

CURRICULUM VITAE

Atif M. Memon

Notarization. I have read the following and certify that this curriculum vitae is a current and accurate statement of my professional record.

Signature: _____

Date: March 20, 2009

(*Atif M. Memon*)

1 PERSONAL INFORMATION

- Atif M. Memon
Associate Professor, University of Maryland
Department of Computer Science and
Institute for Advanced Computer Studies (UMIACS)
Appointed August, 2001.

1.1 EDUCATION

- Ph.D., Computer Science, University of Pittsburgh, 2001.
Dissertation: *A Comprehensive Framework for Testing Graphical User Interfaces*
Advisors: *Martha Pollack and Mary Lou Soffa*
- M.S., Computer Science, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, 1995.
Thesis: *A System for Prototyping Optical Architectures*
Advisor: *Subbarao Ghanta*
- B.C.S., Computer Science, University of Karachi, 1991.

1.2 EMPLOYMENT

- Associate Professor, Computer Science Department, UMCP.
August 2007–*present*.
- Associate Professor, Institute for Advanced Computer Studies, UMCP.
August 2007–*present*.

- Assistant Professor, Computer Science Department, UMCP.
August 2001–July 2007.
- Assistant Professor, Institute for Advanced Computer Studies, UMCP.
August 2001–July 2007.
- Scientist, Fraunhofer Center for Empirical Software Engineering, College Park, Maryland.
August 2001–December 2005.
- Mellon Fellow, Computer Science Department, University of Pittsburgh
August 1999–August 2001.
- Research Assistant, Computer Science Department, University of Pittsburgh
August 1998–August 1999.
- Teaching Fellow, Computer Science Department, University of Pittsburgh
August 1997–August 1998.
- Teaching Assistant, Computer Science Department, University of Pittsburgh
August 1996–August 1997.
- Lecturer, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia
December 1995–July 1996.
- Teaching/Research Assistant, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia
January 1993–December 1995.
- Lecturer/Teaching Assistant, University of Karachi
January 1992–January 1993.

2 RESEARCH, SCHOLARLY, AND CREATIVE ACTIVITIES

†Indicates a student advised, co-advised, or directly supervised by Dr. Memon.

2.1 BOOKS

2.1.1 CHAPTERS IN BOOKS

1. “An Event-Flow Model to Test EDS,” Atif M. Memon, *Software Engineering and Development*, 2009. (**Accepted for publication; to appear**)
2. “Advances in Web Testing,” Cyntica Eaton and Atif M. Memon, (M. V. Zelkowitz ed.), *Advances in Computers*, Academic Press, 2009. (**Accepted for publication; to appear**)
3. “Enhancing Testing Technologies for Globalization of Software Engineering & Productivity,” Amir Khan and Atif M. Memon, *Handbook of Research on Software Engineering and Productivity Technologies: Implications of Globalisation*, 2009. (**Accepted for publication; to appear**)

4. “Using Reverse Engineering for Automated Usability Evaluation of GUI-Based Applications,” Atif M. Memon, *Software Engineering Models, Patterns and Architectures for HCI*, 2009. (**Accepted for publication; to appear**)
5. “Testing Graphical User Interfaces,” Jaymie Strecker[†] and Atif M. Memon, *Encyclopedia of Information Science and Technology, Second ed.*, 2009. (**Accepted for publication; to appear**)
6. “Agile Quality Assurance Techniques for GUI-Based Applications,” Qing Xie[†] and Atif M. Memon, *Agile Software Development Quality Assurance*, (Ioannis Stamelos and Panagiotis Sfetsos ed.), Idea Group Inc., 2007.
7. “Automated GUI Regression Testing Using AI Planning,” Atif M. Memon, *Artificial Intelligence Methods in Software Testing*, (A. Kandel, H. Bunke and M. Last ed.), World Scientific Series in Machine Perception and Artificial Intelligence, World Scientific Publishing Co., vol. 56, pp. 51–100, 2004.
8. “A Process and Role-Based Taxonomy of Techniques to Make Testable COTS Components,” Atif M. Memon, *Testing Commercial-off-the-shelf Components and Systems*, (S. Beydeda and V. Gruhn ed.), Springer, pp. 109–140, 2004.
9. “Advances in GUI Testing,” Atif M. Memon, *Highly Dependable Software*, (M. V. Zelkowitz ed.), Advances in Computers, Academic Press, vol. 58, pp. 149–201, 2003.

2.2 ARTICLES IN REFEREED JOURNALS

1. “Automatically repairing event sequence-based GUI test suites for regression testing,” Atif M. Memon, *ACM Transactions on Software Engineering and Methodology, Association for Computing Machinery Press*, vol. 18, no. 2, article 4, 2008, pp. 1-36.
2. “Using a Pilot Study to Derive a GUI Model for Automated Testing,” Qing Xie[†] and Atif M. Memon, *ACM Transactions on Software Engineering and Methodology, Association for Computing Machinery Press*, vol. 18, no. 2, article 7, 2008, pp. 1-35.
3. “Call Stack Coverage for GUI Test-Suite Reduction,” Scott McMaster[†] and Atif M. Memon, *IEEE Transactions on Software Engineering, IEEE Computer Society Press*, vol. 34, no. 1, 2008, pp. 99-115.
4. “Skoll: A Process and Infrastructure for Distributed Continuous Quality Assurance,” Adam Porter, Cemal Yilmaz, Atif M. Memon, Douglas C. Schmidt, and Bala Natarajan, *IEEE Transactions on Software Engineering, IEEE Computer Society Press*, vol. 33, no. 8, 2007, pp. 510-525.
5. “An Event-Flow Model of GUI-Based Applications for Testing,” Atif M. Memon, *Software Testing, Verification & Reliability, John Wiley & Sons, Inc.*, vol. 17, no. 3, 2007, pp. 137-157.
6. “Experimenting with software testbeds for evaluating new technologies,” by Mikael Lindvall, Ioana Rus, Paolo Donzelli, Atif Memon, Marvin Zelkowitz, Aysu Betin-Can, Tefik Bultan, Chris Ackermann, Bettina Anders, Sima Asgari, Victor Basili, Lorin Hochstein, Jrg Fellmann, Forrest Shull, Roseanne Tvedt, Daniel Pech, and Daniel Hirschbach, *Empirical Software Engineering: An International Journal*, vol. 12, no. 4, 2007, pp. 417-444, Kluwer Academic Publishers.

7. “An Empirical Approach to Testing Web Applications Across Diverse Client Platform Configurations,” Cyntrica Eaton[†] and Atif M. Memon, *International Journal on Web Engineering and Technology (IJWET)*, *Special Issue on Empirical Studies in Web Engineering*, Inderscience Publishers, vol. 3, no. 3, 2007, pp. 227-253.
8. “Designing and Comparing Automated Test Oracles for GUI-based Software Applications,” Qing Xie[†] and Atif M. Memon, *ACM Transactions on Software Engineering and Methodology*, vol. 16, no. 1, 2007, ACM Press.
9. “Reliable Effects Screening: A Distributed Continuous Quality Assurance Process for Monitoring Performance Degradation in Evolving Software Systems,” Cemal Yilmaz, Adam Porter, Arvind S. Krishna, Atif M. Memon, Douglas C. Schmidt, Aniruddha Gokhale, and Balachandran Natarajan, *IEEE Transactions on Software Engineering*, *IEEE Computer Society Press*, vol. 33, no. 2, 2007, pp. 124–141.
10. “Employing User Profiles to Test a New Version of a GUI Component in its Context of Use,” Atif M. Memon, *Software Quality Journal*, *Springer Inc.* vol. 14, no. 4, pp. 359-377, Dec. 2006.
11. “Techniques and Processes for Improving the Quality and Performance of Open-Source Software,” Cemal Yilmaz, Adam Porter, Atif M. Memon, Arvind S. Krishna, Douglas C. Schmidt, and Aniruddha Gokhale, *Software Process - Improvement and Practice Journal: Special Issue on Free/Open Source Software Processes*, *John Wiley & Sons, Inc.*, vol. 11, no. 6, pp. 163–176, May 2006.
12. “Studying the Fault-Detection Effectiveness of GUI Test Cases for Rapidly Evolving Software,” Atif M. Memon and Qing Xie[†], *IEEE Transactions on Software Engineering*, *IEEE Computer Society Press*, vol. 31, no. 10, pp. 884-896, Oct. 2005.
13. “An Evolutionary Testbed for Software Technology Evaluation,” Mikael Lindvall, Ioana Rus, Forrest Shull, Marvin Zelkowitz, Paolo Donzelli, Atif Memon, Victor Basili, Patricia Costa, Roseanne Tvedt, Lorin Hochstein, Sima Asgari, Chris Ackermann, Dan Pech, *Innovations in Systems and Software Engineering*, *Springer Inc.*, vol. 1, no. 1, pp. 3–11, Apr. 2005.
14. “Preserving Distributed Systems Critical Properties: A Model-driven Approach,” Cemal Yilmaz, Atif M. Memon, Adam Porter, Arvind S. Krishna, Douglas C. Schmidt, Aniruddha Gokhale, Balachandran Natarajan, *IEEE Software: Special Issue on Persistent Software Attributes*, *IEEE Computer Society Press*, vol. 21, no. 6, pp. 32–40, Nov. 2004,
15. “A Distributed Continuous Quality Assurance Process to Manage Variability in Performance-intensive Software,” Arvind S. Krishna, Douglas C. Schmidt, Atif M. Memon, Adam Porter, Cemal Yilmaz, *Studia Informatica Universalis, Editions SUGER.*, vol. 4, no. 1, pp. 53–72, Jan. 2005.
16. “Automated Regression Testing for Evolving GUI Software,” Atif M. Memon, Adithya Nagarajan[†], and Qing Xie[†], *Journal of Software Maintenance and Evolution*, *John Wiley & Sons, Inc.*, vol. 17, no. 1, pp. 27–64, Jan. 2005.
17. “GUI Testing: Pitfalls and Process,” Atif M. Memon, *IEEE Computer*, *IEEE Computer Society Press*, vol. 35, issue. 5, pp. 87–88, Aug. 2002.
18. “Hierarchical GUI Test Case Generation Using Automated Planning,” Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, *IEEE Transactions on Software Engineering*, *IEEE Computer Society Press*, vol. 27, no. 2, pp. 144–155, Feb. 2001.

19. "SEROS - A Self-Routing Optical ATM Switch," Mohsen Guizani and Atif M. Memon, *International Journal of Communication Systems, John Wiley & Sons, Inc.*, vol. 9, no. 2, pp. 115–125, Mar. 1996.

2.3 ARTICLES IN REFEREED CONFERENCES AND WORKSHOPS

1. "An Extensible Heuristic-Based Framework for GUI Test Case Maintenance," Scott McMaster[†] and Atif M. Memon, *TESTBEDS'09: Proceedings of the First International Workshop on TESTing Techniques & Experimentation Benchmarks for Event-Driven Software*, Denver, Colorado, April 4, 2009.
2. "Towards Dynamic Adaptive Automated Test Generation for Graphical User Interfaces," Xun Yuan,[†]Myra Cohen, and Atif M. Memon, *TESTBEDS'09: Proceedings of the First International Workshop on TESTing Techniques & Experimentation Benchmarks for Event-Driven Software*, Denver, Colorado, April 4, 2009.
3. "An Initial Characterization of Industrial Graphical User Interface Systems," Penelope Brooks,[†]Brian Robinson and Atif M. Memon, *Proceedings of the 2nd IEEE International Conference on Software Testing, Verification and Validation, (ICST '09)*, Denver, Colorado, April 1–4, 2009.
4. "Alternating GUI Test Generation and Execution," Xun Yuan[†] and Atif M. Memon, *Proceedings of the IEEE Testing: Academic and Industrial Conference (TAIC PART '08)*, Cumberland Lodge, Windsor, UK, August 29-31, 2008.
5. "Effective and Scalable Software Compatibility Testing," Il-Chul Yoon, Alan Sussman, Atif M. Memon, and Adam Porter, *Proceedings of the International Symposium on Software Testing and Analysis (ISSTA '08)*, Seattle, WA, July 20-24 2008.
6. "Test Case Generator for GUITAR," Daniel Hackner[†] and Atif M. Memon, *Research Demonstration Track paper at the 30th International Conference on Software Engineering, (ICSE'08)*, Leipzig, Germany, May 2008
7. "Relationships Between Test Suites, Faults, and Fault Detection in GUI Testing," Jaymie Strecker[†] and Atif M. Memon, *Proceedings of the First international conference on Software Testing, Verification, and Validation (ICST'08)*, Lillehammer, Norway, 2008
8. "Fault Detection Probability Analysis for Coverage-Based Test Suite Reduction," Scott McMaster[†] and Atif M. Memon, *Proceedings of the 21st IEEE International Conference on Software Maintenance (ICSM'07)*, (Paris, France), 2007.
9. "Direct-Dependency-based Software Compatibility Testing," Il-Chul Yoon, Alan Sussman, Atif M. Memon, and Adam Porter, *Proceedings of the 22nd IEEE international conference on Automated software engineering*, (Washington, DC, USA), 2007.
10. "Covering Array Sampling of Input Event Sequences for Automated GUI Testing," Xun Yuan,[†]Myra Cohen, and Atif M. Memon, *Proceedings of the 22nd IEEE international conference on Automated software engineering*, (Washington, DC, USA), 2007.
11. "Automated GUI Testing Guided by Usage Profiles," Penelope Brooks[†] and Atif M. Memon, *Proceedings of the 22nd IEEE international conference on Automated software engineering*, (Washington, DC, USA), 2007.

12. “Test Suite Prioritization by Interaction Coverage,” Renee C. Bryce and Atif M. Memon, *Proceedings of The Workshop on Domain-Specific Approaches to Software Test Automation (DoSTA 2007)*; co-located with *The 6th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering*, (Dubrovnik, Croatia), Sep. 2007.
13. “Faults’ Context Matters,” Jaymie Strecker[†] and Atif M. Memon, *Proceedings of The Fourth International Workshop on Software Quality Assurance (SOQUA ’07)*; co-located with *The 6th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering*, (Dubrovnik, Croatia), Sep. 2007.
14. “Using GUI Run-Time State as Feedback to Generate Test Cases,” Xun Yuan[†] and Atif M. Memon, *Proceedings of the 29th International Conference on Software Engineering (ICSE 2007)*, Minneapolis, MN, USA, May 23-25, 2007, pp. 396-405.
15. “Call Stack Coverage for GUI Test-Suite Reduction,” Scott McMaster[†] and Atif M. Memon, *Proceedings of the 17th IEEE International Symposium on Software Reliability Engineering (ISSRE 2006)*, Raleigh, NC, USA, pp. 33–44, Nov. 6-10 2006.
16. “Studying the Characteristics of a ‘Good’ GUI Test Suite,” Qing Xie[†] and Atif M. Memon, *Proceedings of the 17th IEEE International Symposium on Software Reliability Engineering (ISSRE 2006)*, Raleigh, NC, USA, pp. 159–168, Nov. 6-10 2006.
17. “Automated Model-based Testing of Community-Driven Open Source GUI Applications,” Qing Xie[†] and Atif M. Memon, *Proceedings of the 22nd IEEE International Conference on Software Maintenance (ICSM 2006)*, Philadelphia, PA, USA, pp. 145-154, Sep. 24-27, 2006.
18. “Rapid ‘Crash Testing’ for Continuously Evolving GUI-Based Software Applications,” Qing Xie[†] and Atif M. Memon, *Proceedings of the 21st IEEE International Conference on Software Maintenance (ICSM 2005)*, Budapest, Hungary, pp. 539–548, Sep. 25-30, 2005.
19. “Call Stack Coverage for Test Suite Reduction,” Scott McMaster[†] and Atif M. Memon, *Proceedings of the 21st IEEE International Conference on Software Maintenance (ICSM 2005)*, Budapest, Hungary, pp. 473–482, Sep. 25-30, 2005.
20. “Main Effects Screening: A Distributed Continuous Quality Assurance Process for Monitoring Performance Degradation in Evolving Software Systems,” Cemal Yilmaz, Arvind Krishna, Atif M. Memon, Adam Porter, Douglas C. Schmidt, Aniruddha Gokhale, and Bala Natarajan, *Proceedings of the 27th ACM/IEEE International Conference on Software Engineering (ICSE 2005)*, St. Louis, MO, USA, pp. 293–302, May 15-21, 2005.
21. “Evaluating Web Page Reliability across Varied Browsing Environments,” Cyntica Eaton[†] and Atif M. Memon, *Proceedings of the 15th IEEE International Symposium on Software Reliability Engineering (ISSRE 2004)*, Saint-Malo, Bretagne, France, Nov. 2-5, 2004.
22. “Developing Testing Techniques for Event-Driven Pervasive Computing Applications,” Atif M. Memon, *OOPSLA 2004 workshop on Building Software for Pervasive Computing (BSPC 2004)*, Vancouver, BC, Canada, Oct. 25, 2004.
23. “A Distributed Continuous Quality Assurance Process to Manage Variability in Performance-intensive Software,” Arvind S. Krishna, Cemal Yilmaz, Atif M. Memon, Adam Porter, Douglas C. Schmidt, Aniruddha Gokhale, Balachandran Natarajan, *Component And Middleware Performance, OOPSLA*

- 2004 Workshop*, Vancouver Convention & Exhibition Centre, Vancouver, British Columbia, Canada, Oct. 25, 2004.
24. “Using Transient/Persistent Errors to Develop Automated Test Oracles for Event-driven Software,” Atif M. Memon and Qing Xie[†], *Proceedings of the 19th IEEE International Conference on Automated Software Engineering 2004 (ASE 2004)*, Linz, Austria, pp. 186–195, Sep. 20–24, 2004. *Acceptance rate: 14%*.
 25. “Empirical Evaluation of the Fault-detection Effectiveness of Smoke Regression Test Cases for GUI-based Software,” Atif M. Memon and Qing Xie[†], *Proceedings of the 20th IEEE International Conference on Software Maintenance 2004 (ICSM 2004)*, Chicago, IL, USA, pp. 8–17, Sep. 11–17, 2004.
 26. “Improving Browsing Environment Compliance Evaluations for Websites,” Cyntica Eaton[†] and Atif M. Memon, *International Workshop on Web Quality (WQ 2004)*, July 27, 2004, Munich, Germany.
 27. “Model-Driven Quality Assurance Techniques for Distributed Real-time and Embedded Systems,” Emre Turkay, Arvind S. Krishna, Aniruddha Gokhale, Douglas Schmidt, Bala Natarajan, Adam Porter, Cemal Yilmaz, Atif M. Memon, *OMG Real-Time & Embedded Systems Workshop*, July 12–15, 2004, Hyatt Regency Reston, Reston, VA, USA.
 28. “Improving Software Quality and Performance using Model-integrated Distributed Continuous Quality Assurance,” A. S. Krishna, Douglas C. Schmidt, Atif M. Memon, Adam Porter, D. Sevilla, *Proceedings of the 8th International Conference on Software Reuse (ICSR 2004)*, Madrid, Spain, July 5–9 2004.
 29. “A Model-based Distributed Continuous Quality Assurance Process to Enhance the Quality of Service of Evolving Performance-intensive Software Systems,” Cemal Yilmaz, Arvind S. Krishna, Atif M. Memon, Adam Porter, Douglas C. Schmidt, Aniruddha Gokhale and Balachandran Natarajan, *Remote Analysis and Measurement of Software Systems (RAMSS 2004)*, Edinburgh, Scotland, UK, May 2004.
 30. “Distributed Continuous Quality Assurance: Leveraging User Resources to Improve Software Quality Around-the-World, Around-the-Clock,” Atif M. Memon, Adam Porter, Cemal Yilmaz, and Adithya Nagarajan[†], Douglas C. Schmidt and Bala Natarajan, *Proceedings of the ACM/IEEE International Conference on Software Engineering (ICSE 2004)*, Edinburgh, Scotland, pp. 459–468, May 2004.
 31. “ASPIRE: Automated Systematic Protocol Implementation Robustness Evaluation,” Arunchandar Vasan[†] and Atif M. Memon, *Proceedings (published by the IEEE Computer Society Press) of the Australian Software Engineering Conference (ASWEC 2004)*, Melbourne, Australia, pp. 241–250, Apr. 13–16, 2004. **Best paper award.**
 32. “Using Tasks to Automate Regression Testing of GUIs,” Atif M. Memon, *Proceedings of the IASTED International Conference on ARTIFICIAL INTELLIGENCE AND APPLICATIONS (AIA 2004)*, Innsbruck, Austria, pp. 52–155, Feb. 16–18, 2004.
 33. “Refactoring Using Event-Based Profiling,” Adithya Nagarajan[†] and Atif M. Memon, *The First International Workshop on REFactoring: Achievements, Challenges, Effects (REFACE)*, November 13, 2003, British Columbia, Canada.
 34. “GUI Ripping: Reverse Engineering of Graphical User Interfaces for Testing,” Atif M. Memon, Ishan Banerjee[†], and Adithya Nagarajan[†], *Proceedings of the IEEE 10th Working Conference on Reverse Engineering (WCRE 2003)*, Victoria, British Columbia, Canada, pp. 260–269, Nov. 13–16 2003.

35. “Feedback-driven Design of Distributed Real-time & Embedded Component Middleware Via Model-Integrated Computing & Distributed Continuous Quality Assurance,” Atif M. Memon, Adam Porter and Doug Schmidt, *Science of Design: Software-Intensive Systems, A National Science Foundation Invitational Workshop*, November 2-4, 2003, Airlie Center, VA, USA.
36. “What Test Oracle Should I use for Effective GUI Testing?” Atif M. Memon, Ishan Banerjee[†], and Adithya Nagarajan[†], *Proceedings of the IEEE International Conference on Automated Software Engineering (ASE 2003)*, Montreal, Quebec, Canada, pp. 164–173, Oct. 6–10 2003.
37. “Regression Testing of GUIs,” Atif M. Memon and Mary Lou Soffa, *Proceedings of the 9th ACM/IEEE European Software Engineering Conference (ESEC) and 11th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE-11)*, Helsinki, Finland, pp. 118–127, Sep. 1-5, 2003.
38. “DART: A Framework for Regression Testing Nightly/Daily Builds of GUI Applications,” Atif M. Memon, Ishan Banerjee[†], Nada Hashmi[†] and Adithya Nagarajan[†], *Proceedings of the IEEE International Conference on Software Maintenance 2003 (ICSM 2003)*, Amsterdam, The Netherlands, Sep. 22–26, 2003, pp. 410–419.
39. “Automatically Testing Nightly/Daily Builds of GUI Applications,” Atif M. Memon, Ishan Banerjee[†], Nada Hashmi[†] and Adithya Nagarajan[†], *Proceedings of the IEEE International Conference on Dependable Systems and Networks (DSN 2003)*, San Francisco, CA, USA, June 22–25, 2003, pp. B-8–B-9.
40. “Coverage Criteria for GUI Testing,” Atif M. Memon, Mary Lou Soffa and Martha E. Pollack, *Proceedings of the 8th European Software Engineering Conference (ESEC) and 9th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE-9)*, Vienna University of Technology, Austria, Sep. 10–14, 2001, pp. 256–267.
41. “Survivability Performance Evaluation of an Optical Switch,” M. Guizani and Atif M. Memon, *Proceedings of the IEEE Global Telecommunications Conference, 2000. (GLOBECOM 2000)*, San Francisco, CA, USA, Nov. 27–Dec. 1, 2000, pp. 1192–1195.
42. “Automated Test Oracles for GUIs,” Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, *Proceedings of the ACM/IEEE Eighth International Symposium on the Foundations of Software Engineering (FSE-8)*, San Diego, CA, USA, Nov. 6–10, 2000, pp. 30–39.
43. “A Planning-Based Approach to GUI Testing,” Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, *Proceedings of the 13th International Software/Internet Quality Week (QW 2000)*, San Francisco, CA, USA, May 30–June 2, 2000.
44. “Plan Generation for GUI Testing,” Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, *Proceedings of the Fifth AAAI International Conference on Artificial Intelligence Planning and Scheduling (AIPS 2000)*, Breckenridge, CO, USA, Apr. 15–17, 2000, pp. 226–235.
45. “Using a Goal-driven Approach to Generate Test Cases for GUIs,” Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, *Proceedings of the 21st ACM/IEEE International Conference on Software Engineering (ICSE 1999)*, Los Angeles, CA, USA, May 16-22, 1999, pp. 257–266.
46. “Throughput Analysis of a Fault-Tolerant Switch,” Atif M. Memon, M. Guizani, and M. Benten, *Proceedings of the 15th IEEE International Phoenix Conference on Computers and Communications (IPCCC 1996)*, Phoenix, AZ, USA, Mar. 27-29, 1996, pp. 206–210.

47. “Optical Design of a Fault-Tolerant Self-Routing Switch for Massively Parallel Processing Networks,” M. Guizani, Atif M. Memon, and S. Ghanta, *Proceedings of the IEEE Second International Conference on Massively Parallel Processing using Optical Interconnections (ICMPP 1995)*, San Antonio, TX, USA, Oct. 22-24, 1995, pp. 246–253.
48. “An Optical Architecture for Edge Detection,” Atif M. Memon, S. Ghanta, and M. Guizani, *Proceedings of the Seventh IASTED International Conference on Parallel and Distributed Computing and Systems*, Georgetown University, Washington D.C., USA, Oct. 18-21, 1995, pp. 459–462.
49. “Design and Implementation Tools for Optical Architectures,” Atif M. Memon, M. Guizani, and S. Ghanta, *Proceedings of the Fourth Saudi Engineering Conference*, Jeddah, Saudi Arabia, Nov. 5-8, 1995, pp. 437–442.
50. “A Functional Approach for Simulation of Optical Architectures,” Atif M. Memon, M. Guizani, and S. Ghanta, *Proceedings of the First LAAS International Conference on Computer Simulation*, Beirut, Lebanon, Sep 1-4, 1995, pp. 175–181.
51. “Thinning of Arabic Text,” Atif M. Memon and S. Faizullah, *Proceedings of the 9th International Symposium on Computer and Information Sciences (ISCIS IX)*, Antalya, Turkey, Nov, 1994, pp. 689–696.
52. “ZERAK : A Neural Network Model for Arabic Characters Recognition,” S. Faizullah and Atif M. Memon, *Proceedings of the 9th International Symposium on Computer and Information Sciences (ISCIS IX)*, Antalya, Turkey, Nov, 1994, pp. 501–507.

†Indicates a student advised, co-advised, or directly supervised by Dr. Memon.

2.4 TALKS, ABSTRACTS, TUTORIALS, AND OTHER PROFESSIONAL PAPERS PRESENTED

2.4.1 INVITED TALKS

- Automated Model-Based Testing of Event-driven Software Applications, Tata Consultancy Services, (TCS), Chennai, India, Dec. 16, 2009.
- Automated Model-Based Testing of Event-driven Software Applications, Tata Research Development and Design Centre (TRDDC), Pune, India, Nov. 6, 2009.
- Automated Model-Based Testing of Event-driven Software Applications, Institute of Software, Chinese Academy of Sciences (ISCAS), China, Sep. 24, 2008.
- Software Quality and GUITAR, Sichuan University in Chengdu, China, Sep. 11, 2008.
- Automated Model-Based Testing of Event-driven Software Applications, Sichuan University in Chengdu, China, Sep. 11, 2008.
- Automated Model-Based Testing of Event-driven Software Applications, IEEE Computer Society of Pakistan, June 24, 2008.

- National University of Emerging and Computing Sciences, “New Trends in Software Testing,” June 21, 2008.
- Information Technology Laboratory (ITL) seminar on “Testing Event-Driven Systems” at the National Institute of Standards & Technology, Mar. 5, 2008.
- Google Test Automation Conference, Aug. 23–24, 2007.
- Automated Model-Based Testing of Event-driven Software Applications, Accenture Technology Labs, Chicago, May 11, 2007.
- Testing Event-driven Software Applications – Issues, Challenges, and Solutions, IEEE Computer Society – Kitchener-Waterloo Chapter and the Department of Electrical and Computer Engineering, University of Waterloo, Mar. 17, 2006.
- Testing Event-driven Software, Department of Computer Science, Drexel University, Feb. 11, 2005.
- Enhancing Testing Techniques for Event-driven Software Applications, 2004 University of Washington and Microsoft Research Summer Institute, Trends in Testing: Theory, Techniques and Tools, Aug. 22–26, 2004.
- Event-driven Software Testing, NASA Goddard Space Flight Center (GSFC), in the Technology Education & Assessment Seminars (TEAS) series, July 13, 2004.
- Techniques and Tools for Testing Event-Driven Software, TECH 2004, Mar. 19, 2004.
- Testing Event-driven Software, Microsoft Research, Mar. 12, 2004.
- Testing Event-driven Software, Reliability Engineering Department, University of Maryland, Mar. 4, 2004.
- Testing Event-driven Software, Department of Information and Software Engineering, George Mason University, Mar. 3, 2004.
- Testing Event-driven Software, Fraunhofer IESE, Kaiserslautern, Germany, Feb. 19, 2004.
- Software Quality and GUITAR, National Institutes of Health, Dec. 1, 2003.
- Event-based Software Testing, Avaya Labs Research, June 12, 2003.
- Event-based Software Testing, Titan Corporation, May 14, 2003.
- Testing Graphical User Interface Software, NASA Goddard Tech Summit, Apr. 23, 2002.
- A Comprehensive Framework for Testing Graphical User Interfaces, National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, Jan. 8, 2002.
- A Comprehensive Framework for Testing Graphical User Interfaces, IBM Thomas J. Watson Research Center, Jan. 22, 2001.
- A Comprehensive Framework for Testing Graphical User Interfaces, Department of Computer and Information Science, Ohio State University, Feb. 8, 2001.
- A Comprehensive Framework for Testing Graphical User Interfaces, Department of Computer and Information Sciences, University of Delaware, Feb. 20, 2001.

- A Comprehensive Framework for Testing Graphical User Interfaces, Lucent Technologies, Columbus, Feb. 23, 2001.
- A Comprehensive Framework for Testing Graphical User Interfaces, Department of Computer Science, University of Maryland, Feb. 28, 2001.
- A Comprehensive Framework for Testing Graphical User Interfaces, Department of Computer Science and Engineering, Pennsylvania State University, Mar. 20, 2001.
- A Comprehensive Framework for Testing Graphical User Interfaces, Department of Electrical and Computer Engineering, University of Texas at Austin, Mar. 27, 2001.
- A Comprehensive Framework for Testing Graphical User Interfaces, College of Computing, Georgia Institute of Technology, Apr. 2, 2001.
- A Comprehensive Framework for Testing Graphical User Interfaces, Department of Information and Computer Science, University of California, Irvine, Apr. 9, 2001.
- A Comprehensive Framework for Testing Graphical User Interfaces, Department of Computer Science, University of Southern California, Los Angeles, Apr. 10, 2001.
- Coverage Criteria for GUI Testing, Fraunhofer Center for Experimental Software Engineering, College Park, Maryland, Sep. 17, 2001.

2.4.2 ARTICLES IN MAGAZINES

1. "Mathematica: for Engineers, Scientists, and Educators ," Atif M. Memon and S. Ghanta, *Newsletter of the Information Technology Center, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*, 1994.

2.4.3 OTHER PUBLICATIONS

1. "A Comprehensive Framework for Testing Graphical User Interfaces," Atif M. Memon, *Ph.D. Dissertation, Department of Computer Science, University of Pittsburgh, July, 2001*.
2. "Comparing Causal-Link and Propositional Planners: Tradeoffs between Plan Length and Domain Size," Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, *Technical Report TR-99-06, Dept. of Computer Science, University of Pittsburgh, Pittsburgh, Feb. 1999*.
3. "A System for Prototyping Optical Architectures," Atif M. Memon, *A Thesis Presented to the Faculty of College of Graduate Studies, Department of Information and Computer Science, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, Dec. 20, 1995*.

2.4.4 POSTERS

- Capture/Replay Tool For Testing GUIs, Research Review Day, University of Maryland, Mar. 21, 2003.

- GUITAR - Graphical User Interface Testing Framework, Research Review Day, University of Maryland, Mar. 21, 2003.
- DART: Daily Automated Regression Tester, Research Review Day, University of Maryland, Mar. 21, 2003.
- GUI Ripper: A Tool to Extract GUI Widgets and Windows, Research Review Day, University of Maryland, Mar. 21, 2003.
- Structural Representations of GUI Events for Testing and Analysis, Research Review Day, University of Maryland, Mar. 1, 2002.
- A Planning-Based Approach to Testing GUIs, Research Review Day, University of Maryland, Mar. 1, 2002.
- Automated Test Oracles for GUIs, Research Review Day, University of Maryland, Mar. 1, 2002.
- Determining the Adequacy of GUI Test Cases, Research Review Day, University of Maryland, Mar. 1, 2002.
- A comprehensive framework for GUI testing, Research Review Day, University of Pittsburgh, Dec. 15, 2000.

2.5 CONTRACTS AND GRANTS

- **TITLE:** “Evaluating the Software Engineering Process at OIT”
RECEIPIENT INSTITUTION: *MINDLAB-UMIACS*
FUNDING AGENCY: *Office of Information Technology*
AMOUNT: \$25,000
DATES: June 1, 2005
ROLE: PI.
- **TITLE:** “ A Testbed for Assuring the Quality of DoD Combat”
RECEIPIENT INSTITUTION: *CS Department*
FUNDING AGENCY: *DOD - Navy.ONR*
AMOUNT: \$206,000
DATES: May 1, 2005 (1 year)
ROLE: Co-PI with Adam Porter.
- **TITLE:** “CAREER AWARD: Enhancing Testing Techniques for Event-driven Software”
RECEIPIENT INSTITUTION: *CS Department*
FUNDING AGENCY: *National Science Foundation*
AMOUNT: \$400,000
DATES: Feb. 15, 2005 (5 years)
ROLE: Principal Investigator.
- **TITLE:** “One-day Workshop on Introduction to Software Testing”
RECEIPIENT INSTITUTION: *UMIACS*
FUNDING AGENCY: *Hughes Network Systems*
AMOUNT: \$10,000

DATES: June 20, 2003

ROLE: Instructor.

- **TITLE:** “A GUI Testing Framework in Agile Software Development Methods”
RECEIPIENT INSTITUTION: *Fraunhofer Center for Experimental Software Engineering*
FUNDING AGENCY: *Fraunhofer USA, Inc and Fraunhofer Center for Experimental Software Engineering*
AMOUNT: \$80,562 (Fraunhofer USA, Inc) plus \$21,450 (Fraunhofer Center for Experimental Software Engineering)
DATES: May 1, 2002 – Apr. 30, 2003
ROLE: Scientist.

2.6 FELLOWSHIPS, PRIZES, AND AWARDS

- National Science Foundation CAREER Award (2005).
- Best paper award – The Australian Software Engineering Conference (ASWEC 2004).
- The CS department post-proposal graduate research award, Department of Computer Science, University of Pittsburgh (2001).
- Andrew Mellon Pre-doctoral Fellowship for the second year (2000-2001).
- Chancellor’s Honor Roll, University of Pittsburgh (2000-2001).
- Andrew Mellon Pre-doctoral Fellowship (1999-2000).
- Chancellor’s Honor Roll (1999-2000).
- KFUPM Scholarship for entire M.S. period (1993-1996).
- Gold Medal in B.S., University of Karachi (1992).

2.7 EDITORSHIPS, EDITORIAL BOARDS, AND REVIEWING ACTIVITIES

2.7.1 EDITORIAL BOARDS

- *Journal of Software Testing, Verification and Reliability (STVR)*.
- *The Open Software Engineering Journal (OSE)*.
- *Canadian Journal of Pure and Applied Sciences (CJPAS)*.

2.7.2 REVIEWING ACTIVITIES FOR JOURNALS

- *ACM Transactions on Programming Languages and Systems (TOPLAS)*
- *ACM Transactions on Software Engineering and Methodology (TOSEM)*
- *IEEE Software*

- *IEEE Computer*
- *IEEE Transactions on Software Engineering (TSE)*
- *Parallel Computing*
- *Software: Practice & Experience*
- *Software Testing, Verification & Reliability Journal*
- *Software Quality Journal*
- *Information & Software Technology, Elsevier*

2.7.3 REVIEWING ACTIVITIES FOR REFEREED CONFERENCES

- International Conference on Software Engineering, 2006.
- The International Conference on Dependable Systems and Networks.
- International Conference on Software Engineering, Artificial Intelligence, Networking, Parallel/Distributed Computing.
- European Conference on Planning (ECP).
- International Static Analysis Symposium (SAS).
- International Conference on Parallel Architectures and Compilation Techniques (PACT).
- International Symposium on the Foundations of Software Engineering (FSE).
- Software Technology Conference (STC).

2.7.4 REVIEWING ACTIVITIES FOR BOOKS

- *Building Quality into COTS Components – Testing and Debugging*, edited by Sami Beydeda and Volker Gruhn.
- *How to Break Security; A Practical Guide to Testing Your Software's Security*, by James Whitaker and Herbert H. Thompson.
- *The Information Systems Group Project* by David A. Deeks, Pearson Education.

2.7.5 EDITING ACTIVITIES FOR BOOKS

- *Editor:* Proceedings of The 2004 IEEE International Conference on Information Reuse and Integration.
- *Associate Editor:* Proceedings of The 2003 IEEE International Conference on Information Reuse and Integration.
- *Guest Associate Editor:* IEEE Transactions on Software Engineering, Oct. 2003.

2.8 RESEARCH SOFTWARE

- **GUITAR:** Software testing is a critical component of the software development process and is required to ensure the safety, robustness and usability of software. Unfortunately, it is also complex, labor intensive and expensive, accounting for almost 67% of the total cost of software development. Hence, there has been significant research aimed at automating the testing process. Although automation has achieved some success, many problems remain. In particular, it is not yet clear how to automate the testing of graphical user interfaces (GUIs), which constitute an increasingly large portion of software systems (almost 50% of the total software code). The focus of my research is automated model-based testing of event-driven software; GUIs constitute one of the most popular sub-class of event-driven software. Most of the new techniques that I have developed for GUI testing have been implemented in a downloadable software called GUITAR.

GUITAR has been downloaded by over 2500 users from all over the world, mostly from software development companies. Some of the features that make GUITAR usable are a help menu, a bug database powered by Bugzilla, user manuals, and FAQs. I have given seminars on GUITAR at numerous locations including NASA Goddard Space Flight Center (aaaproduct.gsfc.nasa.gov/teas), Microsoft Research (research.microsoft.com), The National Institutes of Health (www.nih.gov), Fraunhofer Center for Experimental Software Engineering (fc-md.umd.edu), The Titan Corporation (www.titan.com), Avaya Labs Research (www.avaya.com), and Hughes Network Systems (www.hns.com). It was recently exhibited at CeBIT (www.cebit-america.com), a huge marketplace for software vendors and exhibitors.

Users of GUITAR regularly report bugs via a bug database, maintained at bugs.cs.umd.edu. The GUITAR web-site serves as a discussion group; users are constantly informed of updates via a mailing list. Numerous practitioners have provided short-cuts to the GUITAR web-site through their own sites. Two popular examples include **Software QA Testing and Test Tool Resources** (www.aptest.com/resources.html) and **DACS - Data & Analysis Center for Software - DACS - Software** (www.dacs.dtic.mil/databases/url/key.php?keycode=3494:3500).

- **ICE:** In order to preserve the effectiveness of the World Wide Web (WWW) as a communication medium, web developers must have a keen understanding of how pages within their website are rendered to the diversely equipped Web audience. More specifically, since users explore the WWW with a wide variety of browser, browser version, and platform configurations, the display of individual web pages can be significantly different based on the actual browsing environment. Such differences can essentially threaten the ability for pages to be displayed and to function as the author intended resulting in documents with missing elements, improper text alignments, and malfunctioning scripts. Given that web page rendering is largely based on the tags that are contained within the HTML source code for the document and the relative support for a tag within a browsing environment, our approach to identifying page-to-browser compliancy issues is to scan the document source for the presence of tags known to be unsupported within specific browser/version/platform environments. As a result of our work, we have created a tool, the Internet Compliance Evaluator (ICE), that will evaluate compliancy for an entire website based on both predefined and, when necessary, user-specified sets of rules that specify the tags that are unsupported within specific environments. The ability of the tool to accept user-defined rules allows it to be much more flexible than current page-browser compliancy tools and, subsequently, more equipped to deal with newer compliancy rules as they evolve.
- **TerpOffice:** One of the biggest problems with software testing research is the unavailability of standard “benchmarks” for experimentation and evaluation of new testing techniques. To alleviate

this problem, I have developed an OpenSource office suite software called TerpOffice for evaluation of new GUI testing techniques. TerpOffice is being used by numerous researchers for their experiments. For example, Amir Michail and Tao Xie recently used TerpOffice for their experiments reported in a paper entitled “Helping Users Avoid Bugs in GUI Applications,” published in the Proceedings of the 27th International Conference on Software Engineering (ICSE 2005), St. Louis, Missouri, USA, pp. 107-116, May 2005.

To enable maximum dissemination, extra meta and derived information is also maintained as shared artifacts. These shared artifacts have evolved as demanded by researchers. For example, some researchers wanted to use only the source code; other more advanced researchers, wanted to have access to the software’s requirement and design documents to make changes to it; yet others wanted to replicate experiments by using my fault-seeded versions of the software subjects. Consequently, I have made available requirements and design documents, source code, documents describing what the software does, how to use and modify it, development and evolution artifacts such as bug reports, results of experiments, derived artifacts such as event-flow graphs, test cases and tools such as test-case re-players, and fault-seeded versions of the code.

- **OpticalCAD** is a system that I developed during my MS Thesis for prototyping optical architectures. Users of OpticalCAD can describe an optical architecture setup involving optical components (such as lenses, holograms, mirrors, lasers) in an Optical Hardware Description Language (OHDL) that I developed. OpticalCAD carries out discrete event simulation of the optical architecture and reports problems (such as stray laser beams) and output.

3 TEACHING and ADVISING

3.1 COURSES

3.1.1 SPECIALIZED COURSES

Semester	Course	# Students	Description
Spring, 2008	CMSC 737	19	Fundamentals of Software Testing
Fall, 2007	CMSC 330 (Sec. 02**)	41	Organization of Programming Languages
Fall, 2007	CMSC 330 (Sec. 01**)	34	Organization of Programming Languages
Spring, 2007	CMSC 433	42	Programming Language Technologies and Paradigms
Fall, 2006	CMSC 737	10	Fundamentals of Software Testing
Spring, 2006	CMSC 435	15	Software Engineering
Fall, 2005	CMSC 838M	4	Advanced Concepts in Software Testing
Spring, 2005	CMSC 435	38	Software Engineering
Fall, 2004	CMSC 838M	6	Advanced Concepts in Software Testing
Spring, 2004	CMSC 435	38	Software Engineering
Fall, 2003	CMSC 838M	8	Advanced Concepts in Software Testing
Spring, 2003	CMSC 435	42	Software Engineering
Fall, 2002	CMSC 838M	15	Advanced Concepts in Software Testing
Spring, 2002	CMSC 435	50	Software Engineering
Fall, 2001	CMSC 838M	19	Advanced Concepts in Software Testing

3.1.2 INDEPENDENT STUDY

Semester	Course	# Students	Description
Spring, 2008	CMSC 499A	1	Independent Undergraduate Research
Spring, 2008	CMSC 498A	1	Research and Learning
Fall, 2003	CMSC 498A	9	Research and Learning

3.2 COURSES OR CURRICULUM DEVELOPMENT

3.2.1 CMSC433 – Programming Language Technologies and Paradigm

- Traditionally this course has discussed advanced object-oriented programming concepts, restricted to the Java programming language. This course examines different programming paradigms – Object-oriented programming (OOP), logic programming, and functional programming. Due to its popularity, the OOP paradigm is discussed in detail, focusing on existing and emerging technologies used to implement object-oriented programs. Examples include UML, Design Patterns, Aspect-oriented Programming (AOP), refactoring, JUnit, and JavaDoc. The OOP paradigm can be significantly inefficient in certain domains and applications; some of these applications are examined and alternative paradigms like logic programming and functional programming studied. By the end of this course, students are familiar with the state-of-the-art in programming paradigms and associated technologies.

3.2.2 CMSC435 – Software Engineering

- Traditionally, the software engineering course has been taught with a practical component in which the students had to implement a project using software engineering principles. I have made significant modifications to the course by adding many lectures on software testing and revising the course project. The entire class represents a company (named TerpSoft) developing an office suite called TerpOffice. The first phase of the project requires the students to perform extensive regression testing of the existing version of TerpOffice. They then build a new version in subsequent phases and finally test it in the last phase of the project. The class is divided into groups, each working on a relatively independent part of TerpOffice (TerpManager, TerpDraw, TerpWord, TerpPresent, TerpSpreadSheet, and TerpPaint). Each group is further divided into the coding and testing team, with the project manager serving on the testing team. The students use testing tools to create thousands of test cases; they instrument the software's code and compute statement and branch coverage; they report all bugs using Buzilla (bugs.cs.umd.edu) and document their code using JavaDoc. CMSC435 has now become an extremely popular course since students are excited to learn new tools that they have never used before and are likely to use in the future.

3.2.3 CMSC838M – Advanced Topics in Software Testing

- I have developed (and taught five times) a new course that examines advanced software testing techniques. In particular, the important phases of testing are reviewed, emphasizing on the significance of each phase when testing different types of software. Students learn the state of the art in testing technology for object-oriented, component-based, concurrent, distributed, graphical-user

interface, and web software. In addition, closely related concepts such as model checking and program analysis are also studied. Emerging concepts such as test-case prioritization and their impact on testing are examined. Students gain hands-on testing/analysis experience by proposing new solutions to open research problems in the field of software testing and experimentally demonstrate the strengths/weaknesses of their solutions.

3.2.4 CMSC737 – Fundamentals of Software Testing

- I have also developed a new course that examines the fundamental concepts in software testing. In particular, the important phases of testing are reviewed, emphasizing on the significance of each phase when testing different types of software. Students gain hands-on testing/analysis experience by using popular testing tools and creating test cases for several types of software.

3.2.5 Other Universities

- Lecturer at the King Fahd University (1995-1996) Taught the undergraduate data structures course independently. Also team-taught an introductory computer science course.
- Lecturer at the University of Karachi (1992-1993) Taught the undergraduate data structures course, with programming projects. Also taught labs for the digital computer logic course, which involved setting up a digital logic lab for conducting experiments.

3.3 ADVISING: RESEARCH DIRECTION

3.3.1 UNDERGRADUATE

- Adil Bukhari (2009; via the undergraduate research assistant program)
- Chong Kok Hoong (2009; via the undergraduate research assistant program)
- Oluwaseun Akinmade (2008; Independent study)
- Sean Spencer (2008; Independent study after taking my Organization of Programming Languages (CMSC330) course)
- Adesh Francis (2007; Independent study after taking my Programming Language Technologies and Paradigms (CMSC433) course)
- Daniel Hackner (2007; Independent study after taking my Programming Language Technologies and Paradigms (CMSC433) course)
- Timopheyy Zaitsev (2007; Independent study after taking my Programming Language Technologies and Paradigms (CMSC433) course)
- Alexei Ivanov (2004; Independent study after taking my Software Engineering Course CMSC435)
- Chihiro Hirai (2004; via the Undergraduate Research Assistant Program (URAP - <http://www.ugresearch.umd.edu>))
- Lai Ho (2003; via the Undergraduate Research Assistant Program)

- Zhou Luoyan (2003; via the Undergraduate Research Assistant Program)
- April Ahn (2003; via the Undergraduate Research Assistant Program)
- Serey Lay (2003; Independent study after taking my Software Engineering Course CMSC435)
- Eric L. Liu (2003; Independent study after taking my Software Engineering Course CMSC435)
- Devmann Lee (2003; Independent study after taking my Software Engineering Course CMSC435)
- Gilad Suberri (2002; via the Undergraduate Research Assistant Program)
- Richard Dill (2002; Independent study after taking my Software Engineering Course CMSC435)
- Divya Ravi (2002; via the Undergraduate Research Assistant Program)
- Won Sun Ouh (2002; Independent study after taking my Software Engineering Course CMSC435)
- Sureshmi Dilushika Wijewardena (2002; via the Undergraduate Research Assistant Program)

3.3.2 MASTER'S

- Shashvat Thakor, 2008.
- Cyntrica Eaton, Spring 2004. (Currently PhD student at Maryland.)
- Scott McMaster, Spring 2004. (Currently PhD student at Maryland.)
- Ishan Banerjee, August 2003. Worked at AskJeeves.com; Currently at VMWare.
- Adithya Nagarajan, August 2003. Currently at Microsoft.

3.3.3 DOCTORAL

- Qing Xie (graduated August 25, 2006, joining the Accenture Technology Labs, Chicago).
- Cyntrica Eaton (graduated in Fall 2007).
- Scott McMaster (graduated in Spring 2008).
- Xun Yuan (graduated in Summer 2008).
- Jaymie Strecker (current).
- Penelope Brookes (current).

3.4 ADVISING: NON-RESEARCH DIRECTION

3.4.1 GRADUATE (PH.D. COMMITTEE)

Robin, current (Michel Cukier, advisor).

Il-Chul Yoon, current (Alan Sussman, advisor).

Edward Z. Pan, current (Jim Reggia, advisor).

Chuk-Yang Seng, current (Bill Arbaugh, advisor).

Juan-Pablo Hourcade, graduated (Ben Bederson, advisor).

Jeff Carver, graduated 2005 (Vic Basili, advisor).

Okhtay Ilghami, graduated 2006 (Dana Nau, advisor).

Ugur Kuter, current (Dana Nau, advisor).

Fusun Yaman, graduated 2006 (Dana Nau, advisor).

Tamer M. Elsharnouby, graduated (Shankar, advisor).

Cemal Yilmaz, graduated 2005 (Adam Porter, advisor).

David Hovemeyer, graduated 2005 (Bill Pugh, advisor).

3.4.2 MASTER'S SCHOLARLY PAPERS

- Cyntrica Eaton. *“Improving Web-site Compliance.”*
- Scott McMaster. *“Call-stack Coverage for Test-suite Reduction.”*

3.4.3 ACADEMIC ADVISING

- Nick Kuilema.

4 SERVICE

4.1 PROFESSIONAL

4.1.1 REVIEWING ACTIVITIES FOR AGENCIES

- Served on an NSF proposals' review panel, 2009.
- National Academy of Sciences panelist in the area of Computer Science and Information Technology, Pakistan-U.S. Science and Technology Cooperative Program, sponsored by United States Agency for International Development (USAID), 2009.

- National Academy of Sciences panelist in the area of Computer Science and Information Technology, Pakistan-U.S. Science and Technology Cooperative Program, sponsored by United States Agency for International Development (USAID), 2008.
- Served on an NSF SEL CAREER proposals' review panel, 2007.
- National Academy of Sciences panelist in the area of Computer Science and Information Technology, Pakistan-U.S. Science and Technology Cooperative Program, sponsored by United States Agency for International Development (USAID), 2007.
- Reviewed a proposal for the Natural Sciences and Engineering Research Council, Canada, 2006.
- Served on an NSF research proposals' review panel, 2004.
- Reviewed a research proposal for the Swedish Research Council (VR), 2003.

4.1.2 OTHER NON-UNIVERSITY COMMITTEES

- PhD Symposium Chair: The 3rd IEEE International Conference on Software Testing Verification and Validation (ICST'10), 2010.
- General Chair of First International Workshop on TESTing Techniques & Experimentation Benchmarks for Event-Driven Software: TESTBEDS 2009 – GUI Testing.
- Program Committee: ICSM 2009, the 25th IEEE International Conference on Software Maintenance. The conference will be held on September 20-26, 2009, in Edmonton, Alberta, Canada.
- Program Committee: WWW 2009 Web Engineering Track (<http://www2009.org/calls/webeng.html>). WWW 2009 will be held in Madrid, Spain, from 20 to 24 April 2009.
- Program Committee: Testing Academic & Industrial Conference - Practice and Research Techniques (TAIC-PART), 4–6 Sep. 2009, at the Cumberland Lodge in Windsor, UK.
- Program Committee: VALID 2009, The First International Conference on Advances in System Testing and Validation Lifecycle. VALID 2009 is scheduled on September 20-25, 2009 - Porto, Portugal under SoftNet 2009 umbrella.
- Program Committee: ICSEA 2009, The Fourth International Conference on Software Engineering Advances. ICSEA 2009 is scheduled to be in Porto - Portugal, September 20-25, 2009.
- Program Committee ADVCOMP 2009, The Third International Conference on Advanced Engineering Computing and Applications in Sciences, Sliema - Malta, October 11-16, 2009.
- Program Committee: (SNPD 2009) The 10th ACIS International Conference on Software Engineering, Artificial Intelligence, Networking, and Parallel/Distributed Computing is sponsored by ACIS in cooperation with IEEE, Catholic University of Daegu and the Korean Society for Internet Information, 2009.
- Program Committee: Ninth International Conference on Quality Software (QSIC 2009), Jeju, Korea, August 24-25, 2009.

- Program Committee Member for the Software Engineering Symposium, a part of the 2009 World Congress on Computer Science and Information Engineering, March 31-April 2, 2009, Los Angeles/Anaheim.
- Program Committee for 8th IEEE/ACIS International Conference on Computer and Information Science in 2009. ICIS 2009 will be held in Shanghai, China, on June 1-3, 2009.
- International Program Committee ICISOFT 2009: 4th International Conference on Software and Data Technologies, 2009.
- International Program Committee for The 7th ACIS International Conference on Software Engineering Research, Management and Applications (SERA2009). Sponsored by International Association for Computer and Information Science (ACIS). SERA 2009 will be held on Hainan Island in the city of Haikou, China December 2-4, 2009.
- Program Committee Member for INTENSIVE 2009, The First International Conference on Intensive Applications and Services, Valencia, Spain, on April 21-25, 2009.
- Program Committee of WebTest 2009, the 1st International Workshop on Web Testing, to be held on April 1st or 4th, 2009, in co-location with ICST 2009 (Int. Conf. on Software Testing), Denver, Colorado, USA.
- Technical Program Committee: Second IEEE International Conference on Software Testing, Verification and Validation, ICST 2009.
- PhD Symposium Chair: The 2nd IEEE International Conference on Software Testing Verification and Validation (ICST'09), 2009.
- Program Committee: 2nd India Software Engineering Conference (ISEC 2009), to be held in Pune, India, Feb 25-28 2009.
- Program Committee: 30th International Conference on Software Engineering (ICSE 2008), Leipzig, Germany, May 10-18 2008.
- Program Committee: Testing Academic & Industrial Conference - Practice and Research Techniques (TAIC-PART), 29-31 August 2008, at the Cumberland Lodge in Windsor, UK.
- Program Committee: ICSM 2008, the 24th IEEE International Conference on Software Maintenance. The conference will be held on September 28 to October 4, 2008, in Beijing, China.
- Program Committee: Software Engineering Research, Management and Applications Conference (SERA 2008). SERA 2008 will be hosted by Charles University in Prague. The conference is scheduled for August 20-22, 2008.
- Program Committee: Third International Conference on Software and Data Technologies (ICISOFT 2008), Porto (Portugal), on July 2008. The conference is organized by INSTICC, co-sponsored by the Workflow Management Coalition (WfMC) in cooperation with the IICREST.
- Program Committee: 9th International Conference on Software Engineering, Artificial Intelligence, Networking, and Parallel/Distributed Computing in 2008 (SNPD 2008), Phuket, Thailand, on August 6 - 8, 2008.
- Program Committee: Eighth International Conference on Quality Software (QSIC 2008), Oxford, England, 12-13 August 2008.

- Technical Program Committee: International Conference on Software Engineering Advances (ICSEA 2008), October 26 - 31, 2008, Sliema, Malta.
- Program Committee: 7th IEEE/ACIS International Conference on Computer and Information Science (ICIS 2008), Portland, Oregon, May 14 - 16, 2008.
- Technical Program Committee: Second International Conference on Advanced Engineering Computing and Applications in Sciences (ADVCOMP 2008), Valencia, Spain, on September 29 - October 4, 2008.
- Program Committee: Second International Workshop on Software Test Evaluation (STEV 2008). Co-located with ICST 2008, which will take place in Lillehammer, Norway on April 9-11, 2008.
- Program Committee: Web Engineering Track of The 17th International World Wide Web Conference (WWW 2008), Beijing, China, April 21-25, 2008.
- Program Committee: Industry Track of the First IEEE International Conference on Software Testing, Verification and Validation (ICST 2008), 9-11 April 2008, in Lillehammer, Norway.
- Technical Program Committee: Research Track of the First IEEE International Conference on Software Testing, Verification and Validation (ICST 2008), 9-11 April 2008, in Lillehammer, Norway.
- Technical Program Committee: International Conference on Advanced Engineering Computing and Applications in Sciences (ADVCOMP 2007), Tahiti, French Polynesia, Nov. 4–9, 2007.
- Program Committee: First International Workshop on Software Test Evaluation, (STEV 2007), 11 October, 2007 Portland, Oregon, USA.
- Program Committee: 7th International Conference On Quality Software (QSIC 2007), 11-12, October, 2007 Portland, Oregon, USA.
- Program Committee: 5th IEEE International Conference on Software Engineering Research, Management and Applications (SERA2007) in conjunction with 1st International Workshop on Advanced Internet Technology and Applications (AITA2007) August 20 - 22, 2007 Haeundae Grand Hotel, Busan, Korea.
- Program Committee: 2007 International Workshop on Distance Education Technologies (DET 2007), San Francisco Bay, September 6–8, 2007, joint with the 2007 International Conference on Distributed Multimedia Systems (DMS 2007).
- Program Committee: 8th International Conference on Software Engineering, Artificial Intelligence, Networking, and Parallel/Distributed Computing (SNPD2007), Qingdao, China, July 25-27, 2007.
- Technical Program Committee: International Conference on Software Engineering Advances (ICSEA 2007), Cap Esterel, French Riviera, France, August 25-31, 2007.
- Program Committee: IEEE International Workshop on Testing for Emerging Software Technology (TEST 2007), part of the 31st International Computer Software and Applications Conference (COMPSAC).
- Program Committee: ICSM 2007, the 23th IEEE International Conference on Software Maintenance.
- Program Committee: Workshop on Integrating System Environments into Software Testing (WISEST 2007).

- Program Committee: First International Workshop on Model-Based Testing and Object-Oriented Systems (M-TOOS 2006), affiliated with OOPSLA 2006, Portland, OR, USA, Oct. 23, 2006.
- Program Committee: 6th International Conference On Quality Software (QSIC 2006), Beijing, China, Oct. 26-28, 2006.
- Technical Program Committee: International Conference on Software Engineering Advances (ICSEA 2006), Tahiti, French Polynesia, Oct. 29–Nov. 1, 2006.
- Program Committee: Doctoral Symposium of the 21st IEEE/ACM International Conference on Automated Software Engineering (ASE 2006), Tokyo, Japan, Sep. 18-22, 2006.
- Program Committee: Second International Workshop on Testing and Quality Assurance for Component-Based Systems (TQACBS 2006), in conjunction with COMPSAC 2006, Chicago, IL, USA, Sep. 18-21, 2006.
- Program Committee: Web Engineering Track of The Fifteenth International World Wide Web Conference (WWW 2006), Edinburgh, Scotland, May 23–26, 2006.
- Program Committee: 3rd ACIS International Conference on Software Engineering Research, Management & Applications (SERA 2005), Central Michigan University, Mount. Pleasant, Michigan, USA, Aug. 11–13, 2005.
- Technical Committee: First International Conference on Information and Communication Techniques (ICICT 2005), Karachi, Pakistan, Aug. 27–28, 2005.
- Program Committee: First International Workshop on Testing and Quality Assurance for Component-Based Systems (TQACBS 2005), in conjunction with COMPSAC 2005, Edinburgh, Scotland, July 25-28, 2005.
- Program Committee: International Workshop on Frontiers of Information Technology (FIT 2004), Islamabad, Pakistan, Dec. 20-21, 2004.
- Program Committee: Web Engineering Track of The Fourteenth International World Wide Web Conference (WWW2005), Chiba, Japan, May 10-14, 2005.
- Program Committee: The 1st International workshop on Web Quality (WQ 2004), in conjunction with the International Conference on Web Engineering (ICWE 2004), Munich, Germany, July 28-30, 2004.
- Program Committee: Net.ObjectDays 2004 Workshop – Testing Component-based Systems (TECOS 2004), Erfurt, Germany, Sep. 27-30, 2004.
- Program Committee: Building Quality into COTS Components – Testing and Debugging, a book edited by Sami Beydeda and Volker Gruhn, University of Leipzig, Germany.
- Session Chair: Platform and language-specific re-engineering, The 11th IEEE Working Conference on Reverse Engineering (WCRE 2004), Delft University of Technology, the Netherlands, Nov. 9-12, 2004.
- Program Committee: The 11th IEEE Working Conference on Reverse Engineering (WCRE 2004), Delft University of Technology, the Netherlands, Nov. 9-12, 2004.

- Program Committee: 5th International Conference on Software Engineering, Artificial Intelligence, Networking, and Parallel/Distributed Computing (SNPD2004), Beijing, China, June 30-July 2, 2004.
- Session Chair: The IASTED International Conference on ARTIFICIAL INTELLIGENCE AND APPLICATIONS (AIA 2004), Innsbruck, Austria, Feb. 16-18, 2004.
- Publications Chair: IEEE International Conference on Information Reuse and Integration (IRI 2004), Las Vegas, NV, USA, Nov. 8-10, 2004.
- Publications Chair: IEEE International Conference on Information Reuse and Integration (IRI 2003), Las Vegas, NV, USA, Oct. 27-29, 2003.
- Advisory Board: 15th International Internet & Software Quality Week (QW 2002), San Francisco, California, USA, Sep. 3-6 2002.
- Session Chair: Dynamic Program Analysis, Tenth International Symposium on the Foundations of Software Engineering (FSE-10), Charleston, SC, USA, Nov. 18-22, 2002.
- Program Committee: Tenth International Symposium on the Foundations of Software Engineering (FSE-10), Charleston, SC, USA, Nov. 18-22, 2002.
- Advisory Board: 14th International Internet & Software Quality Week (QW 2001), San Francisco, CA, USA, May 29-June 1 2001.

4.1.3 INTERNATIONAL ACTIVITIES

- Worked closely with instructors of the Department of Software Engineering at the Singapore Management University to improve their courses and projects.
- Advising two Masters students in Kabul, Afghanistan.

4.1.4 PAID CONSULTANCIES

- Worked at the Fraunhofer Center for Experimental Software Engineering. Participated in the following projects:
 - “DoD Software Intensive Systems (SIS) Experience Factory Support,” funded (\$310,000) by the *Office of the Under Secretary of Defense (OUSD) SIS*, (May 1, 2001-Apr. 30, 2003).
 - “GSFC Effort Estimation Process,” funded (\$134,000) by the *NASA Goddard*, (Aug. 1, 2003-Apr. 30, 2004).

4.2 CAMPUS

4.2.1 DEPARTMENT

- Member, Graduate admissions committee, 2009.
- Member, Middle States Evaluation Committee, 2008-2009.

- Member, Computer Lab Committee, 2008-2009.
- Teaching Evaluation Committee, 2008-2009.
- Dean's fellowships committee, 2008.
- APT reviewer for Vibha Sazwal, 2008.
- Member, Graduate admissions committee, 2008.
- Computational Biology faculty search committee, 2007.
- Dept. rep. PCC, 2007.
- Spoke at the Undergraduate Visit Day Reception – “Meet Our Family!!”, 2007. Topic: Programming Languages.
- Member, Graduate admissions committee, 2007.
- Spoke at the workshop for undergraduate students on the importance of graduate school, 2006. Topic: “The importance of doing research as an undergrad, and how to go about doing it.”
- Member, Computer Lab Committee, 2006-2007.
- Organized the discussion on Software Engineering with the CS Advisory Board, 2006.
- Member, committee for revising graduate course requirements, 2005-2006.
- Member, Graduate admissions committee, 2006.
- Spoke at the workshop for undergraduate students on the importance of graduate school, 2005. Topic: “The importance of doing research as an undergrad, and how to go about doing it.”
- Spoke at the AWC lecture to inform women about upcoming 400 level courses, 2005.
- Member, Department scholarships review committee, 2005.
- Member, Search Committee to fill Carole's Position in the Business Office, 2005.
- Member, Software Engr/Programming Languages/HCI field committee, 2001-present.
- Member, Computer Lab Committee, 2005-2006.
- Teaching Evaluation Committee, 2005.
- Graduate admissions committee, 2005.
- Spoke at the workshop for undergraduate students on the importance of graduate school, 2004. Topic: “The importance of doing research as an undergrad, and how to go about doing it.”
- Spoke at the AWC lecture to inform women about upcoming 400 level courses, 2004.
- Graduate Student Placement Committee, 2004.
- Teaching Evaluation Committee, 2004.
- IBM Student Fellowship Nomination Committee, 2003.

- Spoke at CMSC838G on “What is going on in Software Engineering.”
- Spoke at the workshop for undergraduate students on the importance of graduate school, 2003. Topic: “The importance of doing research as an undergrad, and how to go about doing it.”
- Spoke at the AWC lecture to inform women about upcoming 400 level courses, 2003.
- Teaching Evaluation Committee, 2003.
- Spoke at the AWC lecture to inform women about upcoming 400 level courses, 2002.
- Undergraduate Course Revision Committee, 2002.
- Member of departmental committee to recruit better quality graduate students, Fall 2001.
- Friday Faculty Lunch Coordinator, Fall 2001.
- President of Pakistan Students’ Association, University of Pittsburgh (1997-2001).
- President of Graduate Students’ Association, University of Pittsburgh (1999-2001).
- Vice President of Graduate Students’ Association, University of Pittsburgh (1998-1999).
- President of Graduate Students’ Association, University of Pittsburgh (1997-1998).
- Editor-in-Chief On-Line Magazine, University of Karachi (1990-1992).
- Editor On-Line Magazine, University of Karachi (1989-1990).

4.2.2 COLLEGE

- Spoke at the Undergraduate Visit Day.
- Member, Organizing committee for Software Day event, 2007.
- Member, Organizing committee for Software Day event, 2006.
- Met with UMIACS External Review Committee, 2006.
- Met with visitors from Tata Consulting Services; discussed software engineering research projects at CS Maryland, 2005.
- Member: UMIACS APT Committee, 2004.
- Chair: UMIACS short courses committee, 2004.
- Participated in Strategic Directions in IT meeting, Nov 24, 2003.
- Member: UMIACS Director Search Committee, 2000–2001.

4.2.3 UNIVERSITY

- External Reviewer for the CMIT program, UMUC, 2008.
- Participated in a panel: CAREER proposal preparation workshop June 21, 2006.
- Member: HPCC Allocations/Advisory Committee, Office of Information Technology, 2006.

4.3 COMMUNITY

- Reviewer, Intel Science Talent Search, Dec. 8, 2007.
- Reviewer, Intel Science Talent Search, Dec. 8, 2006.
- Reviewed another book proposal for the Cambridge University Press, Sep. 15, 2006.
- Reviewed a book proposal for the Cambridge University Press, July 24, 2006.
- Reviewer, Intel Science Talent Search, Dec. 8, 2005.
- Developed and conducted a tutorial on software testing to employees at the National Institutes of Health, Mar. 22, 2004.
- Reviewer, Intel Science Talent Search, Dec. 4, 2004.
- Reviewer, Intel Science Talent Search, Dec. 6, 2003.
- Reviewed a book proposal for the Business Education Publishers Limited, Dec. 5, 2003.
- Chaired a meeting for managers at the National Institutes of Health to increase Software Quality awareness, Dec. 01, 2003.
- Developed and taught a short course on Software Testing at the National Institutes of Health, Aug. 05, 2003.
- Developed and conducted two one-day workshops on Software Quality Assurance for employees of the Hughes Network Systems, June 20, 2003.