harrold

Raul Santelices
College of Computing
Advisor(s): Mary Jean Harrold

James Jones
College of Computing
Advisor: Mary Jean Harrold

Christoph Csallner
College of Computing
Advisor: Yannis Smaragdakis

Mohamed Mansour
College of Computing
Advisor: Karsten Schwan

Ph.D. Examining Committees – External

Tomasz Kuchta
Imperial College London
Title: Enhanced Symbolic Execution for Patch Testing and Document Recovery
Advisors: Cristian Cadar

Casper Svenning Jensen
Aarhus University
Title: Automated Testing of Event-Driven Applications
Advisors: Anders Møller

Qi Dawei
National University of Singapore
Title: Software Regression Localization Via Semantic Analyses
Advisors: Abhik Roychoudhury and Zhenkai Liang

Nadia Alshahwan
University College London
Title: Utilizing Output in Web Application Testing
Advisor: Mark Harman

Ali Mesbah
Delft University of Technology
Title: Ajaxifying Classic Web Applications
Advisor: Arie van Deursen

Murali Krishna Ramanathan
Department of Computer Science, Purdue University
Title: Path-aware Analysis of Program Invariants
Co-advisors: Suresh Jagannathan and Ananth Grama

Christoph Csallner
School of Computer Science, Georgia Tech
Title: Combining Over- and Under-approximating Program Analyses for Automatic Software Testing
Advisor: Yannis Smaragdakis

Matthew Rutherford
Computer Science Department, Univerisity of Colorado at Boulder
Title: Adequacy Criteria for System-Level Testing of Distributed Applications
Co-advisors: Alex Wolf and Antonio Carzaniga

E. External Member of Masters Examining Committees

None.

E. Consulting and Advisory Appointments

1. Expert witness, 2015 to date.
2. Member of the Independent Evaluation Team for the DARPA Application Community program, May 2006 to May 2010.
3. Member of the Advisory Board of Reflective (http://www.reflectivecorp.com/), January 2006 to date.
4. External member of the DARPA-sponsored Information Science and Technology (ISAT) study on "Trustable Deployed Adaptive Systems," January 2006 to August 2006.

F. Research Project Reviewer

1. National Science Foundation. Panelist for proposal review panel, Fall 2022.
2. National Science Foundation. Panelist for proposal review panel, Spring 2019.
3. National Science Foundation. Panelist for proposal review panel, Spring 2017.
4. National Science Foundation. Panelist for proposal review panel, Spring 2016.
5. National Science Foundation. Panelist for proposal review panel, Fall 2015.
6. National Science Foundation. Panelist for proposal review panel, Spring 2015.
7. National Science Foundation. Panelist for proposal review panel, Fall 2013.
8. National Science Foundation. Panelist for proposal review panel, Spring 2010.
9. National Science Foundation. Panelist for proposal review panel, Fall 2009.
10. National Science Foundation. Panelist for proposal review panel, Spring 2007.
11. National Science Foundation. Panelist for proposal review panel, Fall 2003.
12. NASA/EPSCoR. Research Grant Program Reviewer. April 2003.

IV. NATIONAL AND INTERNATIONAL PROFESSIONAL RECOGNITION

A. Invited Conference Session Chairmanships

1. IEEE International Conference on Automated Software Engineering (ASE 2013).
2. ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2013).
3. IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2013).
4. ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2012).
5. IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2012).
6. IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2011).
7. IEEE International Conference on Software Testing, Verification and Validation (ICST 2011).
8. IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2010).
9. IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2009).
10. European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2009).
11. ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2008).
12. IEEE International Conference on Automated Software Engineering (ASE 2008).
13. IEEE International Conference on Automated Software Engineering (ASE 2007).
14. European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2007).
15. IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2007).
16. IEEE and ACM International Conference on Automated Software Engineering (ASE 2006).
17. IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2006).
18. IEEE and ACM International Conference on Automated Software Engineering (ASE 2005).
19. European Software Engineering Conference and ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2005).
20. IEEE and ACM-SIGSOFT International Conference on Software Engineering (ICSE 2004).
21. ACM-SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2004).

A. Patents

1. Title: Methods and Systems for Testing Mobile Applications for Android Mobile Devices
   Patent No.: US10296444B1
   Inventors: S. Roy Choudhary, M. Fazzini, and A. Orso
   Current Assignee: Georgia Tech Research Corp.
   Publication Date: 2019-05-21

B. Editorial and Reviewer Work for Technical Journals and Publishers

1. Editorial work:

    - Associate Editor for IEEE Transactions on Software Engineering (TSE), December 2019 to date.
    - Associate Editor for ACM Transactions on Software Engineering and Methodology (TOSEM), March 2008 to March 2014.
    - Board Member for Elsevier's Information and Software Technology Journal, May 2005 to December 2011.

2. Reviewer for:

    - ACM Transactions on Software Engineering and Methodology (TOSEM).
    - IEEE Transactions on Software Engineering (TSE).
    - Journal of Software Testing, Verification and Reliability (STVR).
    - Automated Software Engineering Journal (ASE).
    - International Journal of Applied Intelligence.
    - Distributed and Parallel Databases.
    - 2004 IEEE International Conference on Software Engineering (ICSE 2004).
    - 2004 ACM International Symposium on Software Testing and Analysis (ISSTA 2004).
    - 2002 IEEE International Conference on Software Engineering (ICSE 2002).
    - 2002 ACM International Symposium on Software Testing and Analysis (ISSTA 2002).
    - 2000 European Conference on Object-Oriented Programming (ECOOP 2000).

V. OTHER CONTRIBUTIONS

A. Invited Talks

1. "Users Beware: Preference Inconsistencies Ahead". Invited Talk at the Innovations in Software Engineering Conference, ISEC 2017, Jaipur, India, January 2017 (together with my student F. Behrang and my collaborator M. Cohen).
2. "Automated Debugging: Are We There Yet?". Meeting of the IFIP WG 2.4 on Software Implementation Technology, Asilomar, CA, USA, February 2014.
3. "Field Failure Reproduction Using Symbolic Execution and Genetic Programming". 30th CREST Open Workshop on Search Based Software Testing (SBST) and Dynamic Symbolic Execution (DSE), University College London, London, UK, January 2014.
4. "Automated Debugging: Are We There Yet?". IMDEA Software Institute, Madrid, Spain, December 2013.
5. "Software Testing and Debugging". Universidad Politecnica de Madrid, Madrid, Spain, December 2013.
6. "Automated Debugging: Are We There Yet?". MSR's Software Engineering Innovation Foundation Workshop, Rio de Janeiro, Brasil, November 2013.
7. "Automated Debugging: Are We There Yet?". Haifa Verification Conference, Haifa, Israel, November 2013 (in connection with the HVC Award).
8. "Automated Debugging: Are We There Yet?". University of Southern California, Los Angeles, CA, September 2013.
9. "Automated Debugging: Are We There Yet?". Google, Santa Monica, CA, September 2013.
10. "In-house Debugging of Field Failures". Coverity, May 2013.
11. "Software Testing and Debugging". Pan American Software Quality Institute, Puntarenas, Costa Rica, July 2013.
12. "How Can I Get My Paper Accepted at a Top SE Conference?" Latin American School on Software Engineering. Rio de Janeiro, Brasil, July 2013.
13. "In-house Debugging of Field Failures". Politecnico di Milano, Italy, Department of Electronics and Informatics, July 2012.
14. "BugRedux: In-house Debugging of Field Failures". 52nd IFIP WG 2.4 Meeting, Vadstena, Sweden, May 2012.
15. "BugRedux: In-house Debugging of Field Failures". Mysore Park Workshop on The Future of Debugging, Mysore, India, February-March 2012.
16. "Testing Evolving Software". First Workshop on Validation Strategies for Software Evolution, Tallin, Estonia. March 2012.
17. "Automated Debugging: Are We There Yet?". UBA – University of Buenos Aires, Buenos Aires, Argentina. November 2011.
18. "Testing and Analysis of Deployed Software". IISc – Indian Institute of Science, Department of Computer Science and Automation, Bangalore, India. August 2011.
19. "Automated Debugging: Are We There Yet?". MSR – Microsoft Research India, Bangalore, India. August 2011.
20. "Testing Modern Evolving Software". TCS – Tata Consultancy Services, Pune, India. August 2011.

21. “Automated Regression Testing of Modified Software”. Dagstuhl Seminar on Self-Repairing Programs. February 2011.

22. “Testing Evolving Software”. Stellenbosch University. May 2010.

23. “Advanced Debugging Techniques for Modern Software”. University of California, Santa Barbara, January 2010.

24. “Improving Web Application Security and Reliability through Program Analysis”. IBM Research, India, August 2009.

25. “Improving Web Application Security and Reliability through Program Analysis”. Delft University of Technology, June 2009.

26. “Web Application Analysis and Testing”. Universität Zürich, Institut für Informatik, September 2008.

27. “Testing y análisis de Web Application (in Castilian)”. University of Buenos Aires, Departamento de Computación, July 2008.

28. “Web application analysis and testing”. Saarland University, Computer Science Department, June 2008, Saarbrücken, Germany.

29. “Web Application Analysis and Testing”. Amazon.com, June 2008, Seattle, WA, USA.

30. “Automated Support for Testing and Maintenance of Exception Handling Constructs”. Bellairs workshop On Software Analysis for Recommendation Systems (SARS 2008), McGill University’s Bellairs Research Institute, Barbardos, February 2008.

31. “Dynamic Tainting and its Application to Memory Protection”. Purdue University, Department of Computer Science, January 2008.

32. “Improving the Security of Web Applications Using Static and Dynamic Analysis”. University of Lugano, Switzerland, April 2007.

33. “(Re)Testing Evolving Software”. Bellairs workshop On Automated Techniques for Software evolution (BOATSe), McGill University’s Bellairs Research Institute, Barbardos, March 2007.

34. “Protecting Web Applications Using Positive Tainting and Syntax-Aware Evaluation”. University of Southern California, Los Angeles, CA, March 2007.

35. “Protecting Web Applications Using Positive Tainting and Syntax-Aware Evaluation”. Google, Santa Monica, CA, March 2007.

36. “Improving SW Quality through Continuous Monitoring”. Analysis, and Testing, DARPA-sponsored Information Science and Technology (ISAT) study on ”Trustable Deployed Adaptive Systems.” Carnegie Mellon University, Pittsburgh, PA, March 2006.

37. “Combining Static Analysis and Runtime Monitoring to Counter SQL-Injection Attacks”. ARO-HS ARPA invitational Malware Detection Workshop. SRI International, Arlington, VA, August 2005.

38. “Analysis and Testing of Deployed Software”. University of Massachusetts-Amherst, April 2004.

39. “Analysis and Testing of Deployed Software”. University of Texas at Austin, Department of Electrical and Computer Engineering, April 2004.

40. “Analysis and Testing of Deployed Software”. IBM Research, April 2004.

41. “Analysis and Testing of Deployed Software”. Purdue University, Department of Computer Science, March 2004.

42. "Analysis and Testing of Deployed Software". University of California, Irvine, School of Information and Computer Science, March 2004.

43. "Analysis and Testing of Deployed Software". North Carolina State University, Department of Computer Science, February 2004.

44. "Improving Dynamic Analysis through Partial Replay of Users' Executions". Dagstuhl Seminar on Understanding Program Dynamics, December 2003.

45. "Regression Testing of Object-Oriented Software". Politecnico di Milano, Italy, Department of Electronics and Informatics, December 2002.

46. "Regression Test Selection for Java Software". University of Colorado at Boulder, Department of Computer Science, October 2002.

47. "Object-Oriented Testing Techniques". University of Illinois at Chicago, EECS Department, September 1999.

B. Participation in U.S.-Funded Projects

1. National Science Foundation Award 0196145, Experimental Systems Program, Scalable Program-Analysis-Based Testing and Maintenance: Infrastructure and Experimentation. PIs: Mary J. Harrold (Georgia Tech), Adam A. Porter (University of Maryland, College Park), Gregg Rothermel (Oregon State University). December 1999 – August 2003.

C. Participation in European-Union-Funded Projects

1. *TWO*. ESPRIT Project, 1998-2001. Project goal: To develop a tool supporting automatic generation of test cases for both C and C++ systems, based on static analysis techniques.

2. *Promote*. ESSI Project, 1998-2000. Project goal: To redefine the testing process of a big-size company, based on the use of both static and dynamic metrics to forecast the testing effort and the cost-effectiveness of testing strategies.

3. *UseGat*. ESPRIT Project, 1996-1997. Project goal: To demonstrate the suitability and viability of combining structured and formal methods, in particular SA/RT and VDM, to develop real large-scale applications.

4. *IDERS*. ESPRIT Project, 1994-1996. Project goal: To develop methodologies and tools to support the complete visibility of software artifacts, during the whole development cycle, and to design a software process well suited for real-time systems.

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Main Areas of Expertise

Software engineering, with emphasis on software testing, program analysis, and software security.

Consulting and Advisory Appointments

(I was retained by the underlined parties.)

Ongoing Engagements

1. **Philips North America LLC v. Image Technology Consulting, LLC and Marshall R. Shannon**
   Type of matter: Litigation
   Case No.: 3:22-cv-00147-B
   Location of court: Northern District of Texas, Dallas Division
   Law firm: Reed Smith LLP

2. **Philips North America LLC, Koninklijke Philips N.V., and Philips India Ltd. v. Global Medical Imaging, LLC d/b/a Avante Ultrasound, Avante Health Solutions f/k/a Jordan Health Products, LLC, and Jordan Industries International, LLC**
   Type of matter: Litigation
   Case No.: 1:21-cv-03615
   Location of court: U.S.D.C. Northern District of Illinois, Eastern Division
   Law firm: Reed Smith LLP

3. **Keysight Technologies, Inc. v. Centripetal, Inc.**
   Type of matter: IPR proceedings
   Law firm: Kramer Levin Naftalis & Frankel LLP

4. **Card Isle Corp. v. Tariq Farid; Edible Arrangements, LLC; and Netsolace, Inc.**
   Type of matter: Litigation
   Case No.: 1:21-cv-01971-TWT
   Location of court: U.S.D.C. Northern District of Georgia
   Law firm: Bondurant Mixson & Elmore LLP

5. **Centripetal, Inc. v. Palo Alto Networks, Inc.**
   Type of matter: IPR proceedings
   Law firm: Kramer Levin Naftalis & Frankel LLP

6. **Philips North America LLC v. Advanced Imaging Services, Inc., d/b/a Advanced Imaging Parts and Wang Xiuyuan, a/k/a Sean Wang**
   Type of matter: Litigation
   Case No.: 2:21-cv-00876
   Location of court: U.S.D.C. Eastern District of California
   Law firm: Reed Smith LLP

7. **Philips North America LLC v. Martin Little**
   Type of matter: Litigation
   Case No.: 5:20-cv-00657-BO
   Location of court: U.S.D.C. Eastern District of North Carolina, Western Division
   Law firm: Reed Smith LLP

8. **OpenText Corp., Webroot, Inc. v. Sophos Ltd.; CrowdStrike, Inc.; TrendMicro, Inc.; BitDefender, Inc.; Kasperksy Total Security**
   Type of matter: Patent infringement
   Case No.: TBD
   Location of court: TBD
   Law firm: King & Spalding LLP

9. **Philips Medical Systems Puerto Rico, Inc., Philips Medical Systems Nederland B.V., and Philips India Ltd. v. Alpha Biomedical**
   Type of matter: Litigation
   Case No.: 3:19-cv-01488-BJM
   Location of court: U.S.D.C. District of Puerto Rico
   Law firm: Reed Smith LLP

10. **Centripetal, Inc. v. Palo Alto Networks, Inc.**
    Type of matter: Patent infringement
    Case No.: 2:21-cv-00137-RCY
    Location of court: U.S.D.C. Eastern District of Virginia
    Law firm: Kramer Levin Naftalis & Frankel LLP

11. **Philips North America LLC v. Dale E. Dorow and William M. Griswold**
    Type of matter: Litigation
    Case No.: 3:19-cv-00272-MOC-DSC
    Location of court: U.S.D.C. Western District of North Carolina, Charlotte Division
    Law firm: Reed Smith LLP

12. **Philips North America LLC, Philips Medical Systems Nederland B.V., Philips Electronics India Ltd., Philips Medical Systems (Cleveland), Inc., Philips Medical Systems Technologies LTD., and Koninklijke Philips N.V. v. Dustin Jay Zimmerman**
    Type of matter: Litigation
    Case No.: 3:19-cv-444-GCM
    Location of court: U.S.D.C. Western District of North Carolina, Charlotte Division
    Law firm: Reed Smith LLP

13. **Finjan, Inc. v. Palo Alto Networks, Inc.**
    Type of matter: Patent infringement
    Case No.: 4:14-cv-04908-PJH
    Location of court: U.S.D.C. Northern District of California, Oakland Division
    Law firm: Fish & Richardson P.C.

14. **Finjan, Inc. v. Qualys Inc.**
    Type of matter: Patent infringement
    Case No.: 4:18-cv-07229-YGR
    Location of court: U.S.D.C. Northern District of California, Oakland Division
    Law firm: Fish & Richardson P.C.

15. **Finjan, Inc. v. Sonicwall, Inc.**
    Type of matter: Patent infringement
    Case No.: 5:17-cv-04467-BLF
    Location of court: U.S.D.C. Northern District of California, San Jose Division
    Law firms: Fish & Richardson P.C.
    Kramer Levin Naftalis & Frankel LLP

16. **Cisco Systems, Inc. v. Centripetal Networks, Inc.**
    Type of matter: Patent infringement
    Case No. 2:18-cv-00094-HCM-LRL
    Location of court: U.S.D.C. Eastern District of Virginia Norfolk Division
    Law firm: Kramer Levin Naftalis & Frankel LLP

17. **Finjan, Inc. v. Rapid7, Inc. and Rapid7 LLC**
    Type of matter: Patent infringement
    Case No.: 1:18-cv-01519-MN
    Location of court: U.S.D.C. Northern District of California
    Law firms: Fish & Richardson P.C.
    Kramer Levin Naftalis & Frankel LLP

18. **Finjan, Inc. v. Check Point Software Technologies Inc. et al.**
    Type of matter: Patent infringement
    Case No.: 3:18-cv-02621-WHO
    Location of court: U.S.D.C. Northern District of California
    Law firm: Kramer Levin Naftalis & Frankel LLP

19. **CUPP Cybersecurity LLC, et al. v. Trend Micro, Inc., et al.**
    Type of matter: Patent infringement
    Case No.: 3:18-cv-01251-M
    Location of court: U.S.D.C. Northern District of Texas
    Law firm: Kramer Levin Naftalis & Frankel LLP

20. **CUPP Cybersecurity LLC, et al. v. Symantec Corp.**
    Type of matter: Patent infringement
    Case No.: 19-cv-00298
    Location of court: U.S.D.C. Northern District of California
    Law firm: Kramer Levin Naftalis & Frankel LLP

21. **Symantec Corp. v. CUPP Cybersecurity LLC, et al.**
    Type of matter: Patent infringement
    Case No.: 5:18-cv-04720
    Location of court: U.S.D.C. Northern District of California
    Law firm: Kramer Levin Naftalis & Frankel LLP

22. **Cisco Systems, Inc. v. Centripetal Networks, Inc.**
    Type of matter: IPR proceedings
    Law firm: Kramer Levin Naftalis & Frankel LLP

23. **Philips Medical Systems Nederland B.V., Philips North America LLC, and Philips Electronics India Ltd. v. TEC Holdings, Inc. f/k/a Transtate Equipment Company, Inc. and Transtate Equipment Company, Inc. f/k/a Transtate Holdings, Inc.**
    Type of matter: Litigation
    Case No.: 1:17-cv-02864-LMM
    Location of court: U.S.D.C. Northern District of Georgia
    Law firm: Reed Smith LLP

24. **Finjan, Inc. v. Juniper Networks, Inc.**
    Type of matter: patent infringement
    Case No.: 3:17-cv-05659-WHA
    Location of court: U.S.D.C. Northern District of California
    Law firm: Kramer Levin Naftalis & Frankel LLP

25. **Finjan, Inc. v. ESET, LLC**
    Type of matter: patent infringement
    Case No.: 3:17-cv-0183-CAB-BGS
    Location of court: U.S.D.C. Southern District of California
    Law firm: Kramer Levin Naftalis & Frankel LLP

Completed Engagements

1. **Philips Medical Systems Nederland B.V., Philips North America LLC, Philips Electronics India Ltd., Philips Medical Systems (Cleveland), Inc., Philips Medical Systems Technologies LTD., and Koninklijke Philips N.V. v. 626 Holdings., Inc. and Alexander Kalish**
    Type of matter: Litigation
    Case No.: 1:19-cv-81263-RS
    Location of court: U.S.D.C. Southern District of Florida
    Law firm: Reed Smith LLP

2. **Finjan, Inc. v. Cisco Systems, Inc.**
    Type of matter: Patent infringement
    Case No.: 17-cv-0072-BLF-SVK
    Location of court: U.S.D.C. Northern District of California
    Law firm: Kramer Levin Naftalis & Frankel LLP

3. **Typemock, LTD. v. Telerik, Inc.**
    Type of matter: Patent infringement
    Case No.: 1:17-cv-10274-RGS
    Location of court: U.S.D.C. District of Massachusetts Boston Division
    Law firm: Proskauer Rose LLP

4. **Centripetal Networks, Inc. v. Keysight Technologies, Inc. and Ixia**
    Type of matter: patent infringement
    Case No.: 2:17-cv-00383-HCM-LRL
    Location of court: U.S.D.C. Eastern District of Virginia Norfolk Division
    Law firm: Kramer Levin Naftalis & Frankel LLP

5. **Technology for Energy Corporation v. William H. Hardy, Power Measurements, LLC & Power Measurements, Inc.**
    Type of matter: Patent infringement
    Case No.: 3:16-cv-00091
    Location of court: U.S.D.C. Eastern District of Tennessee at Knoxville
    Law firm: Bass, Berry & Sims PLC

6. **Finjan, Inc. v. Symantec Corp.**

Type of matter:	patent infringement
Case No.:	3:14-cv-02998-HSG
Location of court:	U.S.D.C. Northern District of California
Law firm:	Kramer Levin Naftalis & Frankel LLP

7. **Sony Corporation v. Pace plc; Pace Americas, LLC; other related companies**

Type of matter:	Patent infringement
Case No.:	1:15-cv-288-SLR-SRF
Location of court:	U.S.D.C. District of Delaware
Law firms:	Andrews Kurth Kenyon LLP Finnegan, Henderson, Farabow, Garrett & Dunner, LLP

8. **Novatel Wireless Solutions, Inc.; Nova Intellectual Solutions v. Franklin Wireless Corp.; ZTE Corp.; ZTE (USA)**

Type of matter:	Patent infringement
Case No.:	3:10-cv-02530-CAB-JMA
Location of court:	U.S.D.C. Southern District of California
Law firm:	Pillsbury LLP

9. **e-Watch, Inc.; e-Watch Corporation v. Apple, Inc.; Blackberry Corporation; Blackberry Limited; HTC America, Inc.; HTC Corporation; Huawei Device Co.; Ltd., Huawei Device USA, Inc.; Kyocera Communications, Inc.; Kyocera International, Inc.; LG Electronics, Inc.; LG Electronics USA, Inc.; LG Electronics MobileComm USA, Inc.; Nokia, Inc.; Microsoft Mobile Oy; Samsung Electronics Co., Ltd.; Samsung Electronics America, Inc.; Sharp Corporation; Sharp Electronics Corporation; Sony Mobile Communications (USA), Inc.; ZTE (USA)**

Type of matter:	Patent infringement
Case No.:	2:13-cv-1061 (LEAD CASE)
Location of court:	U.S.D.C. Eastern District of Texas Marshall Division
Law firm:	Pillsbury LLP