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Research Interests

My research area is software engineering, currently focusing primarily on static and dynamic program analysis techniques towards improving developer productivity, software reliability and computer security. I am also interested in collaborative work technologies and "gameful" approaches to teaching computer science.

Education

PhD Computer Science, August 1985. MS Computer Science, December 1980. Carnegie Mellon University, Pittsburgh PA. PhD Dissertation: *Semantics for Structure Editing Environments*, advisor Nico Habermann.

ScB Computer Science and Engineering, June 1979. Massachusetts Institute of Technology, Cambridge MA. ScB Dissertation: *Automatic Extension of an Augmented Transition Network Grammar for Morse Code Conversations*, advisor Al Veza.

Professional Employment

September 1985 - present: Columbia University Department of Computer Science, New York NY. Professor, January 1998 - present. Associate Professor, January 1990 - December 1997. Tenure effective July 1992. Assistant Professor, September 1985 - December 1989.

August 2005 - August 2006 and June - August 2007: Columbia University Center for Computational Learning Systems, New York NY. Adjunct Senior Research Scientist.

July 2000 - August 2001: Activium Inc. (startup), New York NY. Strategic Technology Research Advisor, full-time summers, consulting academic year.

May - July 2000: Telcordia Technologies Applied Research, Morristown NJ. Academic Visitor.

June - August 1990 and June - August 1988: International Business Machines Thomas J. Watson Research Center, Hawthorne NY. Academic Visitor.

June - August 1986: Carnegie Mellon University Software Engineering Institute, Pittsburgh PA. Visiting Computer Scientist.

September 1979 - July 1985: Carnegie Mellon University Department of Computer Science, Pittsburgh PA. Graduate Research Assistant.

January-October 1983: Mindbank Inc. (startup), Pittsburgh PA. Project Director, half-time.

June 1981 - November 1984: Siemens Corporate Research, Princeton NJ. Member of Technical Staff, full-time summers, consulting during academic years.

February 1978 - August 1979: Massachusetts Institute of Technology Laboratory for Computer Science, Cambridge MA. Division of Sponsored Research Staff Member, full-time June - August 1979, part-time (casual) February 1978 - May 1979.

Honors and Awards

ACM SIGSOFT Distinguished Paper Award. "Identifying Functionally Similar Code in Complex Codebases", by Fang-Hsiang Su, Jonathan Bell, Gail Kaiser, and Simha Sethumadhavan, *24th IEEE International Conference on Program Comprehension*, May 2016. This was one of two best paper awards from ICPC 2016.

People's Choice Award for Best Position Paper, "Challenges in Behavioral Code Clone Detection", by Fang-Hsiang Su, Jonathan Bell, and Gail Kaiser. *10th International Workshop on Software Clones*, March 2016.

ACM SIGSOFT Distinguished Paper Award, "Unit Test Virtualization with VMVM", by Jonathan Bell and Gail Kaiser. *36th International Conference on Software Engineering*, June 2014.

Invited Panelist on "*Future directions and open problems*" at the NSF and Microsoft sponsored *Future of Software Engineering Symposium*, July 2013. Video at <http://research.microsoft.com/apps/video/default.aspx?id=199240> (the panel part starts at about 1:04 hours in).

Best Paper Award, "Application of Metamorphic Testing to Supervised Classifiers", by Xiaoyuan Xie, Joshua Ho, Christian Murphy, Gail Kaiser, Baowen Xu and Tsong Yueh Chen. *9th International Conference on Quality Software*, August 2009.

Best Student Paper Award, "Adaptive Internet Interactive Team Video", by Dan Phung, Giuseppe Valetto and Gail Kaiser. *4th International Conference on Web-based Learning*, August 2005.

Best Student Poster Award, "Extracting Content To Improve Accuracy for HTML Content Extraction", by Suhit Gupta, Gail Kaiser and Salvatore Stolfo, *14th World Wide Web Conference*, May 2005.

Invited Speaker (of 3), "Kinesthetics eXtreme: An External Infrastructure for Monitoring Distributed Legacy Systems", *5th Annual International Active Middleware Workshop* (aka *Autonomic Computing Workshop*), June 2003.

Best Paper Finalist (of 5) and Best Student Paper Finalist (of 2), "DOM-Based Content Extraction of HTML Documents", by Suhit Gupta, Gail Kaiser, David Neistadt and Peter Grimm, *12th International World Wide Web Conference*, May 2003.

Invited Speaker, "Autonomizing Legacy Systems", *2002 IBM Almaden Institute Symposium on Autonomic Computing*, April 2002.

Program Committee Chair, *3rd ACM SIGSOFT Symposium on Foundations of Software Engineering* (FSE), October 1995.

Keynote Address, "Marvelous Support for Semi-Structured Group Activities", *ACM Conference on Organizational Computing Systems*, November 1993.

Invited Speaker (of 3), "Rule-based Approaches to Software Process", *International Symposium on Logic Programming*, October 1993.

Vice-Chair for Operations, ACM Special Interest Group on Programming Languages (SIGPLAN), elected term 1991-1993.

ACM/SIGPLAN National Lecturer, 1989-1991.

Best Paper of Year, "Intelligent Assistance for Software Development and Maintenance", by Gail E. Kaiser, Peter H. Feiler and Steven S. Popovich, *IEEE Software*, 1988.

Presidential Young Investigator in Software Engineering and Software Systems (joint), National Science Foundation, 1988-1993.

Research Initiation Grant in Complex Information Systems (1 of 5), International Business Machines, 1988-1990.

Incentives for Excellence (faculty development award, 1 of 11), Digital Equipment Corporation, 1986-1989.

Graduate Fellowship, Fannie and John Hertz Foundation, 1980-1985.

Graduate Fellowship, National Science Foundation, 1980 (declined).

George E. Forsythe First Prize, "Automatic Extension of an ATN Knowledge Base", ACM Student Paper Competition (undergraduate), 1980-1981.

Computer Systems Prize (best undergraduate thesis in computer science), "Automatic Extension of an Augmented Transition Network Grammar for Morse Code Conversations", Massachusetts Institute of Technology Electrical Engineering and Computer Science Department, 1979.

Sigma Xi 1983. Tau Beta Pi 1979. Eta Kappa Nu 1978.

Grants and Contracts -- Government

NSF. SaTC: CORE: EAGER: Finding Semantic Security Bugs with Pseudo-Oracle Testing, CNS-1842456. With Baishahki Ray (PI) and Suman Jana. \$200,000 for October 2018 - September 2020.

NSF. SHF: Small: Preponderance of the Evidence for Behavioral Code Similarities, CCF-1815494. Sole PI. \$496,571 for October 2018 - September 2021.

GLCPC. Blue Waters Allocations for Broadening Participation in Petascale Parallel Computational Research: Materials Simulations in Geophysics. With Renata Wentzcovitch (PI) and Steve Nowick. May 1, 2018-April 30, 2019.

NSF. TWC: Medium: Toward Trustworthy Mutable Replay for Security Patches, CNS-1563555. PI, with Jason Nieh as co-PI. \$1,200,000 for September 1, 2016 - August 31, 2020.

NSF. SHF: Medium: Overcoming the Intuition Wall: Automatic Graphical Analysis of Programs to Discover and Program New Computer Architectures, CCF-1302269. With Simha Sethumadhavan (PI) and Tony Jebara. \$400,654 for September 1, 2013 - December 31, 2016.

NSF. SHF: Medium: Achieving Software Reliability without True Test Oracles, CCF-1161079. Sole PI. \$894,582 for September 1, 2012 - August 31, 2016.

NIH. Training Program in Computational Biology, 2T32GM082797-06. PI: Barry Honig. July 1, 2013 - June 30, 2016.

NIH. National Center for the Multiscale Analysis of Genomic and Cellular Networks II (MAGNet II), U54 CA121852. PI: Andrea Califano. \$18,709,230 for September 1, 2010 - July 31, 2015.

NSF. CSR: Medium: Guanyin: a Thousand hands with a Thousand eyes for Distributed Software Checking, CNS-0905246. With Junfeng Yang (PI) and Jason Nieh. \$1,012,000 for September 1, 2009 - August 31, 2014. Acceptance rate 15-20%.

NIH. Training Program in Computational Biology, 1T32GM082797-01. PI: Barry Honig. July 1, 2008 - June 30, 2013.

NSF. CSR-VCM: Autonomic Mechanisms for Reducing System Downtime due to Maintenance and Upgrades, CNS-0717544. With Jason Nieh (PI). \$350,000 for August 1, 2007 - July 31, 2010. Acceptance rate 10-15%.

New York State Office of Science, Technology and Academic Research, Center for Advanced Technology at Polytechnic University. Better Mutual Authentication. With Steven Bellovin (PI). \$50,000 for September 1, 2006 - June 30, 2007. (Matching for FSTC industry grant.)

NSF. CT-T: Enabling Collaborative Self-healing Software Systems, CNS-0627473. With Angelos Keromytis (PI) and Salvatore Stolfo. \$800,000 for September 1, 2006 - August 31, 2011. Acceptance rate 10-15%.

NIH. MAGNet: A Center for the Multiscale Analysis of Genomic and Cellular Networks, 1 U54 CA121852-01. PI: Andrea Califano. \$19,117,667 for September 26, 2005 - August 31, 2010.

NSF. ITR - (NHS) - (int/dmc): Secure Remote Computing Services, CNS-0426623. With Jason Nieh (PI) and Angelos Keromytis. \$1,200,000 for September 1, 2004 - August 31, 2011. Acceptance rate 8-10%. Broadening Participation in Research supplement, \$133,565 for September 1, 2005 - August 31, 2011.

NSF. CISE Research Infrastructure: Pervasive Pixels, EIA-0202063. With Henning Schulzrinne (PI), Steven Feiner, Kathleen McKeown and John Kender. \$1,485,098 for September 1, 2002 - August 31, 2008.

NSF. Smart Event Models and Architectures, CCR-0203876. Sole PI. \$270,000 for September 1, 2002 - August 31, 2006.

NSF. Adaptive Internet Interactive Team Video, EIA-0071954. With John Kender (PI) and Jason Nieh. \$1,589,998 for September 15, 2000 - August 31, 2004.

DARPA, monitored by Air Force Research Laboratory. Coping with Complexity: A standards-based kinesthetic approach to monitoring non-standard component-based systems. F30602-00-2-0611 (DARPA Order K503). Lead PI, with George T. Heineman of Worcester Polytechnic Institute (subcontractor). \$940,000 for June 30, 2000 - December 31, 2003.

NSF. Component Technologies for Next-Generation Software Development, CCR-9970790. Sole PI. \$225,000 for September 15, 1999-August 2003.

ONR. Survivable Enterprise Middleware, N000140110441. Sole PI. \$255,443 for February 28, 2001 - February 27, 2002.

DARPA, monitored by Air Force Research Laboratory. A New Infrastructure for Evolutionary Design and Implementation. F30602-97-2-0022 (DARPA Order E101). Columbia PI. \$1,349,090 for December 1996-May 2001.

DARPA, monitored by Air Force Rome Laboratory. Atlantis: An Open Architecture for Synergy of Process-Centered Environments and Computer-Supported Cooperative Work. F30602-94-C-0197 (ARPA Order B128). Columbia PI. \$1,050,195 for June 1994-September 1997.

NSF. CISE Research Instrumentation, CDA-9529304. Semantics-based Prefetching for Mobile Computing. With Daniel Duchamp. \$46,680 for equipment, February 1996-January 1997.

NSF. Components for Decentralized Process-Centered Environments, CCR-9301092. Sole PI. \$217,000 for September 1993-August 1996.

NSF. Multi-Agent Rule-Based Development Environments, CCR-9106368. Sole PI. \$236,334 for September 1991-August 1993.

NSF. Distributed Language-based Environments. CCR-9000930 (renewal). Sole PI. \$99,990 for September 1990-August 1992. CCR-8802741. \$146,330 for July 1988-June 1990.

NSF. CISE Research Instrumentation, CDA-8920080. Research in Software Engineering and Software Systems. With Daniel Duchamp. \$44,097 for equipment, March 1990.

NSF. Presidential Young Investigator Award in Software Engineering and Software Systems, CCR-8858029. \$312,000 for October 1988-September 1993.

NSF Engineering Research Center, Center for Telecommunications Research. Multimedia. PI: Tony Acampora. 1 month for February 1994-January 1995 and 2 GRAs for September 1994-January 1995. 1 month for February 1995-January 1996.

NSF Engineering Research Center for Telecommunications Research. Software for Telecommunications. 2 months and 4 GRAs per year November 1987-January 1989. 3 months and 4 GRAs for February 1989-January 1990. 3.5 months and 4 GRAs for February 1990-January 1991. 3 months, 3.5 GRAs and \$17,500 for equipment for February 1991-January 1992. 1.5 months and 2 GRAs for February-July 1992. 2 GRAs for September 1992-May 1993.

New York State Science and Technology Foundation, Center for Advanced Technology -- High Performance Computing and Communications in Healthcare. Workflow Technology for Healthcare Delivery. \$70,000 per year July 1994-June 1995 and July 1995-June 1996. \$39,877 for July 1996-June 1997.

New York State Science and Technology Foundation, Center for Advanced Technology -- Computer & Information Systems. Focal Project: Extended Transaction Systems. With Calton Pu and Michael Foster, \$147,567 for July 1987-June 1988. With Calton Pu, \$195,545 for July 1988-June 1989. With Daniel Duchamp, \$205,959 for July 1989-June 1990. As sole PI, \$200,660 for July 1990-June 1991, \$180,000 for July 1991-June 1992, \$180,000 for July 1992-June 1993, 2 GRAs for July 1993-June 1994.

New York State Science and Technology Foundation, Center for Advanced Technology -- Computer & Information Systems. Seed Project. \$10,000 for July 1986-June 1987. \$20,000 for July 1987-June 1988.

Grants and Contracts -- Industry

AT&T Foundation. Special Purpose Grants in Science and Engineering. \$25,000 for 1986-1987. \$15,000 for 1987-1988. \$20,000 per year for 1988-1989 and 1989-1990. \$25,000 per year for 1990-1991, 1991-1992 and 1992-1993. \$5,000 per year for 1993-1994 and 1994-1995.

Andersen Consulting. Grant. \$50,000 for 1993-1994.

Bell Northern Research, Inc. Young Faculty Award (PYI matching). \$37,500 for 1990-1991. \$40,000 for 1991-1992. \$25,000 for 1992-1993.

Bull HN Information Systems Inc. Grant. \$25,000 for 1992-1993. \$20,000 for 1993-1994. \$20,000 additional for 1994.

Bull HN Information Systems Inc. Industrial Partners Program. \$10,000 per year for October 1992-October 1993 and October 1993-October 1994.

Citibank Financial Markets Group. CAT matching. \$28,923 for July 1989-June 1990. \$14,461 for July 1990-December 1990.

Digital Equipment Corp. External Research Program (PYI matching). \$45,750 in equipment, Fall 1990 to Spring 1991. \$91,500 in equipment for June 1991-May 1993.

Digital Equipment Corp. Faculty Program: Incentives for Excellence (Young Faculty Award). \$25,000 plus \$35,000 in equipment per year for 1986-1987, 1987-1988 and 1988-1989.

Financial Services Technology Consortium. Better Mutual Authentication. With Steven Bellovin. \$100,000 for September 2006-December 2007.

IBM. Joint Study in Autonomic Computing, Agreement No. W0143710. December 2004-December 2005.

IBM. Eclipse Innovation Award. \$28,000 for 2003.

IBM. University Partnership Program Research Award. \$40,000 plus equipment (Intellistation M Pro 3D WinNT workstation, retail \$7524) for 1998-1999.

IBM. Wireless Network of Portable Electronic Notebooks. With Anthony Acampora (EE), Daniel Duchamp, Steven Feiner and Gerald Q. Maguire, Jr. \$843,730 plus equipment valued at \$176,565 for July 1989-December 1990.

IBM. Joint Study in Parallel Processing on Experimental Multiprocessor Workstation, Agreement No. 14640056. Renewals 1461056, 14642053, 14643053. With Daniel Duchamp and Calton Pu. Loaned multiprocessor valued at \$130,000 for June 1989-December 1992, second loaned multiprocessor starting in Fall 1990.

IBM. Research Initiation Grant for Complex Information Systems. \$98,000 for 1988. \$100,000 per year for 1989 and 1990. Equipment for Research Initiation Grant. With Yechiam Yemini. \$408,201 in hardware (8 RT workstations) and \$21,922 in software in 1989.

IBM. Robotics and Manufacturing. With Peter Allen. \$32,585 for August 1987-August 1988.

IBM Canada Ltd. Process Reuse Study consortium with McGill University, Carnegie Mellon University and the University of Maryland, adding University of Southern California in 1994. \$25,000 per year for 1992, 1993 and 1994.

Lucent Technologies Foundation. Technical Special Purpose Grant. \$20,000 for Fall 1996-Spring 1997.

Microsoft Research. Trustworthy Computing Curriculum. With Angelos Keromytis \$50,000 for 2005.

Microsoft Research. Grant. \$5,000 cash and \$49,554 in-kind (hardware, software, training) for Spring 2002. \$3,000 cash and \$37,302 in-kind for Fall 2002. \$20,000 cash and \$3,276 hardware and software for 2003. \$19,575 hardware and software for 2004.

NEC Computers. Equipment. May 2001.

Paramax Systems Corporation. Multi-User Knowledge Based Software Assistants. \$28,750 for August 1992-August 1993.

Siemens Corporate Research. Grant. \$25,000 for 1986-1987. \$125,000 for 1987-1988. \$25,000 per year for 1988-1989 and 1989-1990.

Siemens Corporate Research. Support for PhD thesis research. Loaned Perq 1A workstation with maintenance for 1982-1985.

SRA America, Inc. Grant. \$40,000 for 1990-91. \$42,000 for 1991-92. \$20,000 for 1992-93. Full-time visiting scientist sent at company's expense for 1991-93.

Sun Microsystems, Inc. Grant. \$50,000 per 18 months (plus Network Software Environment license) for April 1988-September 1989 and October 1989-March 1991.

Sun Microsystems, Inc. Academic Excellent Grant. Sun Ultra 40 M2 Workstation valued at \$4,730. June 2007.

Xerox Foundation. Young Faculty Award (PYI matching). \$10,000 per year for 1988-1989, 1989-1990, and 1990-1991.

Books

Israel Ben-Shaul and Gail E. Kaiser. *A Paradigm for Decentralized Process Modeling*. Kluwer, 1995. Volume 337 of The Springer International Series in Engineering and Computer Science, Springer Science & Business Media, 2012. (301 pages.) ISBN 1461523052, 9781461523055.
<https://books.google.com/books?id=LPrjBwAAQBAJ>

Invited Papers and Book Chapters

Swapneel Sheth, Jonathan Bell and Gail Kaiser. A Gameful Approach to Teaching Software Design and Software Testing. Kendra M.L. Cooper and Walt Scacchi (eds.), *Computer Games and Software Engineering*, Chapman and Hall/CRC. May, 2015, ch. 4, pp. 91-112. ISBN 1482226685, 9781482226683.
<https://books.google.com/books?id=Oy6IoAEACAAJ>

Rean Griffith, Giuseppe Valetto and Gail Kaiser. Effecting Runtime Reconfiguration in Managed Execution Environments. In Manish Parishar and Salim Hariri (eds.), *Autonomic Computing: Concepts, Infrastructure, and Applications*, ch. 18, CRC, 2006.

Gail Kaiser, Janak Parekh, Philip Gross and Giuseppe Valetto. Kinesthetics eXtreme: An External Infrastructure for Monitoring Distributed Legacy Systems. In *5th Annual International Active Middleware Workshop* (aka *Autonomic Computing Workshop*), June 2003, pp. 22-30.

Gail E. Kaiser. Cooperative Transactions for Multi-User Environments. In Won Kim (ed.), *Modern Database Systems: The Object Model, Interoperability, and Beyond*, ACM Press, 1994, ch. 20, pp. 409-433.

Gail E. Kaiser, Wenwey Hseush, Steven S. Popovich and Shyhtsun F. Wu. Multiple Concurrency Control Policies in an Object-Oriented Programming System. In Gul Agha, Peter Wegner and Akinori Yonezawa (eds.), *Research Directions in Concurrent Object Oriented Programming*, MIT Press, 1993, ch. 7, pp. 195-210.

Gail E. Kaiser and Calton Pu. Dynamic Restructuring of Transactions. In Ahmed K. Elmagarmid (ed.), *Database Transaction Models for Advanced Applications*, Morgan Kaufmann, 1992, ch. 8, pp. 265-295.

Gail E. Kaiser. MARVEL 3.0 A Unix-Based Software Development Environment Kernel. In *Soviet Union Unix Systems User Group Workshop on Unix and Applications*, November 1991, pp. 28-31.

Gail E. Kaiser and Dewayne E. Perry. Making Progress in Cooperative Transaction Models. *Data Engineering*, IEEE Computer Society Technical Committee on Data Engineering, 14(1):19-23, March 1991.

Gail E. Kaiser. Interfacing Cooperative Transactions to Software Development Environments. *Office Knowledge Engineering*, IEEE Computer Society Technical Committee on Office Automation, 4(1):56-78, February 1991.

Gail E. Kaiser. AI Techniques in Software Engineering. In Hojjat Adeli (ed.), *Knowledge Engineering, Vol. II, Applications*, McGraw-Hill, 1990, ch. 7, pp. 213-244.

Gail E. Kaiser and David Garlan. Synthesizing Programming Environments from Reusable Features. In Ted J. Biggerstaff and Alan J. Perlis (eds.), *Software Reusability*, Addison-Wesley, 1989, vol. II, ch. 2, pp. 35-55.

Gail E. Kaiser and Naser S. Barghouti. An Expert System for Software Design and Development. In *1988 Proceedings of the Statistical Computing Section*, American Statistical Association, August 1988, pp. 10-19.

R.W. Schwanke and G. Kaiser. Version Inconsistency in Large Systems. In Heinz Schwartzel (ed.), *Informatik in der Praxis: Aspekte ihrer industriellen Nutzenwendubg* (Informatics in Practice: Aspects of its Industrial Use and Application), Springer-Verlag, 1986, pp. 88-99. https://doi.org/10.1007/978-3-642-93336-3_9

Articles in Journals

Jonathan Bell, Eric Melski, Mohan Dattatreya and Gail E. Kaiser. Vroom: Faster Build Processes for Java. *IEEE Software*, 32(2):97-104, Mar/Apr 2015. <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7006344>.

Jonathan Bell, Christian Murphy and Gail Kaiser. Metamorphic Runtime Checking of Applications Without Test Oracles. *Crosstalk the Journal of Defense Software Engineering*, 28(2):9-13, Mar/Apr 2015. <http://static1.1.sqspcdn.com/static/f/702523/25999119/1425257561223/201503-Bell.pdf>.

Swapneel Sheth and Gail Kaiser. Towards using Cached Data Mining for Large Scale Recommender Systems. Recent Progress in Data Engineering and Internet Technology, Ford Lumban Gaol (ed.), *Lecture Notes in Electrical Engineering*, 156:349-357, Springer, Berlin, Heidelberg, 2013. http://dx.doi.org/10.1007/978-3-642-28807-4_49. (Originally appeared in *International Conference on Data Engineering and Internet Technology*, March 2011.)

Xiaoyuan Xie, Joshua W. K. Ho, Christian Murphy, Gail Kaiser, Baowen Xu and Tsong Yueh Chen. Testing and Validating Machine Learning Classifiers by Metamorphic Testing. *Journal of Systems and Software*, Elsevier, 84(4):544-558, April 2011. <https://doi.org/10.1016/j.jss.2010.11.920>. (Solicited expansion of Application of Metamorphic Testing to Supervised Classifiers, *9th International Conference on Quality Software*, August 2009. 28% accepted.)

Huning Dai, Christian Murphy and Gail Kaiser. CONFU: Configuration Fuzzing Testing Framework for Software Vulnerability Detection. *International Journal of Secure Software Engineering*, IGI Publishing,

1(3):41-55, July-September 2010. <http://doi.org/10.4018/jsse.2010070103>. (Solicited expansion of Configuration Fuzzing for Software Vulnerability Detection, *4th International Workshop on Secure Software Engineering*, January 2010.)

Rean Griffith, Ritika Virmani and Gail Kaiser. The Role of Reliability, Availability and Serviceability (RAS) Models in the Design and Evaluation of Self-Healing Systems. *International Transactions on Systems Science and Applications*, 5(3):252-263, November 2009. (Solicited from *3rd International Conference on Self-Organization and Autonomous Systems in Computing and Communications*, September 2007.)

Dan Phung, Giuseppe Valetto, Gail E. Kaiser, Tiecheng Liu and John R. Kender. Adaptive Synchronization of Semantically Compressed Instructional Videos for Collaborative Distance Learning. *International Journal of Distance Education Technologies*, Idea Group Publishing, 5(2):56-73, 2007.

Janak Parekh, Gail Kaiser, Philip Gross and Giuseppe Valetto. Retrofitting Autonomic Capabilities onto Legacy Systems. *Journal of Cluster Computing*, Kluwer, 9(2):141-159, April 2006.

Yixin Diao, Joseph L. Hellerstein, Sujay Parekh, Rean Griffith, Gail Kaiser and Dan Phung. A Control Theory Foundation for Self-Managing Computing Systems. *IEEE Journal on Selected Areas in Communications*, 23(12):2213-2222, December 2005.

Michael F. Chiang, Roy G. Cole, Suhit Gupta, Gail E. Kaiser and Justin B. Starren. Computer and World Wide Web Accessibility by Visually Disabled Patients: Problems and Solutions. *Survey of Ophthalmology*, Elsevier, 50(4):394-405, July-August 2005.

Suhit Gupta, Gail E. Kaiser, Peter Grimm, Michael F. Chiang, and Justin Starren. Automating Content Extraction of HTML Documents. *World Wide Web*, Kluwer, 8(2):179-224, June 2005.

D. Wang, M. Peleg, D. Bu, M. Cantor, G. Landesberg, E Lunenfeld, S.W. Tu, G.E. Kaiser, G. Hripcsak, V.L. Patel and E.H. Shortliffe. GESDOR - a generic execution model for sharing of computer-interpretable clinical practice guidelines. *Journal of the American Medical Informatics Association*, 2003 AMIA Annual Symposium supplement, October 2003.

Wenke Lee and Gail E. Kaiser. Interfacing Oz with the PCTE OMS: A Case Study of Integrating a Legacy System with a Standard Object Management System. *Journal of Systems Integration*, Kluwer, 9(4):329-358, December 1999.

Jingshuang J. Yang and Gail E. Kaiser. JPernLite: Extensible Transaction Services for WWW. *IEEE Transactions on Knowledge and Data Engineering*, 11(4):639-657, Jul/Aug 1999.

Gail E. Kaiser, Stephen E. Dossick, Wenyu Jiang, Jack Jingshuang Yang and Sonny Xi Ye. WWW-based Collaboration Environments with Distributed Tool Services. *World Wide Web*, Baltzer Science Publishers, 1:3-25, January 1998. <https://doi.org/10.1023/A:1019291009758>.

Israel Z. Ben-Shaul and Gail E. Kaiser. Federating Process-Centered Environments: the Oz Experience. *Journal of Automated Software Engineering*, Kluwer, 5(1):97-132, January 1998. https://doi.org/10.1007/978-1-4615-5441-7_5. (The issue was reprinted as a book, Elisabetta Di Nitto and Alfonso Fuggetta (eds.), *Process Technology*, Kluwer, 1997.)

Wenke Lee, Gail E. Kaiser, Paul D. Clayton, and Eric H. Sherman. OzCare: A Workflow Automation System for Care Plans. *Journal of the American Medical Informatics Association*, 1996 AMIA Annual Fall Symposium supplement, Hanley & Belfus, Inc., October 1996, pp. 577-581.

Giuseppe Valetto and Gail E. Kaiser. Enveloping Sophisticated Tools into Process-Centered Environments. *Journal of Automated Software Engineering*, Kluwer, 3:309-345, 1996.

Jack Jingshuang Yang and Gail E. Kaiser. An Architecture for Integrating OODBs with WWW. *Computer Networks and ISDN Systems, The International Journal of Computer and Telecommunications Networking*, 28(7-11):1243-1254, Elsevier Science B.V., May 1996. (Special issue on *5th International World Wide Web Conference*, 25% accepted.)

Stephen E. Dossick and Gail E. Kaiser. WWW Access to Legacy Client/Server Applications. *Computer Networks and ISDN Systems, The International Journal of Computer and Telecommunications Networking*, 28(7-11):931-940, Elsevier Science B.V., May 1996. (Special issue on *5th International World Wide Web Conference*, 25% accepted.)

Calton Pu, Wenwey Hseush, Gail E. Kaiser, Kun-Lung Wu and Philip S. Yu. Divergence Control for Distributed Database Systems. *Distributed and Parallel Databases*, 3(1):85-109, January 1995.

Gail E. Kaiser, Steven S. Popovich and Israel Z. Ben-Shaul. A Bi-Level Language for Software Process Modeling. In Walter F. Tichy (ed.), *Configuration Management*, Trends in Software 2:39-72, ch. 2, John Wiley & Sons, 1994.

Josephine Micallef and Gail E. Kaiser. Extending Attribute Grammars to Support Programming-in-the-Large. *ACM Transactions on Programming Languages and Systems*, 16(5):1572-1612, September 1994.

G.T. Heineman, J.E. Botsford, G. Caldiera, G.E. Kaiser, M.I. Kellner and N.H. Madhavji. Emerging technologies that support a software process life cycle. *IBM Systems Journal*, 33(3):501-529, 1994.

Israel Z. Ben-Shaul, Gail E. Kaiser and George T. Heineman. An Architecture for Multi-User Software Development Environments. *Computing Systems, The Journal of the USENIX Association*, 6(2):65-103, University of California Press, Spring 1993.
https://www.usenix.org/legacy/publications/compsystems/1993/spr_benshaul.pdf.

Josephine Micallef and Gail E. Kaiser. Support Algorithms for Incremental Attribute Evaluation of Asynchronous Subtree Replacements. *IEEE Transactions on Software Engineering*, 19(3):231-252, March 1993.

Gail E. Kaiser and Simon M. Kaplan. Parallel and Distributed Incremental Attribute Evaluation Algorithms for Multi-User Software Development Environments. *ACM Transactions on Software Engineering and Methodology*, 2(1)47-92, January 1993. <http://doi.acm.org/10.1145/151299.151312>.

Steven S. Popovich and Gail E. Kaiser. An Architectural Survey of Object Management Systems. *International Journal of Intelligent & Cooperative Information Systems*, World Scientific, 1(3&4):515-577, December 1992.

George T. Heineman, Gail E. Kaiser, Naser S. Barghouti and Israel Z. Ben-Shaul. Rule Chaining in Marvel: Dynamic Binding of Parameters. *IEEE Expert*, 7(6):26-32, December 1992.

David Garlan, Gail E. Kaiser and David Notkin. Using Tool Abstraction to Compose Systems. *Computer*, IEEE Computer Society, 25(6):30-38, June 1992.

Gail E. Kaiser and Brent Hailpern. An Object-Based Programming Model for Shared Data. *ACM Transactions on Programming Languages and Systems*, 14(2):201-264, April 1992.

Naser S. Barghouti and Gail E. Kaiser. Scaling Up Rule-Based Development Environments. *International Journal on Software Engineering & Knowledge Engineering*, World Scientific, 2(1):59-78, March 1992.
https://doi.org/10.1007/3540547428_59.

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Travis L. Winfrey and Gail E. Kaiser. Testing Reliable Distributed Applications Through Simulated Events. *8th Symposium on Reliable Distributed Systems*, October 1989, pp. 160-166.

Gail E. Kaiser, Dewayne E. Perry and William M. Schell. Infuse: Fusing Integration Test Management with Change Management. *13th International Computer Software & Applications Conference*, September 1989, pp. 552-558. <http://ieeexplore.ieee.org/document/65147/>

Gail E. Kaiser. A Marvelous Extended Transaction Processing Model. *11th World Computer Conference IFIP '89*, Elsevier Science Publishers B.V., August 1989, pp. 707-712. <30% accepted.

Gail E. Kaiser, Steven S. Popovich, Wenwey Hseush and Shyhtsun Felix Wu. Melding Multiple Granularities of Parallelism. *3rd European Conference on Object-Oriented Programming*, Cambridge University Press, July 1989, pp. 147-166. 23% accepted.

Calton Pu, Gail E. Kaiser and Norman Hutchinson. Split-Transactions for Open-Ended Activities. *14th International Conference on Very Large Data Bases (VLDB)*, August 1988, pp. 26-37. 18% accepted. <https://pdfs.semanticscholar.org/137b/8467ada9b9edc8efc2f51ce87a7b7981b938.pdf>.

Gail E. Kaiser and Simon M. Kaplan. Rapid Prototyping of Concurrent Programming Languages. *8th International Conference on Distributed Computing Systems*, June 1988, pp. 250-255. 30% accepted.

Wenwey Hseush and Gail E. Kaiser. Data Path Debugging: Data-Oriented Debugging for a Concurrent Programming Language. *ACM SIGPLAN/SIGOPS Workshop on Parallel and Distributed Debugging*,

May 1988, pp. 236-246. 32% accepted. <http://doi.acm.org/10.1145/68210.69238>. (Special issue of *SIGPLAN Notices*, 24(1), January 1989.)

Dewayne E. Perry and Gail E. Kaiser. Models of Software Development Environments. *10th International Conference on Software Engineering*, April 1988, pp. 60-68. 20% accepted. <http://dl.acm.org/citation.cfm?id=55823.55830>.

Simon M. Kaplan and Gail E. Kaiser. Garp: Graph Abstractions for Concurrent Programming. *European Symposium on Programming*, H. Ganzinger (ed.), Lecture Notes in Computer Science 300, Springer-Verlag, March 1988, pp. 191-205. 31% accepted.

Ursula Wolz and Gail E. Kaiser. A Discourse-Based Consultant for Interactive Environments. *4th IEEE Conference on Artificial Intelligence Applications*, March 1988, pp. 28-33. 23% accepted. <http://ieeexplore.ieee.org/document/196077/>.

Yoelle S. Maarek and Gail E. Kaiser. Change Management for Very Large Software Systems. *7th International Phoenix Conference on Computers and Communications*, March 1988, pp. 280-285. <http://ieeexplore.ieee.org/document/10085/>.

Naser S. Barghouti and Gail E. Kaiser. Implementation of a Knowledge-Based Programming Environment. *21st Hawaii International Conference on System Sciences*, January 1988, vol. II, pp. 54-63. <http://ieeexplore.ieee.org/document/11788/>.

Josephine Micallef and Gail E. Kaiser. Version and Configuration Control in Distributed Language-Based Environments. Jurgen F.H. Winkler (ed.), *International Workshop on Software Version and Configuration Control*, German Chapter of the ACM Berichte 30, B.G. Teubner, Stuttgart, January 1988, pp. 119-143.

Robert W. Schwanke and Gail E. Kaiser. Living with Inconsistency in Large Systems. Jurgen F.H. Winkler (ed.), *International Workshop on Software Version and Configuration Control*, German Chapter of the ACM Berichte 30, B.G. Teubner, Stuttgart, January 1988, pp. 98-118.

Yoelle S. Maarek and Gail E. Kaiser. Using Conceptual Clustering for Classifying Reusable Ada Code. *Using Ada: ACM SIGAda International Conference*, December 1987, pp. 208-215. 26% accepted. <http://doi.acm.org/10.1145/317500.317528>.

Gail E. Kaiser and David Garlan. MELDing Data Flow and Object-Oriented Programming. *Object-Oriented Programming Systems, Languages, and Applications Conference*, October 1987, pp. 254-267.

Gail E. Kaiser and Dewayne E. Perry. Workspaces and Experimental Databases: Automated Support for Software Maintenance and Evolution. *Conference on Software Maintenance*, September 1987, pp. 108-114.

Wenwey Hseush and Gail E. Kaiser. A Network Architecture for Reliable Distributed Computing. *1987 Symposium on Simulation of Computer Networks*, August 1987, pp. 11-22. 50% accepted.

Gail E. Kaiser and Peter H. Feiler. An Architecture for Intelligent Assistance in Software Development. *9th International Conference on Software Engineering*, March 1987, pp. 180-188. 11.5% accepted. <http://dl.acm.org/citation.cfm?id=41765.41783>.

Gail E. Kaiser and Simon M. Kaplan. Reliability in Distributed Programming Environments. *6th Symposium on Reliability in Distributed Software and Database Systems*, March 1987, pp. 45-55. 32% accepted.

Dewayne E. Perry and Gail E. Kaiser. Infuse: A Tool for Automatically Managing and Coordinating Source Changes in Large Systems. *15th ACM Computer Science Conference*, February 1987, pp. 292-299. <http://doi.acm.org/10.1145/322917.322963>.

Gail E. Kaiser and David Garlan. MELD: A Declarative Language for Writing Methods. *6th International Phoenix Conference on Computers and Communications*, February 1987, pp. 280-285.

Gail E. Kaiser and Peter H. Feiler. Intelligent Assistance without Artificial Intelligence. *32nd IEEE Computer Society International Conference*, February 1987, pp. 236-241.

Gail E. Kaiser and David Garlan. Composing Software Systems from Reusable Building Blocks. *20th Hawaii International Conference on System Sciences*, January 1987, vol. II, pp. 536-545.

Peter H. Feiler and Gail E. Kaiser. Granularity issues in a knowledge-based programming environment. *2nd Kansas Conference on Knowledge-Based Software Development*, October 1986.
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Simon M. Kaplan and Gail E. Kaiser. Incremental Attribute Evaluation in Distributed Language-Based Environments. *5th ACM Symposium on Principles of Distributed Computing*, August 1986, pp. 121-130. 20% accepted. <http://doi.acm.org/10.1145/10590.10601>.

Gail E. Kaiser. Generation of Run-Time Environments. *SIGPLAN '86 Symposium on Compiler Construction*, June 1986, pp. 51-57. 20% accepted. <http://doi.acm.org/10.1145/12276.13316>. (Special issue of *SIGPLAN Notices*, 21(7), July 1986.)

Gail E. Kaiser and Peter H. Feiler. Generation of Language-Oriented Editors. *Programmierumgebungen und Compiler*, H. Morgenbrod and W. Sammer (eds.), German Chapter of the ACM Berichte 18, B.G. Teubner, Stuttgart, April 1984, pp. 31-45. (Paper in English.)

Peter H. Feiler and Gail E. Kaiser. Display-Oriented Structure Manipulation in a Multi-Purpose System. *IEEE Computer Society's 7th International Computer Software and Applications Conference*, November 1983, pp. 40-48.

Gail E. Kaiser and A. Nico Habermann. An Environment for System Version Control. *26th IEEE Computer Society International Conference*, February 1983, pp. 415-420.

Miscellaneous Publications

Jonathan Bell, Eric Melski, Gail Kaiser and Mohan Dattatreya. Accelerating Maven by Delaying Dependencies. Poster in *3rd International Workshop on Release Engineering*, May 2015, p. 28.
<http://dx.doi.org/10.1109/RELENG.2015.16>.

Jonathan Bell and Gail Kaiser. Unit Test Virtualization: Optimizing Testing Time. Poster in *2nd International Workshop on Release Engineering*, April 2014.

Jonathan Bell, Kendra M.L. Cooper, Gail Kaiser, and Swapneel Sheth. Report from the Second International Workshop on Games and Software Engineering (GAS 2012). *ACM SIGSOFT Software Engineering Notes*, 38(2):34-35, March 2013. <http://dx.doi.org/10.1145/2382756.2382763>.

Swapneel Sheth, Jonathan Bell and Gail Kaiser. HALO (Highly Addictive, socialLly Optimized) Software Engineering. Position paper in *1st Games and Software Engineering Workshop*, May 2011.

Swapneel Sheth, Nipun Arora, Christian Murphy and Gail Kaiser. The weHelp Reference Architecture for Community-Driven Recommender Systems. Poster in *2nd International Workshop on Recommendation Systems for Software Engineering*, May 2010, pp. 46-47. <http://doi.acm.org/10.1145/1808920.1808930>

Kevin M. Jackson, Gail Kaiser, Lyndon Wong, Daniel Rabinowitz and Michael F. Chiang. Comparing Speed of Provider Data Entry: Electronic Versus Paper Methods. Poster in *Annual Meeting of the American Academy of Optometry*, November 2009.

Rean Griffith, Gail Kaiser and Javier Alonso López. Multi-perspective Evaluation of Self-Healing Systems Using Simple Probabilistic Models. Poster in *6th International Conference on Autonomic Computing and Communications*, June 2009.

Nipun Arora, Ravindra Babu Ganapathi, John Demmes, Simha Sethumadhavan and Gail Kaiser. COMPASS Community Driven Parallelization Advisor for Sequential Software Systems. Student poster in *14th International Conference on Architectural Support for Programming Languages and Operating Systems*, March 2009.

Chris Murphy, Gail Kaiser and Matt Chu. The In Vivo Approach to Testing Software Applications. Student poster in *International Symposium on Software Testing and Analysis*, July 2008.

Suhit Gupta, Hila Becker, Gail Kaiser and Salvatore Stolfo. Verifying Genre-based Clustering Approach to Content Extraction. Poster in *15th World Wide Web Conference*, May 2006.

Rean Griffith, Joseph L. Hellerstein, Gail Kaiser and Yixin Diao. Dynamic Adaptation of Temporal Event Correlation Rules. Position paper in *1st International Workshop on Feedback Control Implementation and Design in Computing Systems and Networks*, April 2006.

Suhit Gupta, Gail Kaiser and Salvatore Stolfo. Extracting Content To Improve Accuracy for HTML Content Extraction. Poster in *14th World Wide Web Conference*, May 2005, pp. 1114-1115. **(Best Student Poster Award.)**

Suhit Gupta and Gail Kaiser. Extracting Content from Accessible Web Pages. Position paper in *International Cross-Disciplinary Workshop on Web Accessibility*, May 2005.

Yixin Diao, Joseph L. Hellerstein, Gail Kaiser, Sujay Parekh and Dan Phung. Self-managing Systems: A Control Theory Foundation. Position Paper in *1st Workshop on Operating System and Architectural Support for the on demand IT InfraStructure*, October 2004.

Suhit Gupta and Gail Kaiser. CRUNCH – Web-based Collaboration for Persons with Disabilities. Position Paper in W3C Web Accessibility Initiative Teleconference on *Making Collaboration Technologies Accessible for Persons with Disabilities*, April 2003. (One of 3 position papers selected for presentation.)

Alpa Shah and Gail Kaiser. Decentralized Information Spaces for Composition and Unification of Web Services. Position Paper in *Workshop on Object-Oriented Web Services*, November 2002.

Dan Port and Gail Kaiser. Introducing a "Street Fair" Open Source Practice Within Project Based Software Engineering Courses. Position paper in *1st Workshop on Open Source Software Engineering*, May 2001.

Gail Kaiser and Giuseppe Valetto. Ravages of Time: Synchronized Multimedia for Internet-Wide Process-Centered Software Engineering Environments. Position paper in *3rd Workshop on Software Engineering over the Internet*, June 2000.

Barry Boehm, Gail Kaiser and Daniel Port. A Combined Curriculum Research and Curriculum Development (CRCDD) Approach to Software Engineering Education. Position paper in *Conference on Software Engineering Education and Training: Workshop on Developing Undergraduate Software Engineering Programs*, March 2000.

Gail Kaiser, Adam Stone and Stephen Dossick. A Mobile Agent Approach to Lightweight Process Workflow. Position paper in *International Process Technology Workshop*, September 1999.

Stephen E. Dossick and Gail E. Kaiser. Distributed Software Development with CHIME. Position paper in *2nd Workshop on Software Engineering over the Internet*, May 1999.

Gail Kaiser. From Oz To TreatyMaker. Position paper in *WACC '99 Workshop on Cross-Organisational Workflow Management and Co-ordination*, February 1999 (36% selected for presentation).

Gregory Alan Bolcer and Gail Kaiser. Collaborative Work: SWAP: Leveraging the Web to Manage Workflow. Column in *IEEE Internet Computing*, 23(1):85-88, January/February 1999.

Daniel Port and Gail Kaiser. Collaborative Work: Collaborative Technologies for Evolving Software Systems. Column in *IEEE Internet Computing*, 2(6):79-83, November/December 1998.

Stephen E. Dossick and Gail E. Kaiser. Worklets for Adaptive Workflow. Position paper in *CSCW-98 Workshop: Towards Adaptive Workflow Systems*, November 1998.

Frank Maurer and Gail Kaiser. Software Engineering in the Internet Age. Guest Editors' Introduction in *IEEE Internet Computing*, 2(5):22-24, September/October 1998.

Shih-Fu Chang, Luis Gravano, Gail E. Kaiser, Kenneth Ross, Salvatore J. Stolfo. Database Research At Columbia University. Unrefereed article in *SIGMOD RECORD*, 27(3):75-80, September 1998.

Andrew P. Kosoresow and Gail E. Kaiser. Collaborative Work: Using Agents to Enable Collaborative Work. Column in *IEEE Internet Computing*, 2(4):85-87, July/August 1998.

Israel Ben-Shaul and Gail Kaiser. Collaborative Work: Coordinating Distributed Components over the Internet. Column in *IEEE Internet Computing*, 2(2):83-86, March/April 1998.

Wenyu Jiang, Gail E. Kaiser, Jack Jingshuang Yang and Stephen E. Dossick. WebCity: A WWW-based Hypermedia Environment for Software Development. Poster paper in *7th Workshop on Information Technologies and Systems*, December 1997, pp. 241-245.

Peyman Oreizy and Gail Kaiser. Collaborative Work: The Web as Enabling Technology for Software Development and Distribution. Column in *IEEE Internet Computing*, 1(6):84-87, November/December 1997.

Stephen E. Dossick and Gail Kaiser. Collaborative Work: Tool Services for Intranets. Column in *IEEE Internet Computing*, 1(5):80-81, September/October 1997.

Roy T. Fielding and Gail Kaiser. Collaborative Work: The Apache HTTP Server Project. Column in *IEEE Internet Computing*, 1(4):88-90, July/August 1997.

Gail E. Kaiser, Stephen E. Dossick, Wenyu Jiang and Jack J. Yang. An Open Hypertext Collaboration Environment for the World Wide Web and Other Distributed Computing Infrastructures. Position paper in Uffe K. Wiil (ed.), *3rd Workshop on Open Hypermedia Systems*, April 1997, pp. 86-92.

Gail Kaiser and Jim Whitehead. Collaborative Work: Distributed Authoring and Versioning. Column in *IEEE Internet Computing*, 1(2):76-77, March/April 1997.

Gail E. Kaiser, George T. Heineman, Peter D. Skopp and Jack J. Yang. On the Yellow Brick Road to Component-based Product Lines. Position paper in Barry Boehm (ed.), *10th International Software Process Workshop: Process Support of Software Product Lines*, June 1996.

Gail E. Kaiser and Wenke Lee. Pay No Attention to the Man Behind the Curtain. Position paper in *NSF Workshop on Workflow and Process Automation in Information Systems: State-of-the-Art and Future Directions*, May 1996, pp. 46-52.

Giuseppe Valetto and Gail E. Kaiser. Enveloping "Persistent" Tools for a Process-Centered Environment. Position paper in *4th European Workshop on Software Process Technology*, Wilhelm Schafer (ed.), Lecture Notes in Computer Science 913, Springer-Verlag, April 1995, pp. 200-204.

Gail E. Kaiser and Simon M. Kaplan. CSCW and Software Process. Session summary in *Ninth International Software Process Workshop: The Role of Humans in the Process*, October 1994, pp. 9-11.

Andrew Z. Tong and Gail E. Kaiser. Reducing the Technical Overhead of Software Reuse. Position paper in *6th Workshop on Software Reuse*, November 1993.

Gail E. Kaiser. MARVEL 3.1: A Multi-User Software Development Environment. Invited talk abstract in *International Symposium on Logic Programming*, October 1993, pp. 36-39.

Shyhtsun F. Wu and Gail E. Kaiser. Shared Memory vs. Message Passing in the Real-Time Producers/Consumers Problem. Short paper in *IEEE Workshop on Parallel and Distributed Real-Time Systems*, April 1993, p. 257.

Gail E. Kaiser and Israel Z. Ben-Shaul. Process Evolution in the Marvel Environment. Position paper in *8th International Software Process Workshop: State of the Practice in Process Technology*, March 1993, pp. 104-106.

Webb Stacy, Richard Helm, Gail E. Kaiser and Bertrand Meyer. Ensuring Semantic Integrity of Reusable Objects. Panel statement in *Conference on Object-Oriented Programming Systems, Languages, and Applications*, October 1992, pp. 298-302.

James Lee, Wenwey Hseush, Erik Hilsdale and Gail E. Kaiser. Dynamic Orthogonal Composition in Meld. Short paper presented and distributed at *2nd Workshop on Objects in Large Distributed Applications*, October 1992.

Israel Z. Ben-Shaul, Gail E. Kaiser and George T. Heineman. Support for Concurrency in a Componentized SEE Architecture. Position paper presented and distributed at *Process-Sensitive SEE Architectures Workshop*, September 1992.

Gail E. Kaiser. We Need To Measure The Quality Of Our Work. Abstract in Walter F. Tichy, Nico Habermann and Lutz Prechelt (editors, *Future Directions in Software Engineering*, February 1992. In *ACM Software Engineering Notes*, 18(1):37, January 1993.

Karen E. Huff and Gail E. Kaiser. Change in the Software Process. Session summary in *7th International Software Process Workshop: Communication and Coordination in the Software Process*, October 1991, pp. 10-13.

Gail E. Kaiser. A Rule-based Process Server Component for Constructing Rule-based Development Environments. Position paper in *7th International Software Process Workshop: Communication and Coordination in the Software Process*, October 1991, pp. 76-78.

Michael Lowry, Gail Kaiser, Dorothy Setliffe and David Steier. Knowledge-Based Design Environments. Panel statement in *6th Knowledge-Based Software Engineering Conference*, September 1991, pp. 239-244.

Gail E. Kaiser. Open Object-Oriented Database Requirements for Extended Transactions. Position paper in *DARPA Open Object-Oriented Database Workshop II*, September 1991.

Gail E. Kaiser. Marvel's Activity-Centered View of Configuration Management. Position paper in *The International Workshop on Software Configuration Management Position Papers*, June 1991, pp. 51-53.

Gail E. Kaiser. Open Object-Oriented Database Support for Multi-User Process-Oriented Environments. Position paper in *DARPA Open Object-Oriented Database Workshop I*, March 1991.

Naser S. Barghouti and Gail E. Kaiser. MARVEL 2.6 A Unix-Based Software Development Environment Kernel. Position paper in *International Workshop on UNIX-Based Software Development Environments*,

January 1991.

Steven S. Popovich, Gail E. Kaiser and Shyhtsun F. Wu. Melding Transactions and Objects. Position paper in *ECOOP-OOPSLA Workshop on Object-Based Concurrent Programming*, special issue of *OOPS Messenger*, 2(2):94-98, April 1991.

Naser S. Barghouti and Gail E. Kaiser. Concurrency Control in Multi-Agent Object-Based Development Environments. Position paper in *Workshop on Transactions and Objects*, October 1990, pp. 21-25.

Israel Z. Ben-Shaul, Gail E. Kaiser and Naser S. Barghouti. An Object-Oriented Framework for Rule-Based Development Environments. Position paper in *ECOOP/OOPSLA '90 Workshop on Object-Oriented Program Development Environments*, October 1990.

Gail E. Kaiser, Israel Z. Ben-Shaul and Naser S. Barghouti. Preliminary Design of an Object Management System for Multi-User Marvel. Position paper in *6th International Software Process Workshop: Experience with Software Process Models*, October 1990, pp. 121-123.

Simon M. Kaplan, Anthony Finkelstein, Gail Kaiser, Kevin Ryan and Wilhelm Schafer. Interactively Supporting the Software Process. Panel statement in *IFIP TC 13 3rd International Conference on Human-Computer Interaction -- INTERACT '90*, D. Diaper, D. Gilmore, G. Cockton and B. Shackel (eds.), North-Holland, August 1990, pp. 1047-1049.

Josephine Micallef, Gail E. Kaiser and Dewayne E. Perry. SETA1 Working Group on Ada Libraries, Configuration Management, and Version Control. Working group report in *1st Symposium on Environments and Tools for Ada*, special issue of *Ada Letters*, 11(3):29-31, Spring 1991.

Gail E. Kaiser. Extended Transaction Models. Introduction to minitrack in *23rd Hawaii International Conference on System Sciences*, January 1990, vol. II, p. 471.

Gail E. Kaiser. Modeling Configurations as Transactions. Position paper in *2nd International Workshop on Software Configuration Management*, special issue of *Software Engineering Notes*, 17(7):129-132, November 1989.

Gail E. Kaiser. Mechanisms Session Report. Workshop session report in *5th International Software Process Workshop: Experience with Software Process Models*, October 1989, pp. 13-15.

Gail E. Kaiser. Experience with Marvel. Position paper in *5th International Software Process Workshop: Experience with Software Process Models*, October 1989, p. 82-84.

Michael H. Sokolsky and Gail E. Kaiser. Experiments with Rule Based Process Modeling in an SDE. Position paper in *Software Engineering Environments International Workshop on Environments*, Fred Long (ed.), Lecture Notes in Computer Science 467, Springer-Verlag, September 1989, pp. 107-114.

Gail E. Kaiser. Constructing Enactable Models. Workshop session report in *4th International Software Process Workshop: Representing and Enacting the Software Process*, special issue of *Software Engineering Notes*, 14(4):15-16, June 1989.

Gail E. Kaiser. Rule-Based Modeling of the Software Development Process. Position paper in *4th International Software Process Workshop: Representing and Enacting the Software Process*, special issue of *ACM SIGSOFT Software Engineering Notes*, 14(4):84-86, June 1989.

Gail E. Kaiser. Object-Based Concurrency. Position paper distributed at *ECOOP '89 Workshop on Object-Based Concurrent Programming*, July 1989.

Gail E. Kaiser. MARVELous Programming Environments. Public relations article in *Columbia Engineering Research*, Number 38, May 1989.

Gail E. Kaiser. Transactions for Concurrent Object-Oriented Programming Systems. Position paper in *ACM SIGPLAN Workshop on Object-Based Concurrent Programming*, special issue of *SIGPLAN Notices*, 24(4):120-122, April 1989.

Gail E. Kaiser. Concurrent Meld. Position paper in *ACM SIGPLAN Workshop on Object-Based Concurrent Programming*, special issue of *SIGPLAN Notices*, 24(4):136-138, April 1989.

Gail E. Kaiser. Marvel Software Development Environments. Position paper in *Working Notes AAAI Spring Symposium Series Artificial Intelligence and Software Engineering*, March 1989, pp. 40-42.

Gail E. Kaiser. Research in Software CAD Databases. Position paper in *1989 ACM SIGMOD Workshop on Software CAD Databases*, February 1989, pp. 67-69.

Gail E. Kaiser. Concurrent Meld. Full paper presented and distributed at *Workshop on Object-Based Concurrent Programming*, September 1988.

Gail Kaiser. Position paper in *ISF Architecture: Report on an International Workshop*, Alvey Information Systems Factory Study, January 1988, pp. 4-5.

Gail E. Kaiser. Use of AI Techniques for Software Design and Implementation. Introduction to minitrack in *21st Hawaii International Conference on System Sciences*, January 1988, volume II, p. 11.

Peter H. Feiler and Gail E. Kaiser. Intelligent Assistance in Software Development Environments. In *Annual Technical Review 1987*, Carnegie Mellon University, Software Engineering Institute, 1987, pp. 43-56.

Gail E. Kaiser. *Semantics for Structure Editing Environments*. PhD Thesis, Carnegie Mellon University, Department of Computer Science CMU-CS-85-131, May 1985.

David Notkin, Nico Habermann, Robert Ellison, Gail Kaiser and David Garlan. Letter to the Editor. *SIGPLAN Notices*, 18(4):7-12, April 1983.

Gail E. Kaiser, *Automatic Extension of an Augmented Transition Network Grammar for Morse Code Conversations*. Revision of ScB Thesis, Massachusetts Institute of Technology, Laboratory for Computer Science TR-233, April 1980.

Albert Vezza, P. David Lebling, Edward H. Black, Timothy A. Anderson, John F. Haverty, David Sherry and Gail E. Kaiser. Machine Recognition and Understanding of Manual Morse. In *Distributed Sensor Nets*, DARPA/ISTO Workshop, December 1978, pp. 125-136.

Invited Talks (selected)

2013: *Testing 1...2...3...*, CS Distinguished Lecture, University of Southern California, Los Angeles CA,

2004: *Self-Management of Complex Legacy Systems and Systems of Systems*, Technology Transfer Institute Vanguard conference on "The Challenge of Complexity", Los Angeles CA; *An External Infrastructure Approach to Autonomic Computing*, IBM T.J. Watson Research, Hawthorne NY.

2003: *Kinesthetics eXtreme: An External Infrastructure for Monitoring Distributed Legacy Systems*, 5th Annual International Active Middleware Workshop (aka Autonomic Computing Workshop), Seattle WA.

2002: *Autonomizing Legacy Systems*, 2002 IBM Almaden Institute Symposium on Autonomic Computing, San Jose CA.

2001: *A Mobile Agent Approach to Process-based Dynamic Adaptation of Complex Software Systems*, Naval Research Laboratory, Washington DC.

1999: *Component Technologies and Frameworks for Software Engineering Teams*, 11th Annual Software Technology Conference, Salt Lake City UT; *From Oz to TreatyMaker: An International Alliance Metaphor for Multi-Organization Workflows*, Workshop on Cross-Organisational Workflow Management and Co-ordination, San Francisco CA.

1998: *Component Technologies for Next-Generation Software Development Environments*, Software Productivity Consortium, Herndon, VA.

1996: *Pay No Attention to the Man Behind the Curtain*, NSF Workshop on Workflow and Process Automation in Information Systems: State-of-the-Art and Future Directions, Athens GA.

1994: *Oz Process-Centered Environment and CSCW*, CSCW Workshop on Relationships between CSCW and Software Process, Chapel Hill NC.

1993: *Marvelous Support for Semi-Structured Group Activities*, ACM Conference on Organizational Computing Systems, Milpitas CA (keynote address); *Rule-based Approaches to Software Process*, International Symposium on Logic Programming, Vancouver British Columbia, Canada (keynote address); *Cooperative Transactions for Engineering Environments*, MIT Industrial Liaison Program Symposium on Collaborative Engineering, Cambridge MA.

1992: *The Wizardry of Oz: Componentizing Marvel*, 4th International Symposium on Future Software Environments, Sydney, Australia.

1991: *MARVEL 3.0 A Unix-Based Software Development Environment Kernel*, Soviet Unix Users Group Workshop on Unix and Applications, Moscow, Russia (USSR).

1990: *Cooperative Transactions for Software Development Environments*, 2nd International Symposium on Future Software Environments, Boulder CO; *Change Propagation for Multi-User, Distributed Software Development Environments*, National Science Foundation, Washington DC.

1989: *Software Engineering Research at Columbia University*, Syracuse University CASE Center Winter Conference, Syracuse NY.

1988: *Marvel: An Expert System for Software Design and Development*, Joint Statistical Meetings, New Orleans LA; *Constructing Enactable Models*, 4th International Software Process Workshop, Devon, United Kingdom.

Invited Panels

2013: *Future directions and open problems*, Future of Software Engineering symposium (sponsored by NSF and Microsoft Research), Microsoft Commons, Redmond WA. Video at <http://research.microsoft.com/apps/video/default.aspx?id=199240> (the panel part starts at about 1:04 hours in).

2004: *OSS [Operations Support Systems] Re-systemization - Issues and Challenges*, Applied Research 3rd Quarter Review, Telcordia, Piscataway NJ.

2003: *Autonomic Computing* briefing of the Foresight and Governance Project, Woodrow Wilson International Center for Scholars, Washington DC.

1998: *What do we really need: More adaptive workflows, or less prescriptive process models?*, Adaptive Workflow Workshop, Seattle, WA.

1992: *Ensuring Semantic Integrity of Reusable Objects*, Conference on Object-Oriented Programming Languages, Applications and Systems, Vancouver BC, Canada; *Software Process and Knowledge-Based Tools*, 7th Knowledge-Based Software Engineering Conference, McLean VA; *Processes in Large Software Projects*, IBM Worldwide Software Development Conference on Quality Process Improvements, Toronto ON, Canada.

1991: *An Analysis of the Strengths and Weaknesses of Process Description Formalisms*, 7th International Software Process Workshop, Yountville CA; *Knowledge-Based Design*, 6th Knowledge-Based Software Engineering Conference, Syracuse NY.

1990: *Application of Process Models: how can rigorous software process models be beneficially applied?*, Software Process Symposium, Washington DC; *Interactively Supporting the Software Process*, IFIP TC 13 3rd International Conference on Human-Computer Interaction -- INTERACT '90, Cambridge, United Kingdom.

1989: *Database Support for Software Development Environments: Report from the 1989 Software CAD Database Workshop*, Federal CASE Conference, Gaithersburg MD.

1988: *Languages and Models for Concurrent Object-Based Programming*, Workshop on Object-Based Concurrent Programming, San Diego CA; *Object-Oriented Programming*, 21st Hawaii International Conference on System Sciences, Kona HI.

Journal Editorships

Editorial Boards: *World Wide Web: Internet and Web Information Systems*, Kluwer, 1998-2004 (previously *World Wide Web*, Baltzer Science Publishers); *Software Process Improvement and Practice*, Wiley & Sons, Ltd., 1996-2003; *IEEE Internet Computing*, 1996-2001; *ACM Transactions on Software Engineering and Methodology*, 1989-1998; *International Journal of Intelligent & Cooperative Information Systems*, World Scientific, 1991-92.

Misc: Guest Editor, with Frank Maurer, special issue on Software Engineering over the Internet, *IEEE Internet Computing*, Sept/Oct 1998; ACM Press Systems Editor, 1988-1993.

Program Committees

2020: International Conference on Software Engineering.

2019: OOPSLA (part of SPLASH, the ACM SIGPLAN conference on Systems, Programming, Languages and Applications: Software for Humanity); 4th International Workshop on Metamorphic Testing (MET).

2018: **Co-Chair** for New Ideas and Emerging Results Track at the ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE-NIER); 3rd International Workshop on Metamorphic Testing (MET).

2017: 2nd International Workshop on Metamorphic Testing (MET); Onward! (part of SPLASH, the ACM SIGPLAN conference on Systems, Programming, Languages and Applications: Software for Humanity); 2nd Annual IEEE International Workshop on Cyber Resilience Economics.

2016: Onward! (part of SPLASH, the ACM SIGPLAN conference on Systems, Programming, Languages and Applications: Software for Humanity); Visions and Reflections (VaR) Track at the ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE); 5th International Workshop on Games and Software Engineering (GAS); 1st International Workshop on

Metamorphic Testing (MET); 1st IEEE International Workshop on Cyber Resilience Economics (CRE); 8th International Workshop on Social Software Engineering (SSE).

2015: OOPSLA (part of SPLASH, the ACM SIGPLAN conference on Systems, Programming, Languages and Applications: Software for Humanity); 7th International Workshop on Social Software Engineering (SSE); 4th International Workshop on Games and Software Engineering (GAS).

2014: 7th IEEE International Conference on Software Testing, Verification and Validation (ICST); Onward! Essays (part of SPLASH, the ACM SIGPLAN conference on Systems, Programming, Languages and Applications: Software for Humanity); 6th International Workshop on Social Software Engineering (SSE).

2013: 6th IEEE International Conference on Software Testing, Verification and Validation (ICST); Onward! Essays (part of SPLASH, the ACM SIGPLAN conference on Systems, Programming, Languages and Applications: Software for Humanity).

2012: **Co-Chair** for 2nd International Workshop on Games and Software Engineering (GAS 2012): Realizing User Engagement with Game Engineering Techniques.

2010: 3rd IEEE International Conference on Software Testing, Verification and Validation.

2009: Onward! (part of the ACM SIGPLAN conference on Systems, Programming, Languages and Applications: Software for Humanity); 6th IEEE International Conference on Autonomic Computing; 4th International Workshop on Software Engineering for Adaptive and Self-Managing Systems.

2008: 5th IEEE International Conference on Autonomic Computing; 3rd International Workshop on Software Engineering for Adaptive and Self-Managing Systems.

2007: 4th IEEE International Conference on Autonomic Computing; 16th International World Wide Web Conference; 2nd Workshop on Software Engineering for Adaptive and Self-Managing Systems; 1st IEEE International Conference on Self-Adaptive and Self-Organizing Systems.

2006: 3rd IEEE International Conference on Autonomic Computing; 15th International World Wide Web Conference, 2nd IEEE Symposium on Dependable Autonomic and Secure Computing.

2005: 2nd IEEE International Conference on Autonomic Computing, 3rd IEEE International Conference on Web Services, 1st IFIP Workshop on Trusted and Autonomic Ubiquitous and Embedded Systems.

2004: 15th IFIP/IEEE International Workshop on Distributed Systems: Operations & Management, 13th International World Wide Web Conference, IASTED International Conference on Software Engineering.

2003: 25th International Conference on Software Engineering.

2001: 27th International Conference on Very Large Databases; 1st Workshop on Engineering of E-Business Applications at the IEEE 10th International Workshops on Enabling Technologies; Working Conference on Complex and Dynamic Systems Architectures.

2000: VLDB Workshop on Technologies for E-Services.

1998: **Vice-Chair of Distributed Software Engineering and Languages** for 18th International Conference on Distributed Computing Systems, 10th ACM Conference on Hypertext and Hypermedia.

1997: **Vice-Chair of Programming Languages, Tools and Software Engineering** for 17th International Conference on Distributed Computing Systems, 8th Israeli Conference on Computer Systems and Software Engineering.

1996: 11th Knowledge-Based Software Engineering Conference; International Conference on Information and Knowledge Management; Annual Workshop on Information Technologies and Systems.

1995: **Chair** for 3rd ACM SIGSOFT Symposium on Foundations of Software Engineering, 17th International Conference on Software Engineering; 10th Knowledge-Based Software Engineering Conference.

1994: 2nd ACM SIGSOFT Symposium on Foundations of Software Engineering; 9th International Software Process Workshop; ICSE Workshop on Research Issues in the Intersection Between Software Engineering and Databases.

1993: **Vice-Chair of Programming Languages, Tools and Software Engineering** for 13th International Conference on Distributed Computing Systems, Conference on Organizational Computer Systems; 15th International Conference on Software Engineering; 4th European Software Engineering Conference.

1992: **Chair** for 2nd International Symposium on Environments and Tools for Ada (ACM SIGADA), 5th SIGSOFT Symposium on Software Development Environments; 14th International Conference on Software Engineering; 4th International Conference on Computer Languages; 7th Knowledge-Based Software Engineering Conference.

1991: 6th ACM Conference on Object-Oriented Programming Systems, Languages, and Applications; 1st International Conference on the Software Process; 6th Knowledge-Based Software Engineering Conference; 3rd International Workshop on Software Configuration Management.

1990: 4th ACM SIGSOFT Symposium on Software Development Environments; 12th International Conference on Software Engineering; 6th International Software Process Workshop (keynote presenter); 1st International Symposium on Environments and Tools for Ada (working group moderator); 23rd Hawaii International Conference on System Sciences (minitrack chair).

1989: 11th International Conference on Software Engineering; 9th International Conference on Distributed Computing Systems.

1988: 3rd Ada Applications and Environments Conference; 21st Hawaii International Conference on System Sciences (minitrack chair).

Other Professional Activities

Patents: CODE RELATIVES DETECTION, with Fang-hsiang Su, Lakshminarasimhan Sethumadhavan, Tony Jebara, publication number 20180046441, preliminary February 10, 2015, application filed February 9, 2016, published February 15, 2018; US Patent 10061753, 9372838, 8468445, SYSTEMS AND METHODS FOR CONTENT EXTRACTION [FROM A MARK-UP LANGUAGE TEXT ACCESSIBLE AT AN INTERNET DOMAIN], with Suhit Gupta, Salvatore J. Stolfo, publication number 20170031883, 20130326332, 20070050708, application filed March 30, 2006 published March 1, 2007, application filed May 23, 2013 published December 5, 2013, application filed June 21, 2016 published February 2, 2017; IT TO20030327, Procedimento E Piattaforma Per La Gestione Automatizzata, Gail Kaiser and Giuseppe Valetto, application filed May 2, 2003 (also Method and platform for the automated management of distributed system, corresponding telecommunications network and computer program product, publication number 20060075087, application filed February 17, 2004, published April 6, 2006).

Conference Organizing Committees: Grace Hopper Celebration of Women in Computing (PhD Forum Committee Member), 2010; IEEE International Workshop on Trusted and Autonomic Computing Systems (Advisory Committee), 2006; 1st IEEE International Conference on Autonomic Computing (Steering Committee), 2004; International Conference on Software Engineering (Tutorials Co-Chair), 2001; International Conference on Software Engineering (Formal Research Demos Chair), 1999.

Advisory Boards: Bergen County [New Jersey] Technical School Computer Science/Information Technology Advisory board, 2016-present; Microsoft Research University Relations Faculty Advisory Board, Redmond WA, 2003.

Consulting: Trustforte Corp., New York NY, June 2008-present; Educational Testing Service, Princeton NJ, December 1995 and April 2000; University of Massachusetts, Amherst MA, September 1999; Andersen Consulting, Chicago IL, August 1993; Siemens Corporate Research, Princeton NJ, June 1981-September 1992; AT&T Bell Laboratories, Murray Hill NJ, October 1985-December 1991; Software Design & Analysis (consulting firm), Boulder CO, May-August 1991; COMPASS, Inc., Wakefield MA, August 1988; Sun Microsystems, Inc., Mountain View CA, August 1986-January 1987; TRW Defense & Space Systems Group, Dayton OH, November 1980-September 1981.

Grant Panels and Site Visit Committees: NSF CISE panels 2016, 2015, 2013, 2004, 1998, 1995, 1989 (2); NSF CISE site visit committees 2014, 2012, 1990; Polytechnic University Center for Advanced Technology in Telecommunications internal proposal review panel, 1992; New York State Science and Technology Foundation CAT site visit committee, 1990.

Grant Proposal Reviews (other than panels): The Netherlands Organisation for Scientific Research (NWO); Kuwait University Office of the Vice President of Research; United States-Israel Binational Science Foundation; Stichting informatica-onderzoek in Nederland (The Netherlands Computer Science Research Foundation); Fonds national suisse de la recherche scientifique (Switzerland NSF); Natural Sciences and Engineering Research Council of Canada (NSERC); Montanans On a New Trac for Science (State of Montana, part of NSF Experimental Program to Stimulate Competitive Research); New York State Science and Technology Foundation; numerous NSF programs (Visiting Professorships for Women; International Programs; Information Technology and Organizations; Operating Systems and Systems Software; Programming Languages and Compilers; Experimental Systems; Database and Expert Systems; Design, Tools and Test; Cooperative Science; New Technologies; Software Systems; Software Engineering; Networking and Communications; Computer Systems Architecture).

Journal Article and Book Reviews (in addition to editorial boards): IEEE Transactions on Emerging Topics in Computing, Springer's International Journal on Software Tools for Technology Transfer, ACM Transactions on Internet Technology, IEEE Transactions on Computers, IEEE Multimedia, IEEE Transactions on Mobile Computing, Journal of Biomedical Informatics, IEEE Transactions on Systems, Man and Cybernetics, Pearson Education, Decision Support Systems, Annals of Software Engineering, Journal of Parallel and Distributed Computing, Journal of Empirical Software Engineering, Journal of Automated Software Engineering, The Computer Journal, Theory and Practice of Object Systems, Information Systems, Journal of Integrated Computer-Aided Engineering, Information and Software Technology, Trends in Software, ACM Letters on Programming Languages and Systems, Addison-Wesley, IEEE Computer Society Press, ACM Transactions on Information Systems, IEEE Parallel and Distributed Technology: Systems and Applications, Journal of Complexity, IEEE Transactions on Knowledge and Data Engineering, Machine Learning, ACM Transactions on Computer Systems, ACM Computing Surveys, IEEE Bulletin on Office Knowledge Engineering, IEEE Transactions on Parallel and Distributed Systems, International Journal of Parallel Programming, IEEE Expert, Acta Informatica, ACM Transactions on Programming Languages and Systems, Computer Science Press, IEEE Transactions on Software Engineering, Computer, IEEE Software, Software - Practice & Experience, Communications of the ACM.

Conference Paper Refereeing (in addition to program committees): 2nd IEEE International Conference on Computer and Communication Technology '11, IEEE International Conference on Data Engineering

and Internet Technology '11, 8th Workshop on Hot Topics in Operating Systems '01, HICSS34 Mini-track on Software Tools '01, SIGPLAN Conference on Programming Language Design and Implementation '00, 8th WETICE workshop on Coordinating Distributed Software Development Projects, CASCON '94 and '93, 6th Architectural Support for Programming Languages and Operating Systems, World Computer Congress IFIP '94 and '89, 3rd IFIP Working Conference on Dependable Computing for Critical Applications, 21st International Conference on Fault-Tolerant Computing, 6th and 5th International Parallel Processing Symposium, 2nd IEEE Symposium on Parallel and Distributed Processing, SIGMOD '90, 1990 International Conference on Computer Languages, 26th, 25th, 24th, 22nd and 20th Hawaii International Conference on System Sciences, OOPSLA '88 Conference, 14th ACM SIGACT/SIGPLAN Symposium on Principles of Programming Languages, 8th International Conference on Software Engineering, 1984 ACM SIGSOFT/SIGPLAN Software Engineering Symposium on Practical Software Development Environments, 1982 ACM AdaTEC Conference on Ada.

Invited Meetings: Senior Researcher Mentor for the "Mentorship Sessions" at the ACM SIGSOFT International Symposium on the Foundations of Software Engineering, 2016; ARO Workshop on Trustworthy Social Computing, 2009 (co-leader of discussion group on Applications and Requirements for Trustworthy Social Computing); XML and Data Binding, 2003; Future Directions in Software Engineering, 1992; Software Engineering Institute Process Definition Advisory Group, 1990; IFIP Working Group 2.4 Systems Implementation Languages, 1990 (observer); Software Engineering Institute Software Process Modeling Evaluation Symposium, 1989; Alvey Information Systems Factory Workshop, 1987.

Professional societies: Vice-Chair for Operations, ACM Special Interest Group on Programming Languages (SIGPLAN), elected term 1991-1993; ACM/SIGPLAN National Lecturer, 1989-1991; ACM SIGPLAN '90 Organizing Committee (Registration Chair), June 1990. Member of AAAI, ACM, IEEE (Senior Member Grade, about 8% of membership is promoted) Computer Society.

Misc.: Academic Reviewer for the Coordinating Committee on Graduate Affairs (CCGA) of the University of California Systemwide Academic Senate, 2017; Session Chair at CMU School of Computer Science 25th Anniversary Symposium, 1990.

Current Graduate Student Advising

PhD Advisees: Riley Spahn (co-advised with Prof. Geambasu, expected to defend "soon"), Anthony Saieva Narin, Shirish Singh (incoming), Aditya Sridhar (incoming).

DES Advisee: Jeffrey Bender.

Doctoral Dissertations Supervised

Riley Spahn, *New Data Protection Abstractions for Emerging Mobile and Big Data Workloads*, proposed January 2019; defense expected summer 2019.

Jeffrey Bender, *Social Addictive Gameful Engineering (SAGE): An Intelligent Game-based Learning and Assessment System that Infuses Computational Thinking in Grade 6-8 Curricula*, proposed December 2018; defense expected someday.

Fang-Hsiang "Mike" Su, *Uncovering Features in Behaviorally Similar Programs*, defended December 2017, deposited January 2018; Research Scientist, Facebook, New York NY.

Nipun Arora, *Sandboxed, Online Debugging of Production Bugs for SOA Systems*, defended September 2017, deposited January 2018; Senior Software Engineer, Dropbox, New York NY.

Jonathan Bell, *Making Software More Reliable by Uncovering Hidden Dependencies*, defended May 2016, deposited May 2016; Assistant Professor, George Mason University, Fairfax VA.

Leon Wu, *Improving System Reliability for Cyber-Physical Systems*, deposited September 2015; CEO and Chief Scientist, Briskpoint, New York NY.

Swapneel Sheth, *Exploring Societal Computing based on the Example of Privacy*, deposited April 2014; Lecturer, University of Pennsylvania, Philadelphia PA.

Christian D. Murphy, *Using Metamorphic Testing at Runtime to Detect Defects in Applications without Test Oracles*, deposited May 2010; Associate Professor of Practice, University of Pennsylvania, Philadelphia PA.

Rean Griffith, *Evaluating Software Systems via Fault-Injection and Reliability, Availability and Serviceability (RAS) Metrics and Models*, deposited October 2008; Principal Engineer, Captricity, San Francisco Bay Area CA.

Janak J. Parekh, *Privacy-Preserving Distributed Event Correlation*, deposited May 2007; Software Engineer, Google, Mountain View CA.

Suhit Gupta, *Context-Based Content Extraction of HTML Documents*, deposited December 2005; Chief Information Officer, Solutions at The Carlyle Group, New York NY.

Giuseppe Valetto, *Orchestrating the Dynamic Adaptation of Distributed Software with Process Technology*, deposited April 2004; Artificial Intelligence Team Leader, Docebo, Milano Italy.

Stephen E. Dossick, *A Virtual Environment Framework for Software Engineering*, deposited November 2000; CTO, PushSpring, Inc., Seattle WA.

Jingshuang Jack Yang, *External, Extensible Transaction Services for WWW-Based Collaborative Systems*, deposited May 2000; Executive Vice President, Beijing Institute of Big Data Research, Beijing China.

Steven S. Popovich, *An Architecture for Extensible Workflow Process Servers*, deposited January 1997; Digital Technical Specialist, Caterpillar, Peoria IL.

George T. Heineman, *A Transaction Manager Component for Cooperative Transaction Models*, deposited June 1996; Associate Professor of Computer Science, Worcester Polytechnic Institute, Worcester MA.

Shyhtsun Felix Wu, *Epsilon-Consistent Real-Time Monitoring for Rapidly Changing Data*, deposited July 1995; Associate Dean of Academic Personnel and Research at College of Engineering and Professor of Computer Science, University of California at Davis, Davis CA.

Israel Z. Ben-Shaul, *A Paradigm for Decentralized Process Modeling and its Realization in the OzEnvironment*, deposited April 1995; Director of Engineering, Google, Tel Aviv Israel.

Ursula Wolz, co-supervised with Kathleen Mckeown, *Extending User Expertise in Interactive Environments: A Task-Centered Approach to Automatic Assistance*, deposited May 1992; Professor, Bennington College.

Naser S. Barghouti, *Concurrency Control in Rule-Based Software Development Environments*, deposited February 1992; Founder and CEO, Objectiva Software Solutions, San Diego CA.

Josephine Micallef, *Incremental Attribute Evaluation for Multi-User Semantics-Based Editors*, Columbia University, deposited May 1991; Senior Research Director, Vencore Labs, Basking Ridge NJ.

MS Dissertations Supervised

Huning (David) Dai, *CONFU: Configuration Fuzzing Testing Framework for Software Vulnerability Detection*, April 2010.

Nipun Arora, *COMPASS: Community driven Parallelization advisor for legacy Software Systems*, May 2009.

Suhit Gupta, *AI2TV - Video Synchronization in a Collaborative Virtual Environment*, May 2001.

Peter D. Skopp, *Low-Bandwidth Operation in a Multi-User Software Development Environment*, December 1995.

Giuseppe Valetto, *Expanding the Repertoire of Process-based Tool Integration*, November 1994.

Tushar M. Patel, *Real-time Portfolio Management and Automatic Extensions*, October 1991.

Madhav Krish Ponamgi, *MpD: A Multiprocessor Debugger*, September 1991.

Israel Z. Ben-Shaul, *An Object Management System for Multi-User Programming Environments*, April 1991.

Shyhtsun F. Wu, *Towards a Framework for Comparing Object-Oriented Systems*, July 1989.

Michael H. Sokolsky, *Data Migration in an Object-Oriented Software Development Environment*, April 1989.

Takahisa Ishizuka, *Tool Extension in an ALOE Editor*, September 1988.

Harris Morgenstern, *An Inconsistency Management System*, March 1987.

Undergraduate Theses Supervised

Francis Hinton, *Wearable Cardiovascular Health Monitor and Mobile Application*, expected May 2019.

Janak J. Parekh, *Palm-sized Hyperweb Manager*, May 1999.

Stephen E. Dossick, *OzWeb: Interfacing the Oz System to the World Wide Web*, December 1996.

Teaching

W3998, W4901, W6901 Projects in Computer Science, undergraduate and graduate students, Fall 1985-present (>200 total, I stopped counting about a decade ago).

W6156 Topics in Software Engineering, primarily graduate students, Spring 2016 (51), Spring 2017 (26), Spring 2018 (17), Spring 2019 (23).

W4156 Advanced Software Engineering, upper-level undergraduates and graduate students, Fall 1989 (32), Spring 1998 (20), Spring 2002 (16), Fall 2002 (20), Fall 2003 (29), Spring 2005 (35), Fall 2006 (35), Fall 2007 (39), Fall 2008 (60), Fall 2009 (46), Fall 2010 (104), Fall 2011 (67), Fall 2013 (48), Fall 2014 (46), Fall 2015 (95), Fall 2016 (141), Summer 2017 (7), Fall 2017 (93), Fall 2018 (117).

E6123 Programming Environments and Software Tools, graduate students, Spring 1987 (24), Spring 1989 (12), Spring 1991 (6), Spring 1993 (16), Fall 1996 (17), Fall 1999 (37), Spring 2015 (11).

E6125 Web-Enhanced Information Management, previously *E6998 Web-Based Information Management*, previously *E6113 Topics in Database Systems: WWW-based Collaborative Work*, graduate students, Fall 1997 (28), Fall 2000 (81), Spring 2003 (34), Spring 2004 (27), Spring 2007 (45), Spring 2008 (57), Spring 2009 (36), Spring 2010 (41), Spring 2011 (34), Spring 2012 (35), Spring 2014 (5).

W4111 Database Systems, previously *E6101 Database Systems*, upper-level undergraduates and graduate students, Spring 1988 (56), Fall 2004 (44).

W3156 Introduction to Software Engineering, undergraduates, Spring 1995 (60), Spring 1996 (48), Spring 1997 (68), Spring 1998 (91), Spring 2000 (90), Spring 2001 (110).

W4115 Programming Languages and Translators, upper-level undergraduates and MS students, Spring 1986 (50), Fall 1986 (53), Fall 1987 (82), Fall 1988 (37), Fall 1990 (53), Fall 1992 (47).

W4118 Operating Systems, upper-level undergraduates and MS students, Spring 1992 (53).

W3131 Data Structures, undergraduates, Fall 1985 (71).

Carnegie Mellon University, Introduction to Computing, experimental section for liberal arts majors (in Lisp), lower-level undergraduates, Fall 1981 (approx. 25).

Short courses and Tutorials: University of Illinois at Urbana-Champaign, Software Management, Illinois Software Summer School, guest lecturer, July 1990; IEEE International Conference on Data Engineering, Database Management Systems for Software Engineering, full-day, February 1990; AT&T Bell Laboratories at Murray Hill and Holmdel, Programming Language Design, Winter 1986-1987 and Summer 1987.

Teaching Assistantships: Carnegie Mellon University, Software Engineering Methods, upper-level undergraduates, Spring 1981.

Other Educational Activities

PhD Dissertation Committees (other than advisees): Gang Hu, *Techniques for Efficient and Effective Mobile Testing*, January 2018; Kyung Hwa Kim, *Towards Trouble-Free Networks for End Users*, August 2017; Suman Srinivasan, *Improving Content Delivery and Service Discovery in Networks*, February 2016; Ohan Oda, *Supporting Multi-User Interactions in Co-Located and Remote Augmented Reality by Improving Reference Performance and Decreasing Physical Interference*, December 2015; Jong Yul Kim, *On SIP Server Clusters and the Migration to Cloud Computing Platforms*, June 2015; Heming Cui, *Stable Multithreading: A New Paradigm for Reliable and Secure Threads*, November 2014; Jeremy Andrus, *Multi-Persona Mobile Computing*, May 2014; Christopher W.A. Dragert, *Model-Driven Development of AI for Digital Games*, McGill University, School of Computing, January 2014; Wonsang Song, *Next Generation Emergency Call System with Enhanced Indoor Positioning*, December 2013; Omer Boyaci, *High Performance Multimedia Collaboration Tools for Application Sharing, Measuring Capture-to-display Latency, and User Created Services*, July 2011; Dinesh Subhraveti, *Record and vPlay: Problem Determination with Virtual Replay Across Heterogeneous Systems*, July 2011; Oren Laaden, *A Personal Virtual Computer Recorder*, September 2010; Shaya Potter, *Operating System Virtualization Mechanisms for Mobility, Security and System Administration*, August 2009; Haoqiang Zheng, *CPU Scheduling with Automatic Interactivity and Dependency Detection*, July 2009; Knarig Arabshian, *Ontology-based context-aware service discovery in a globally distributed network*, May 2008; Marc Eaddy, *An Empirical Assessment of the Crosscutting Concern Problem*, April 2008; Maryam Kamvar, *Using Context to Improve Query Formulation and Entry from Mobile Phones*, April 2008; Ricardo A. Baratto, *THINC: A Virtual and Remote Display Architecture for Desktop Computing*, October 2007; Xiaotao Wu, *Ubiquitous Programmable Internet Telephony End System Services*, February 2007; Kundan Singh, *Reliable, Scalable and Interoperable Internet Telephony*, June 2006; Sinem Güvem, *Authoring and Presenting Situated*

Media in Augmented and Virtual Reality, April 2006; Shlomo Hershkop, *Behavior-based Email Analysis with Application to Spam Detection*, August 2005; Gaurav S. Kc, *Defending Software Against Process-Subversion Attacks*, April 2005; Alexander V. Konstantinou, *Towards Autonomic Computing*, September 2003; Dongwen Wang, *A Generic Execution Model for Sharing of Computer-Interpretable Clinical Practice Guidelines*, Columbia University Department of Medical Informatics, January 2003; Sushil da Silva, *Netscript: A Language System for Active Networks*, October 2002; Kazi Atif-Uz Zaman, *Computing and Querying Datacubes*, December 2000; Jun Rao, *Advanced Query Processing in Databases*, May 2000; Wenke Lee, *A Data Mining Framework for Constructing Features and Models for Intrusion Detection Systems*, June 1999; Blair MacIntyre, *Exploratory Programming of Distributed Augmented Environments*, December 1998; David Gerstl, *Semantic Concurrency Control, Recovery, and Performance Profiling for Improving Response Time in Database Systems*, State University of New York at Stony Brook, Department of Computer Science, December 1998; Zhe Li, *Distributed Join Query Processing Architecture and Techniques*, August 1997; Bruce Zenel, *A Proxy Based Filtering Mechanism for the Mobile Environment*, July 1997; David Espinosa, *Semantic Lego*, March 1995; William N. Schilit, *Context-Aware Software Reconfiguration Supporting Mobile Distributed Computing*, December 1994; Victor Klig, *The Effect of Representation on Learning to Reason with Problems involving Computer Program Oriented Complex Logic*, Teachers College, November 1990; Subrata Mazumdar, *Knowledge-Based Monitoring of Integrated Networks for Performance Management*, Columbia University, Department of Electrical Engineering, August 1990; Scott A. Vorthmann, *Syntax-Directed Editor Support for Incremental Consistency Maintenance*, Georgia Institute of Technology, January 1990; Michael van Biema, *The Constraint-Based Paradigm: The Integration of the Object-Oriented and the Rule-Based Programming Paradigms*, November 1989; Nihal Nounou, *A Methodology for Specification-Based Performance Analysis of Protocols*, June 1986.

PhD Thesis Proposal Committees (other than advisees and dissertation committees): Philip Gross, Wenwey Hseush, Alexia (Henry) Massalin.

PhD Candidacy Exam Committees (other than advisees): Ihimu Ukpo, Gang Hu, Shen Wang, Kangkook Jee, Kyung Hwa Kim, Lauren Wilcox, Suman Srinivasan, Omer Boyaci, Dinesh Subhraveti, Hila Becker, Oren Laaden, Dan Phung, Maryam Kamvar, Josh Reich, Shaya Potter, Knarig Arabsian, Alpa Jain, Sinem Guven, Shlomo Hershkop, Haoqiang Zheng, Gaurav Kc, Dongwen Wang (Medical Informatics), Carl Tait, Michelle Baker, Monnett Hanvey, Michael van Biema.

Misc.: External Review Committee for Hunter College (CUNY) Computer Science Department, May 2003; Mentor for two recipients of Computing Research Association Distributed Mentoring Project, Summers 1995 and 1994; Committee of Examiners for Educational Testing Service Computer Science Advanced Test (GRE), 1990-1993; Faculty Mentor for one recipient of Columbia University GSAS Minority Summer Research Fellowship, Summer 1991.

University Service

Department of Computer Science: Director of Graduate Studies (PhD Chair) 1997-present, PhD Committee 1989-1997; Data Science PhD Specialization Committee 2018-present; MS Machine Learning track advisor 2018-present; MS Software Systems track advisor (and MS Committee) 2004-present; Academic Committee 2014-present; MS Admissions, 2011-present; Faculty Recruiting 2017-2018 and 1996-1997; WICS faculty advisor 2013-14; PhD Admissions Committee Chair 1997-2008, Member 1994-97, AA review for female and minority applicants 1988-92; Representative to Columbia College and/or Columbia College registration advisor 1999-2003, 1994-98 and 1987-91; Software PhD Qualifier Examination Committee Member 1992-1997, Chair 1986-91, Member 1985-86; Budget Committee Chair 1991-92, Member 1989-91; Scheduling PhD candidate instructors and teaching assistants 1987-92; Faculty Service Committee 1987-89; "Marriage" Committee (negotiates PhD advisors) 1987-89; Liaison to Software Engineering Institute Academic Affiliates Program 1986-1991; Facilities Committee 1985-89.

School of Engineering and Applied Science: PhD Data Science Track Curriculum Committee 2018-present; CEPSR Space Committee 1994-1997; Center for Advanced Technology - Computers & Information Systems Executive Committee 1987-93; Center for Telecommunications Research Co-PI for REU summer program 1990 and 1991; Center for Telecommunications Research Education Committee 1989-1991.

University: Columbia Undergraduate Science Journal Faculty Advisory Board, 2005-2007; Information Systems Subcommittee of the University Planning and Budget Committee Fall 1992.