



## **FARNAM JAHANIAN**

President  
Henry L. Hillman President's Chair  
Carnegie Mellon University  
5000 Forbes Avenue  
Pittsburgh, PA 15213-3890  
Phone: 412-268-2200  
e-mail: [president@cmu.edu](mailto:president@cmu.edu)

**Farnam Jahanian** was appointed the tenth president of Carnegie Mellon University by its Board of Trustees in March 2018. He was previously the university's provost and later served as interim president from July 2017 to February 2018.

A nationally recognized computer scientist, entrepreneur, public servant and higher education leader, Jahanian brings to CMU extensive leadership and administrative expertise, not only in advancing research and education within and across disciplines, but also in translating research into technologies and practices that benefit society.

He first joined CMU as vice president for research in 2014, where he was responsible for nurturing excellence in research, scholarship and creative activities. In his role as provost from May 2015 to June 2017, Jahanian had broad responsibility for leading CMU's schools, colleges, institutes and campuses and was instrumental in long-range institutional and academic planning and implementation.

Jahanian holds faculty appointments in the School of Computer Science (Computer Science), the College of Engineering (Electrical and Computer Engineering) and the H. John Heinz III College (Information Systems and Management) at Carnegie Mellon University. His faculty page is available at <http://www.cs.cmu.edu/~farnam/>.

Prior to CMU, Jahanian led the National Science Foundation Directorate for the Computer and Information Science and Engineering (CISE) from 2011 to 2014. With the budget of over \$900 million, he was responsible for directing CISE programs and initiatives that support advances in research and cyber infrastructure, foster broad interdisciplinary collaborations, and contribute to the development of a computing and information technology workforce with skills essential to success in the increasingly competitive global market. He also served as co-chair of the Networking and Information Technology Research and Development (NITRD) Subcommittee of the National Science and Technology Council Committee on Technology, providing coordination and oversight of R&D activities of 17 government agencies.

Working closely with the White House Office of Science and Technology Policy, the CISE Directorate developed and led several presidential initiatives under his leadership, including the National Robotics Initiative (NRI), the National Big Data Research and Development Initiative (BIGDATA), and Cyberlearning and Future Learning Technologies. During his tenure at NSF, CISE also launched several cross-disciplinary research and education programs including Secure and Trustworthy Cyberspace (SaTC), Smart and Connected Health (SCH), Algorithms in the Field, Exploiting Parallelism and Scalability (XPS), and more than doubled the budget of Cyber Physical Systems (CPS). He played a major role in the launch of several public-private partnership programs including US Ignite, which spurs the creation of next-generation applications and services for smart communities, and the highly successful I-Corps program in technology entrepreneurship and research commercialization.

Jahanian was on the faculty at the University of Michigan from 1993 to 2014, where he held the Edward S. Davidson Collegiate Professorship in the College of Engineering, and served as Chair for Computer Science and Engineering from 2007 to 2011 and the Director of the Software Systems Laboratory from 1997 to 2000. He co-founded Arbor Networks in 2001 and served as its President and Chief Scientist until 2004. He remained as Chairman of Arbor Networks until its acquisition in 2010. Earlier in his career, he held research and management positions at the IBM T.J. Watson Research Center. Jahanian's research interests span distributed computing, network security and network protocols and architectures. His research has been sponsored by NSF, DHS, DARPA,

NSA, ONR and numerous companies including Cisco, Intel, Google, Boeing, VeriSign, Hitachi, Hewlett-Packard and IBM.

While at the University of Michigan, Jahanian led several large-scale research projects that studied the growth and scalability of the Internet infrastructure, which ultimately transformed how cyber threats are addressed by Internet Service Providers. In the late 1990s, his research team, including former students, Craig Labovitz and G. Robert Malan, demonstrated fundamental limitations in the core routing architecture of the Internet by uncovering the fragility of the underlying routing infrastructure. The group's seminal work on Internet routing stability and convergence has been highly influential within both the network research community and the Internet operations community. It served as a catalyst for significant changes in commercial Internet routing software implementation and impacted routing policies employed by Internet Service Providers worldwide. The centerpiece of this work was recognized with an ACM SIGCOMM Test of Time Award in 2008. Furthermore, it has inspired significant new endeavors by numerous networking researchers over the last decade.

Anticipating the emergence of increasingly complex, widely distributed cyber attacks on IP-based networks, long before terms such as "distributed denial of service" and "zero-day worms" entered the mainstream, Jahanian led an effort to develop new techniques that combine network topology information and traffic flow statistics to detect, backtrack and filter DDoS attacks. Working from a granular understanding of normal network traffic flows, the anomaly detection technique invented by Jahanian's research team rapidly uncovers distributed attacks, closing a costly gap between the detection of a widely distributed attack and its resolution. This approach, without requiring any changes to the existing Internet routing infrastructure, has transformed how network security is addressed by today's Internet Service Providers.

The impact of Jahanian's contributions to Internet stability and security extends beyond the research community and into industry, as is evident in the successful commercialization of his research through Arbor Networks ([www.arbor.net](http://www.arbor.net)), which Jahanian co-founded with former UM graduate student G. Robert Malan in 2000. Over a 10-year period, Jahanian led the research, co-founded the company, launched its flagship products, and upon his return to the University of Michigan, served as Chief Scientist and Chairman of Arbor Networks setting the strategic direction until its acquisition in 2010. During a three-year leave from the University of Michigan, he led the management team of the company and raised over \$33 million in two rounds of funding from venture capital firms and strategic investors.

At Arbor Networks, Jahanian and his team developed highly scalable, service provider-class solutions for protecting networks against distributed denial of service attacks, zero-day network threats and routing exploits. These Internet security solutions have been widely implemented by hundreds of Internet Service Providers, wireless carriers, cloud service providers and numerous mission-critical networks in leading financial, retail, healthcare and government organizations in 107 countries around the globe, including AT&T, Verizon, British Telecom, Comcast, NTT, Telecom Italia, Vodafone, Internet2, Yahoo and Cisco. In 2010, 70 percent of Internet backbone transit traffic was being protected by their technology. Over the last decade, Arbor Networks's technology has been utilized by the world's leading companies to measure, monitor and defend networks against attack, including 90% of the world's Tier 1 service providers, 8 of the 10 largest cloud service providers, 9 of the 10 largest managed security service providers, 3 of the 5 largest social media networks, 5 of the 6 largest U.S. cable broadband providers, and 4 of the top 6 U.S. banks based on assets under management. In addition, more than 50 global carriers and cloud service providers offer managed security services to their enterprise customers based on Arbor Networks products. The technology has also been used to successfully protect Web properties for five Olympic Games and two World Cups.

The author of over 100 published research papers, Jahanian has also served on dozens of national advisory boards and panels. He serves as chair of the National Research Council's Computer Science and Telecommunications Board (CSTB), sits on the executive committee of the Council on Competitiveness, and is a trustee of the Dietrich Foundation. He is also a board member of the Computing Research Association (CRA), the National Center for Women and Information Technology (NCWIT), the Advanced Robotics for Manufacturing (ARM) Institute, and the Allegheny Conference on Community Development, among others. Jahanian has testified before Congress on a broad range of topics, including cybersecurity, next generation computing and "big data" analytics. He has been an

active advocate for how basic research can be uniquely central to an innovation ecosystem that drives global competitiveness and addresses national priorities, working with entrepreneurs and lecturing on the topic.

He has received numerous awards, including a National Science Foundation CAREER Award (1995), University of Michigan College of Engineering Teaching Excellence Award (1998), Amoco Teaching Award (2000), DARPA Innovation Award (2000), EECS Outstanding Faculty Achievement Award (2005), the State of Michigan Governor's University Award for Commercialization Excellence (2005) and the ACM SIGCOMM Test of Time Award (2008). He was named "Distinguished University Innovator" at the University of Michigan (2009) and "Entrepreneur of the Year" by New Enterprise Forum (2010). In 2015, he received the Computing Research Association's Distinguished Service Award and in 2016, he was honored in Carnegie Corporation of New York's "Great Immigrants — The Pride of America" campaign.

Jahanian holds a master's degree and a Ph.D. in Computer Science from the University of Texas at Austin. He is a Fellow of the Association for Computing Machinery (ACM), the Institute of Electrical and Electronic Engineers (IEEE) and the American Association for the Advancement of Science (AAAS).

# **FARNAM JAHANIAN**

President

Henry L. Hillman President's Chair

Carnegie Mellon University

5000 Forbes Avenue

Pittsburgh, PA 15213-3890

Phone: 412-268-2200

e-mail: president@cmu.edu

## **EDUCATION**

### **UNIVERSITY OF TEXAS AT AUSTIN**

Doctor of Philosophy degree in Computer Science, 1989.

Master of Science in Computer Science, Minor in Electrical Engineering, 1987.

### **UNIVERSITY OF TEXAS AT SAN ANTONIO**

Bachelor of Science in Mathematics, Computer Science, and System Design (Summa cum Laude), 1982.

## **PROFESSIONAL EXPERIENCE**

### **CARNEGIE MELLON UNIVERSITY**

President (March 2018 – present)

Interim President (July 2017 – February 2018)

Provost and Chief Academic Officer (May 2015 – June 2017)

Vice President for Research (August 2014 – April 2015)

Professor, School of Computer Science

Professor, College of Engineering

Professor, Heinz College

### **NATIONAL SCIENCE FOUNDATION**

Directorate for Computer and Information Science and Engineering

(March 2011–August 2014)

### **UNIVERSITY OF MICHIGAN**

Edward S. Davidson Collegiate Professor of EECS

Professor, EECS Department (2001–2014)

Chair, Computer Science and Engineering (2007–2011)

Director, Software Systems Research Lab (1997–2000)

Associate Professor, EECS Department (1995–2001)

Assistant Professor, EECS Department (1993–1995)

### **ARBOR NETWORKS**

Chairman of the Board (2004–2010)

President and Chief Scientist (2000–2004, on leave from UM)

### **IBM T.J. WATSON RESEARCH CENTER**

Senior Manager, Research Division (1991–1993)

Research Staff Member (1989–1991)

### **UNIVERSITY OF TEXAS AT AUSTIN (1984 –1989)**

Research Assistant with the Real-Time Systems Group

## HONORS AND AWARDS

- Professional Societies
  - Fellow of the Association for Computing Machinery (ACM).
  - Fellow of the Institute of Electrical and Electronics Engineers (IEEE).
  - Fellow of the American Association for the Advancement of Science (AAAS).
- Carnegie Corporation of New York's "Great Immigrants —The Pride of America" Campaign Honoree, 2016.
- Computer Research Association (CRA) Distinguished Service Award, 2015.
- New Enterprise Forum Entrepreneur of the Year, 2010.
- Edward S. Davidson Collegiate Professor of EECS, 2009.
- Distinguished University Innovator Award, University of Michigan, 2009.
- Association for Computing Machinery SIGCOMM Test of Time Award, 2008.
- Governor's University Award for Commercialization Excellence (U-ACE), 2005.
- EECS Outstanding Faculty Achievement Award, University of Michigan, 2005.
- Ernst & Young Entrepreneur of the Year Finalist, 2003.
- Amoco Faculty Teaching Award, University of Michigan, 2000.
- IBM Faculty Development Award, 2000.
- DARPA Innovation Award, Fault-Tolerant Networking Program, 2000.
- College of Engineering Teaching Excellence Award, University of Michigan, 1998.
- The *ComputerWorld* Smithsonian Innovation Awards: UARC project, 1998.
- IBM University Partnership Program Research Award, 1998.
- ACM SIGCOMM Best Student Paper Award (Craig Labovitz), 1997.
- EECS Department Teaching Excellence Award, University of Michigan, 1996.
- National Science Foundation CAREER Award, 1995.
- Eta Kappa Nu Honor Society EECS Professor of the Year, 1995.
- IEEE Service Award, 1993.
- IBM Research Division Award, 1992.
- IBM Outstanding Technical Innovation Group Award, 1992.
- Elected to Eta Kappa Nu, Phi Kappa Phi and Alpha Chi honor societies.
- More than 25 company and innovation awards granted to Arbor Networks from 2000-2010 by leading industry publications and organizations including Techworld Award for Security Product Of The Year, Information Security Product Award, and Inc 500 Award.

## REPRESENTATIVE PROFESSIONAL ACTIVITIES AND SERVICES

### *Active Board Memberships and Advisory Committees*

- Council on Competitiveness, Executive Committee, 2017-present.
- Dietrich Foundation, Board of Trustees, 2017-present.
- Pittsburgh Symphony Orchestra, Board of Directors, 2017-present.
- Allegheny Conference on Community Development, Board of Directors, 2017-present.
- The Team Pennsylvania Foundation, Board of Directors, 2017-present.
- Advanced Robotics for Manufacturing (ARM) Institute, Board of Directors, 2016-present.
- Computer Science and Telecommunications Board (CSTB), National Research Council, Chair and Board Member, 2015-present.
- Computer Research Association (CRA), Board of Directors, 2015-present.
- National Center for Women and Information Technology (NCWIT), Board of Directors, 2014-present.
- Ben Franklin Technology Development Authority (BFTDA) Board of Directors, 2016-present.
- Qatar Computing Research Institute, Scientific Advisory Committee, 2014-present.
- IEEE Fellow Selection Committee.

### *Recent Board Memberships and Advisory Committees*

- University of Texas Computer Science Advisory Council, 2015-2017.
- Acrobatiq Inc, Board of Directors, 2015-2017.
- CRA Snowbird Conference, Steering Committee Member, 2015-2016.
- National Governors Association's Cybersecurity Advisory Council, Member, 2012-2014.
- Co-chair, Networking and Information Technology R&D Subcommittee of the National Science and Technology Council's (NSTC) Committee on Technology, 2011-2014.
- External Review Panel, Office of Naval Research, Information Technology Division, 2002, 2007, 2010, 2013.
- IEEE Dependable Systems and Networks, Steering Committee, 2008-2016.
- IFIP Working Group 10.4 on Dependable Computing and Fault-Tolerance, Vice Chair, 2012-2017.
- UM Center for Entrepreneurship, Advisory Board, 2008-2014.
- National Advisory Board, UM Office of Technology Transfer, 2006-2014.
- Twilio Inc., Advisory Board Member, 2009-2011.
- Arbor Networks, Chairman of the Board, 2003-2010.
- Internet2 External Relations Advisory Council (ERAC), Member, 2007-2010.
- Early Stage Partners Advisory Board, 2007-2011.
- Michigan Innovation Board Member, 2009-2010.
- Search Committee, Internet2 CTO and VP Research and Development, 2009.
- Wayne State University, Computer Science Department Advisory Committee, 2005-2010.
- Ann Arbor IT Zone, Board Member, 2004-2008.
- Dartmouth Inst. of Security Technology Studies, Advisory Committee, 2004-2006.
- NSF WG on "Future Scenarios for Networking Research and Associated Infrastructure Support."

### *Significant Editorship and Technical Committees*

- General Chair, IEEE Int. Conf. on Dependable Systems and Networks (DSN), 2010.
- Student Forum Chair, IEEE Int. Conf. on Dependable Systems and Networks, 2007.
- Program Chair, ACM Workshop on Recurring Malcode (WORM), 2006.
- Chair, IFIP Workshop on “Infrastructure Security and Operational Challenges of Service Provider Networks,” June 2006.
- Co-chair, 2nd EU-US Workshop on “Cyber Trust: System Dependability and Security,” April 2006.
- Program Chair, IEEE Int. Conf. on Dependable Systems and Networks (DSN), 2002.
- Program Committee Vice Chair, Fault-Tolerance Track, 21st ICDCS, 2000.
- Publicity Chair, IEEE Int. Conf. On Dependable Systems and Networks, 2000.
- Elected member of IFIP Working Group 10.4 on Dependable Computing, 1998.
- Editor, IEEE Transactions on Computer, 1995-1999.
- Associate Editor, Real-Time Systems Journal, 1997-present.
- Chair, DARPA Working Group on Integrated High-Conf. Computing, 1998-1999.
- Program Committee Vice-Chair, Distributed Real-Time Systems, 16th ICDCS, 1996.
- General Chair - 15th IEEE Real-Time Systems Symposium, 1994.
- Program Chair - 14th IEEE Real-Time Systems Symposium, 1993.
- Over 30 program committees of technical conferences and symposia, including:
  - 2009 ACM/Usenix Symposium on Networked Systems Design and Implementation.
  - 2009, 2010 IEEE Symposium on Security and Privacy.
  - 2008, 2009, 2010 ACM Computer and Communications Security Conference.
  - 2007 IEEE Internet Measurement Conference.
  - 2001, 2002, 2003, 2005, 2007, 2008, 2009, 2012 IEEE International Conference on Dependable Systems and Networks.
  - 2005-2008 International Symposium Recent Advances in Intrusion Detection (RAID).

### *National Science Foundation Review Panels, 2000-2010*

- CAREER Panel, NSF CISE Directorate.
- Site Visit Member, Research Infrastructure, CISE Directorate.
- Science and Technology Center, Panel, Cross-foundation.
- SBIR Panel, ENG Directorate.
- NSF Infrastructure Panel, CISE Directorate.
- Combined Research-Curriculum Development Panel, Engineering Directorate.
- Operating Systems and Compiler Panel, CISE Directorate.
- Cyber Security ITR, CISE Directorate.
- Engineering Research Center, Panel, ENG Directorate.
- NeTS Networking of Sensor Systems, CISE Directorate.
- CyberTrust Program, CISE Directorate.
- Trustworthy Computing Program, CISE Directorate.
- FIND Panel, NSF CISE Directorate.
- Site Visit Member, TRUST Science and Technology Center, Cross-Foundation.

## SELECTED INVITED TALKS AND KEYNOTES (2011-Present)

- “Our Accelerating Digital Future: Trends, Disruptions, and Market Opportunities,” Plenary Talk, Computing Research: Addressing National Priorities and Societal Needs, Computing Research Association’s Computing Community Consortium (CCC), Washington, D.C., October 2017.
- Panel on Cybersecurity, University Industry Demonstration Partnership (UIDP25), Detroit, Michigan, September 2017.
- “The Cybersecurity Imperative,” Keynote Address, DSN 2017: The 47th IEEE/IFIP International Conference on Dependable Systems and Networks, Denver, CO, June 2017.
- “Innovation and Impact in Cyber Security,” Keynote Address, National Science Foundation’s 2017 Secure and Trustworthy Cyberspace (SaTC) Principal Investigators’ Meeting, Arlington, VA, January 2017.
- “Smart & Connected Communities,” Panel, Computing Research Association (CRA) Conference, Snowbird, UT, July 2016.
- “Research Funding Overview,” Invited Talk, Computing Research Association’s 2016 Career Mentoring Workshop, Arlington, VA, February 2016.
- “Academic Perspectives Panel on Smart Cities,” White House Smart Cities Forum, Washington, D.C., September 2015.
- “Accelerating Innovation in a Connected and Data-Rich World: Technology Trends, Disruptive Forces and Market Opportunities,” Keynote, 25<sup>th</sup> Anniversary Conference, Carnegie Bosch Institute, September 2015.
- “Unleashing the Discovery and Innovation Ecosystem,” CSTB Continuing Innovation in Information Technology Forum, National Research Council, Washington, D.C., March 2015.
- “The Transformative Impact of Computing and Communication in a Data-driven World,” Invited talk, Organick Lecture Series, University of Utah, February 2015.
- “Unleashing the Discovery and Innovation Ecosystem,” Keynote and Panel, National Security Agency Cyber Security Forum, Baltimore, MD, October 2014.
- “The Imperative for a Cyber Secure Society,” Keynote Address, Information Trust Institute 10-Year Anniversary, University of Illinois, September 2014.
- “Computation and Data in Networked World,” Keynote Address, ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc), Philadelphia, PA, August 2014.
- “The Transformative Impact of Computation and Communication in a Data-Driven World,” Keynote Address, Extreme Science and Engineering Discovery Environment (XSEDE) Annual Conference, Atlanta, GA, July 2014.
- “The Imperative of Research in the Innovation Ecosystem,” Invited Talk, Computing Community Consortium (CCC) CI Fellows Workshop, San Francisco, CA, May 2014.
- “Innovating for Society: The Transformative Impact of Computing in a Data-Driven World,” Invited talk, Committee on the Status of Women in Computing Research (CRA-W), Grad Cohort Workshop, Santa Clara, CA, April 2014.
- “The Policy Infrastructure for Big Data: From Data to Knowledge to Action,” Invited talk and panel, Big Data Future Conference, Ohio State University, March 2014.
- “Accelerating Innovation in Big Data: From Data to Knowledge to Action,” Keynote Address, Big Data Summit, Washington, DC, March 2014.
- “The Transformative Impact of Computation in a Data-Driven World,” Invited Talk, Super Computing (SC) 2013, Denver, CO, November 2013.
- “The Imperative for a Cyber Secure Society,” Keynote Lecture, Qatar Foundation Annual Research Conference (ARC’ 13), Qatar National Convention Center, Doha, November 2013.
- “Innovating for Society: Realizing the Transformative Impact of Computing and Communication,” Carnegie Mellon University, November 2013.
- “Harnessing the Promise of Data,” Data to Knowledge to Action: Building New Partnerships, White House Office of Science and Technology Policy, Washington, DC, November 2013.



- “Innovating for Society: Realizing the Transformative Impact of Computing and Communication,” CSAIL Colloquium, MIT, September 2013.
- “Innovating for Society: Realizing the Transformative Impact of Computing and Communication,” Invited Talk, Task Force on American Innovation, Washington, DC, September 2013.
- “Innovating for Society: Realizing the Transformative Impact of Computing and Communication,” Keynote Address, Front Range Consortium for Research Computing HPC Symposium, University of Wyoming, August 2013.
- “Building and Protecting Michigan’s Critical Cyber Infrastructure,” Panel, Mackinac Policy Conference, May 2013.
- “The Promise of Big Data,” White House Big Data Partners Workshop, Washington, DC, May 2013.
- “Innovating for Society: Realizing the Transformative Impact of Computing and Communication,” CSE Colloquium, University of Washington, May 2013.
- “Congressional Testimony on “Next Generation Computing and Big Data Analytics,” Subcommittee on Technology and Subcommittee on Research Joint Hearing, Washington, DC, April 2013.
- Leadership in Science Policy Institute, Computing Community Consortium (CCC), Invited Talk, Washington, DC, April 2013.
- “From Data to Knowledge to Discovery,” Keynote Address, Research Data Alliance Launch, Gothenburg, Sweden, March 2013.
- “Pillars of Societal Innovation: The Growing Imperative of Research and Education in Computing,” Biennial CRA Conference at Snowbird, Snowbird, UT, July 2012.
- “Big Data: What it Means and How it Drives Innovation,” TechAmerica U.S. Congressional Big Data Staff Briefing, Washington, DC, May 2012.
- “Realizing the Transformative Impact of Computing and Communication,” Keynote Address, Electrical and Computer Engineering Department Heads Association, Annual Conference, Orlando, Florida, March 2012.
- “Beyond Moore’s Law: A Golden Opportunity for Innovations in Architecture and Software,” AAAS Annual Meeting, Vancouver, CA, February 2012.
- “IT Discovery and Innovation Ecosystem,” Symposium on the Impact Networking and Information Technology, 20<sup>th</sup> Anniversary of NITRD, Washington, DC, February 2012.
- “NSF CISE Programs, Plans and Budget,” Coalition for Academic Scientific Computation (CASC) Spring Meeting, Arlington, VA, February 2012.
- “Innovating for Society: Realizing the Promise of Computing and Communications,” Columbia University, New York, January 2012.
- “Trends, Advances and Transformative Research Opportunities in Computing and Communication,” Keynote Address, Symposium Beyond the Info-plosion, Tokyo, Japan, January 2012.
- “Innovating for Society: Realizing the Promise of Computing and Communications,” Keynote Address, IEEE Global Communications Conference (GLOBECOM), Houston, TX, December 2011.
- “Innovating for Society: Realizing the Promise and Potential of Computing,” Cray Distinguished Speaker Series, University of Minnesota, November 2011.
- “Reflections on the Evolution of Internet Threats: The Growing Imperative for a Cyber Secure Society,” Keynote Address, 18<sup>th</sup> ACM Conference on Computer and Communications Security (CCS), Chicago, Illinois, October 2011.
- “The Promise of Smart Health,” Keynote Address, Wireless Health Annual Conference, San Diego, CA, October 2011.
- “Innovating for Society: Realizing the Promise and Potential of Computing,” Keynote Address, 17<sup>th</sup> Annual ACM International Conference on Mobile Computing and Networking (ACM MobiCom), September 2011.
- “CPS Past and Future,” Cyber Physical Systems Principal Investigator Meeting, National Harbor,

MD, August 2011.

- “Innovating for Society: Realizing the Promise and Potential of Computing,” Keynote Address, International Conference on Distributed Computing Systems (ICDCS), June 2011.
- Congressional Testimony on “Protecting Information in the Digital Age,” Subcommittee on Technology and Innovation and Subcommittee on Research and Science Education Joint Hearing, Washington, DC, May 2011.
- “The Growing Imperative and Transformative Impact of Cyber-Physical Systems,” Keynote Address, Cyber Physical Systems Week, April 2011.
- “Securing the Internet Cloud: A Perspective on Seeding Innovation and Technology Transfer,” New Enterprise Forum Entrepreneur of the Year Speech, NEF 25<sup>th</sup> Anniversary Gala, February 2011.

## RESEARCH PROJECTS ([nsrg.eecs.umich.edu](http://nsrg.eecs.umich.edu))

- “*In-Cloud Security Services for Mobile Devices*,” National Science Foundation, Farnam Jahanian (PI), Michael Bailey, 2009-2014.
- “*Mission Assurance in Tomorrow's IP-based Networks*,” Boeing Corporation, Farnam Jahanian (PI), Michael Bailey, 2010-2013.
- “*Virtual Center for Network and Security Data*,” Department of Homeland Security, Farnam Jahanian (PI), Michael Bailey, (UM); Paul Barford (U. Wisconsin); Nick Feamster (Georgia Tech); Manish Karir (Merit Network), 2005-2014.
- “*Botnet Attribution and Removal: from Axioms to Theories to Practice*,” ONR MURI Award, Wenke Lee (PI), Nick Feamster, David Dagon (Georgia Tech); Kang Shin, Farnam Jahanian, Mike Bailey (UM); Christopher Kruegel, Giovanni Vigna (UCSB); John Mitchell (Stanford), 2009-2014.
- “*In-Cloud Security for Mobile Devices*,” Google, Farnam Jahanian (PI), 2009.
- “*Topology-Aware Internet Threat Detection Using Pervasive Darknets*,” National Science Foundation, Farnam Jahanian (PI) and Jignesh Patel, 2006-2010.
- “*CLEANSE: Cross-Layer Large-Scale Efficient Analysis of Network Activities to SEcure the Internet*,” National Science Foundation, Wenke Lee (PI), Nick Feamster, David Dagon, Mustaque Ahamad (Georgia Tech); Farnam Jahanian, Mike Bailey (UM); Mike Reiter, Fabian Monrose (UNC), 2008-2012.
- “*New Frameworks for Detecting and Minimizing Information Leakage in Anonymized Network Data*,” Department of Homeland Security, Fabian Monrose (PI) Johns Hopkins University; Farnam Jahanian and Michael Bailey (UM); Mike Reiter (CMU), 2008-2010.
- “*Collaborative Research: Enabling Security and Network Management Research for Future Networks*,” National Science Foundation, Morley Mao (PI), Farnam Jahanian (UM); Wenke Lee and Nick Feamster (Georgia Tech); Manish Karir (Merit Network); Southern Crossroads, 2008-2011.
- “*Detecting and Dismantling Botnet Command and Control Infrastructure using Behavioral Profilers and Bot Informants*,” Department of Homeland Security, Farnam Jahanian (PI), Morley Mao (UM); Greg Travis (Indiana University); Manish Karir (Merit Network), 2006-2008.
- “*Internet Motion Sensor*,” Gift from Intel Corporation, Farnam Jahanian (PI), 2006.
- “*Internet Motion Sensor*,” Gift from Cisco Systems, Farnam Jahanian (PI), 2006.
- “*Distributed Systems Instructional Infrastructure*,” Intel Corporation Equipment Grant, 2004. Farnam Jahanian (PI).
- “*Multi-Tiered Distributed Indication, Warning and Defense System*,” Sponsored by ARDA, Farnam Jahanian (PI) and Peter Chen, 2003-2004.
- “*Lighthouse Project: Detecting and Surviving Large-Scale Network Infrastructure Attacks*,” Sponsored by DARPA, Farnam Jahanian (PI) and Paul Howell (Merit Network), 1999-2003.
- “*Internet Infrastructure Scalability and Stability*,” Intel Corporation, 1999-2000. Farnam Jahanian (PI).
- “*IPMA Project: Internet Performance Measurement & Analysis*,” National Science Foundation, Craig Labovitz (Merit Net) and Farnam Jahanian (Co-PI), 1997-2000.
- “*Experimentation with Multi-Threaded, Distributed Routing Technology in the Internet*,” National Science Foundation, Farnam Jahanian (PI) and Craig Labovitz (Merit Network), 1997-2000.
- “*Development of Ultra High Speed Next Generation Internet Technology*,” Sponsored by Hitachi Corporation, Farnam Jahanian (PI), Craig Labovitz and Hirabaru Masaki (Merit Network), 1999-2000.
- “*Middleware Services for Collaboratives on Wide-Area Networks*,” Sponsored by Intel Corporation, Farnam Jahanian (PI), 1997-2000.
- “*The SPARC Project: Collaborative Knowledge-Work Environments for Team Science*,” National Science Foundation KDI Initiative, Dan Atkins (PI), Gary Olson, Farnam Jahanian, Tim Killeen and Atul Prakash, 1998-2001.

- Network Infrastructure Equipment Gift, CISCO Systems, 1999.
- *“IBM UPP: Networking Support for Adaptive Internet-based Applications,”* IBM, Farnam Jahanian and Brian Noble, 1998.
- *“ARMADA Project: Building Scalable Real-Time Fault-Tolerant Systems for Embedded Applications,”* Sponsored by DARPA, Kang Shin (PI), Farnam Jahanian and Peter Chen, 1995-99.
- National Science Foundation *CAREER Award*, Farnam Jahanian (PI), 1995-1999.
- *“End-to-End Performance Studies of Web-Based Groupware and Collaborative Applications over the Internet,”* Sponsored by Hewlett-Packard Company, Farnam Jahanian (PI) and Sugih Jamin, 1997-1998.
- *“Integrated Execution Simulation and Monitoring Environment for the Modechart Toolset,”* Naval Research Laboratories, 1996-1998, Farnam Jahanian (PI).
- *“Enabling Multimedia-Based Collaboration over Computer networks,”* Sponsored by the AT&T Foundation, Atul Prakash (PI) and Farnam Jahanian.
- *“Probing and fault Injection of Distributed Real-Time Protocols,”* Office of Naval Research,

## DOCTORAL COMMITTEES CHAIRED

- Jakub Jerzy Czyz – May 2016  
“Studies on the Deployment and Security of the Emerging IPv6 Internet”
- Jing Zhang – December 2015  
“A Macroscopic Study of Network Security Threats at the Organizational Level”
- Yunjing Xu – December 2013  
“Characterizing and Mitigating Virtual Machine Interference in Public Clouds”
- Jon Oberheide – December 2011  
“Leveraging the Cloud for Software Security Services”
- Sushant Sinha – August 2009  
“Context-Aware Network Security”
- Michael D. Bailey – May 2006  
“A Scalable Hybrid Network Monitoring Architecture for Measuring, Characterizing, and Tracking Internet Threat Dynamics”
- Junghee Han – December 2004  
“Enhancing End-to-end Availability and Performance by Leveraging Internet Redundancy”
- David Watson – May 2004  
“Measurement and Analysis of Routing Protocol Behavior on Production Networks”
- Scott Johnson – December 2001  
“Scalable Group Composition”
- G. Robert Malan – May 2000  
“Transparent Measurement and Manipulation of Internet Protocols”
- Craig Labovitz – August 99  
“Scalability of Internet Backbone Routing Infrastructure”
- Monica Brockmeyer – May 99  
“Monitoring, Testing, and Abstractions of Real-Time Specifications”
- Hengming Zou – December 99  
“Dynamic Active-Passive Replication”
- Scott Dawson – December 97  
“Message Level Fault Injection in Distributed Systems”
- Wu-chi Feng – August 96  
“Video-on-Demand services: Efficient Transportation and Decompression of Variable Bit Rate Video”
- Served on 25+ doctoral dissertation committees (1993-2010)
- Supervised 50+ undergraduates in my research group since joining UM

## TEACHING RECORD

| <b>Term</b> | <b>EECS Course</b>    | <b>Enrollment</b> | <b>Class Score*</b> | <b>Instructor Score*</b> |
|-------------|-----------------------|-------------------|---------------------|--------------------------|
| Fall 93     | 682: Special Topic    | 28                | 4.71                | 4.89                     |
| Winter 94   | 582: Adv. OS          | 22                | 4.28                | 4.80                     |
| Fall 94     | 482: Intro OS         | 89                | 4.70                | 4.84                     |
| Winter 95   | 482: Intro OS         | 108               | 4.60                | 4.86                     |
| Fall 95     | 682: Special Topic    | 26                | 4.42                | 4.78                     |
| Winter 96   | 380: Data Structures  | 76                | 4.38                | 4.87                     |
| Fall 96     | 682: Distributed Syst | 27                | 4.65                | 4.89                     |
| Winter 97   | 482: Intro OS         | 83                | 4.40                | 4.90                     |
| Fall 97     | 591: Distributed Syst | 41                | 4.21                | 4.70                     |
| Winter 98   | 482: Intro OS         | 125               | 4.33                | 4.69                     |
| Fall 98     | 591: Distributed Syst | 38                | 4.18                | 4.46                     |
| Winter 99   | 482: Intro OS         | 125               | 4.57                | 4.85                     |
| Fall 00     | 591: Distributed Syst | 40                | 4.40                | 4.64                     |
| Fall 01     | 281: Data Structures  | 54                | 4.16                | 4.64                     |
| Winter 03   | 591: Distributed Syst | 34                | 4.25                | 4.65                     |
| Fall 03     | 498: Intro Dist Syst  | 14                | 4.78                | 4.96                     |
| Winter 04   | 591: Distributed Syst | 26                | 4.63                | 4.80                     |
| Fall 04     | 281: Data Structures  | 54                | 4.25                | 4.82                     |
| Winter 05   | 591: Distributed Syst | 22                | 4.00                | 4.77                     |
| Fall 05     | 498: Intro Dist Syst  | 21                | 4.83                | 4.96                     |
| Winter 06   | 591: Distributed Syst | 22                | 4.55                | 4.77                     |
| Fall 06     | 496: Major Design     | 132               | 3.95                | 4.74                     |
| Winter 07   | 591: Distributed Syst | 23                | 4.67                | 4.88                     |
| Fall 07     | 496: Major Design     | 128               | 4.22                | 4.71                     |
| Fall 08     | 496: Major Design     | 115               | 4.65                | 4.90                     |
| Fall 09     | 496: Major Design     | 170               | 4.60                | 4.85                     |
| Fall 10     | 496: Major Design     | 162               | 4.60                | 4.88                     |

\* Maximum score of 5.

## SELECTED REFEREED PUBLICATIONS

(Full list of research group's publications at [nsrg.eecs.umich.edu/publications.html](http://nsrg.eecs.umich.edu/publications.html))

- F. Jahanian, "The Policy Infrastructure for Big Data: From Data to Knowledge to Action," Journal of Law and Policy for Information Society, vol. 10, no. 3, Winter 2015.
- Y. Xu, M. Bailey, B. Noble and F. Jahanian, "Small is Better: Avoiding Latency Traps in Virtualized Data Centers." Proceedings of the 2013 ACM Symposium on Cloud Computing (SoCC'13) Santa Clara, CA, USA, Oct. 2013.
- J. Zhang, R. Berthier, W. Rhee, M. Bailey, P. Pal, F. Jahanian, and W. Sanders, "Learning from Early Attempts to Measure Information Security Performance." Proceeding of the 5th Workshop on Cyber Security Experimentation and Test (CSET '12), Bellevue, Washington, Aug. 2012.
- J. Zhang, R. Berthier, W. Rhee, M. Bailey, P. Pal, F. Jahanian, and W. Sanders, "Safeguarding Academic Accounts and Resources with the University Credential Abuse Auditing System." Proceedings of the 42nd Annual IEEE International Conference on Dependable Systems and Networks (DSN '12), Boston, MA, June 2012.
- Y. Xu, M. Bailey, F. Jahanian, K. Joshi, M. Hiltunen, and R. Schlichting, "An Exploration of L2 Cache Covert Channels in Virtualized Environments." Proceedings of the 3rd ACM Cloud Computing Security Workshop (CCSW '11), Chicago, Illinois, Oct. 2011.
- K. Nyalkalkar, S. Sinha, M. Bailey, and F. Jahanian, "A Comparative Study of Two Network-based Anomaly Detection Methods." In (mini-conference) the 30th IEEE International Conference on Computer Communications (INFOCOM '11), Shanghai, China, Apr. 2011.
- E. Wustrow, M. Karir, M. Bailey, F. Jahanian, and G. Houston, "Internet Background Radiation Revisited." ACM/USENIX Internet Measurement Conference, Melbourne, Australia, Nov. 2010.
- C. Labovitz, S. Ikle-Johnson, D. McPherson, J. Oberheide and F. Jahanian, "Internet Inter-Domain Traffic." Proceedings of ACM SIGCOMM, August 2010.
- Y. Xu, M. Bailey and F. Jahanian, "CANVuS: Context-Aware Network Vulnerability Scanning." 13th International Symposium on Recent Advances in Intrusion Detection (RAID), Ottawa, CA, Sept. 2010.
- S. Sinha, M. Bailey, and F. Jahanian, "Improving SPAM Blacklisting through Dynamic Thresholding and Speculative Aggregation." 17th Annual Network & Distributed System Security Symposium (NDSS'10), San Diego, CA, Mar. 2010.
- J. Oberheide and F. Jahanian, "When Mobile is Harder Than Fixed: Demystifying Security Challenges in Mobile Environments." Eleventh Workshop on Mobile Computing Systems and Applications (HotMobile), Annapolis, MD, Feb. 2010.
- J. Oberheide, M. Bailey, and F. Jahanian, "PolyPack: An Automated Online Packing Service for Optimal Antivirus Evasion." 3rd USENIX Workshop on Offensive Technologies (WOOT '09), Montreal, Canada, Aug. 2009.
- J. Oberheide, E. Cooke, and F. Jahanian, "If It Ain't Broke, Don't Fix It: Challenges and New Directions for Inferring the Impact of Software Patches." Workshop on Hot Topics in Operating Systems (HotOS XII), May 2009.
- S. Sinha, M. Bailey, and F. Jahanian, "One Size Does Not Fit All: 10 Years of Applying Context Aware Security." Proceedings of the 2009 IEEE International Conference on Technologies for Homeland Security (HST '09), Waltham, MA, May 2009.
- M. Bailey, E. Cooke, F. Jahanian, Y. Xu, and M. Karir. "A Survey of Botnet Technology and Defenses." Proceedings of the Cybersecurity Applications & Technology Conference For Homeland Security (CATCH '09), Washington, DC, Mar. 2009.
- J. Oberheide, E. Cooke, and F. Jahanian, "CloudAV: N-Version Antivirus in the Network Cloud." Proceedings of the 17th USENIX Security Symposium, July 2008.
- J. Oberheide, K. Veeraraghavan, E. Cooke, J. Flinn, and F. Jahanian, "Virtualized In-Cloud Security Services for Mobile Devices." Workshop on Virtualization in Mobile Computing (MobiVirt'08), June 2008.

- S. Sinha, M. Bailey, and F. Jahanian. "Shades of Grey: On the Effectiveness of Reputation-based blacklists," Proceedings of the 3rd International Conference on Malicious and Unwanted Software (MALWARE '08), pages 57-64, Fairfax, Virginia, USA, Oct. 2008.
- J. Oberheide, E. Cooke, and F. Jahanian, "Exploiting Live Virtual Machine Migration," Black Hat DC, Washington DC, Feb. 2008.
- M. Bailey, J. Oberheide, J. Andersen, Z. M. Mao, F. Jahanian, and J. Nazario, "Automated Classification and Analysis of Internet Malware," 10th International Symposium Recent Advances in Intrusion Detection (RAID), Queensland, Australia, Sept. 2007.
- J. Oberheide, E. Cooke, and F. Jahanian, "Rethinking Antivirus: Executable Analysis in the Network Cloud," 2nd USENIX Workshop on Hot Topics in Security (HotSec), Boston, MA, Aug. 2007.
- J. Oberheide, M. Karir, Z. M. Mao and F. Jahanian, "Characterizing Dark DNS Behavior," Proceedings of the 4th International Conference on Detection of Intrusions and Malware, and Vulnerability Assessment (DIMVA'07)," Switzerland, July 2007.
- S. Sinha, M. Bailey, and F. Jahanian, "Shedding Light on the Configuration of Dark Addresses," Network and Distributed System Security Symposium (NDSS), San Diego, California, Feb. 28-Mar. 2, 2007.
- E. Cooke, A. Myrick, D. Rusek, and F. Jahanian, "Resource-Aware Multi-Format Network Security Data Storage," Proceedings of the SIGCOMM Workshop on Large Scale Attack Defense (LSAD'06), Sept. 2006.
- S. Sinha, F. Jahanian, and J. Patel, "WIND: Workload-aware Intrusion Detection," 9th International Symposium on Recent Advances in Intrusion Detection (RAID), Hamburg, Germany, Sept. 2006.
- E. Cooke, Z. M. Mao, and F. Jahanian, "Hotspots: The Root Causes of Non-Uniformity in Self-Propagating Malware," International Conference on Dependable Systems and Networks (DSN 2006), Philadelphia, PA, pp. 179-188, June 2006.
- J. Han, D. Watson, F. Jahanian, "An Experimental Study of Internet Path Diversity," IEEE Transactions on Dependable and Secure Computing, vol. 3, no. 4, pp. 273-288, Oct-Dec, 2006.
- E. Cooke, M. Bailey, F. Jahanian, and R. Mortier, "The Dark Oracle: Perspective-Aware Unused and Unreachable Address Discovery," 3rd Symposium on Networked Systems Design and Implementation (NSDI06), San Jose, CA, May 2006.
- M. Bailey, E. Cooke, F. Jahanian, A. Myrick, and S. Sinha, "Practical Darknet Measurement," Proceedings of the 40th Annual Conference on Information Sciences and Systems (CISS '06), pages 1496-1501, Princeton, New Jersey, Mar. 2006.
- M. Bailey, E. Cooke, F. Jahanian, N. Provos, K. Rosaen, and D. Watson, "Data Reduction for the Scalable Automated Analysis of Distributed Darknet Traffic," Internet Measurement Conference (IMC 2005), Oct. 2005.
- M. Bailey, E. Cooke, F. Jahanian, J. Nazario, and D. Watson, "The Blaster Worm: Then and Now," IEEE Security & Privacy Magazine, volume 3, issue 4, pp. 26- 31, July-Aug. 2005.
- E. Cooke, F. Jahanian, and D. McPherson, "The Zombie Roundup: Understanding, Detecting, and Disrupting Botnets," Usenix Workshop on Steps to Reducing Unwanted Traffic on the Internet (SRUTI 2005), pp. 39-44, Cambridge, MA, July 2005.
- J. Han, D. Watson, and F. Jahanian, "Topology Aware Overlay Networks," IEEE Infocom, Miami, FL, Mar. 2005.
- M. Bailey, E. Cooke, F. Jahanian, J. Nazario, and D. Watson, "The Internet Motion Sensor: A Distributed Blackhole Monitoring System," Proceedings of the 12th Annual Network and Distributed System Security Symposium (NDSS), San Diego, CA, Feb. 2005.
- E. Cooke, M. Bailey, Z. M. Mao, D. Watson, F. Jahanian, and D. McPherson, "Toward Understanding Distributed Blackhole Placement," WORM'04, Washington, DC, pp. 56-64, Oct. 2004.
- J. Han and F. Jahanian, "Impact of Path Diversity on Multi-homed and Overlay Networks," IEEE International Conference on Dependable Systems and Networks (DSN-2004), Florence, Italy, pp. 22-31, June 2004.



- D. Watson, M. Smart, G. R. Malan, and F. Jahanian, "Protocol Scrubbing: Network Security through Transparent Flow Modification." IEEE/ACM Transactions on Networking, vol. 12, no. 2, pp. 261-73, April 2004.
- D. Watson, G. R. Malan, and F. Jahanian, "An extensible probe architecture for network protocol performance measurement." vol. 34, Software Practice & Experience, 2004.
- M. Bailey, F. Jahanian, G. R. Malan, J. Nazario, D. Song, and R. Stone, "Measuring, Characterizing, and Tracking Internet Threat Dynamics," Proceedings of the OpenSig 2003 Workshop (OpenSig '03), New York, NY, Oct. 2003.
- D. Watson, F. Jahanian, and C. Labovitz, "Experiences with Monitoring OSPF on a Regional Service Provider Network." 23rd IEEE International Conference on Distributed Computing Systems (ICDCS), pp. 204-213, May 2003.
- J. Han, G. Robert Malan, and F. Jahanian, "Fault-tolerant virtual private networks within an autonomous system." Proceedings of 21st IEEE Symposium on Reliable Distributed Systems, pp. 13-16, Oct. 2002.
- C. Labovitz, A. Ahuja, A. Bose, and F. Jahanian, "Delayed internet routing convergence." IEEE/ACM Transactions on Networking, vol. 9, no. 3, pp. 293-306, June 2001.
- D. Stuart, M. Brockmeyer, F. Jahanian, and A.K. Mok, "Simulation and Verification: Biting at the State Explosion Problem." vol. 27, no. 7, pp. 599-617, IEEE Transactions on Software Engineering, July 2001.
- D. Watson, M. Smart, G.R. Malan, and F. Jahanian, "Protocol scrubbing: network security through transparent flow modification." Proceedings of DISCEX'01: DARPA Information Survivability Conference & Exposition II, Vol. 2, pp. 108-118, June 2001.
- M. Brockmeyer, F. Jahanlan, C. Heitmeyer, and E. Winner, "A flexible, extensible simulation environment for testing real-time specifications." IEEE Transactions on Computers, Vol. 49, no. 11, pp. 1184-2001, Nov. 2000.
- S. Johnson, F. Jahanian, A. Miyoshi, D. de Niz, R. Rajkumar, "Constructing real-time group communication middleware using the Resource Kernel." 21st IEEE Real-Time Systems Symposium, pp. 3-12, Nov. 2000.
- C. Labovitz, A. Ahuja, A. Bose, and F. Jahanian, "An Experimental Study of BGP Convergence," Proceedings of ACM SIGCOMM 2000, Stockholm, Sweden, pp. 175-87, Aug. 2000.
- M.C. Smart, R.G. Malan, and F. Jahanian, "Defeating TCP/IP Stack Fingerprinting," 9th USENIX Security Symposium, Denver, CO, pp. 229-39, August 2000.
- S. Johnson, F. Jahanian, S. Ghosh, B. VanVoorst, and N. Weininger, "Experiences with Group Communication Middleware." Practical Experience Report, Int. Conference on Dependable Systems and Networks (DSN-2000), New York, NY, pp. 37-42, June 2000.
- R. Malan, D. Watson, F. Jahanian, and P. Howell, "Transport and Application Protocol Scrubbing." Proceeding of INFOCOM2000, Israel, Vol. 3, pp. 1381-90, Mar. 2000.
- H. Zou, N. Soparkar, F. Jahanian, "Probabilistic Data Consistency for Wide-Area Applications." Abstract in 16th International Conference on Data Engineering, pp. 85, Feb.-Mar. 2000.
- S. Subramanian, G.R. Malan, H.S. Shim, J.H. Lee, P. Knoop, T. Weymouth, F. Jahanian, A. Prakash, and J. Hardin, "The UARC Web-Based Collaboratory: Software Architecture and Experiences," Chapter 1 in Handbook of Internet Computing, 2000.
- G. Olson, D. Atkins, B. Clauer, T. Weymouth, A. Prakash, T. Finholt, F. Jahanian, and C. Rassmussen, "The Upper Atmospheric Research Collaboratory (UARC)," in Coordination Theory and Collaboration Technology, ed. by T. Malone, and J. Smith, Lawrence Erlbaum Associates, 2000.
- H. Zou and F. Jahanian, "Real-Time Primary-Backup Replication with Temporal Consistency Guarantees." IEEE Transactions on Parallel & Distributed Systems, vol. 10, no. 6, pp. 533-48, June 1999.
- S. Subramanian, G.R. Malan, H.S. Shim, P. Knoop, T. Weymouth, F. Jahanian, and A. Prakash, "Software Architecture for the UARC Web-based Collaboratory." IEEE Internet Computing, vol. 3, no. 2, pp. 46-54, Mar.-Apr. 1999.

- S. Johnson and F. Jahanian, and J. Shah, "The Inter-Group Router Approach to Scalable Group Composition." Proceedings of 19th International Conference on Distributed Computing Systems, ICDCS-99, Austin, TX, pp. 4-14, June 1999.
- C. Labovitz, A. Ahuja, and F. Jahanian, "Experimental Study of Internet Stability and Wide-Area Backbone Failures." Proceedings of FTCS-29, the 29th International Symposium on Fault-Tolerant Computing Madison, Wisconsin, pp. 278-285, June 1999.
- T. Abdelzaher, S. Dawson, W.C. Feng, F. Jahanian, S. Johnson, A. Mehra, T. Mitton, A. Shaikh, K. Shin, Z. Wang, and H. Zou, "ARMADA Middleware and Communication Services," Real-Time Systems Journal, vol. 16, no. 2-3, pp. 127-53, May 1999.
- C. Labovitz, G.R. Malan, and F. Jahanian, "Origins of Internet Routing Instability." Proceedings of INFOCOM99, New York, NY, vol. 1, pp. 218-26, Mar. 1999.
- Craig Labovitz, G. Robert Malan, and Farnam Jahanian, "Internet Routing Instability." ACM/IEEE Trans. on Networking, vol. 6, no. 5, pp. 515-528, Oct. 1998.
- H. Zou and F. Jahanian, "Optimization of a Real-Time Primary-Backup Replication Service." Proceedings of the IEEE Symposium on Reliable Distributed Systems, Oct. 1998.
- G. Robert Malan and Farnam Jahanian, "An Extensible Probe Architecture for Network Protocol Performance Measurement." Proceedings of the ACM SIGCOMM '98 Conference, Vancouver, British Columbia, Sept. 1998.
- Hengmin Zou and Farnam Jahanian, "Real-Time Primary-Backup Replication with Temporal Consistency Guarantees." Proceedings of the IEEE International Conference on Distributed Computing Systems, Amsterdam, The Netherlands, June 1998.
- G. R. Malan, F. Jahanian, and S. Subramanian, "Attribute-Based Data Dissemination for Internet Applications." Journal of High-Speed Networking Special Issue Multimedia Networking, Vol. 7, Number 3-4, pp. 319-337, 1998.
- G. Olson, D. Atkins, R. Clauer, T. Finholt, F. Jahanian, T. Killeen, A. Prakash, and T. Weymouth, "The Upper Atmospheric Research Collaboratory." ACM Interactions Magazine, v. 3, pp. 48-55, May-June 1998.
- S. Dawson, F. Jahanian, and T. Mitton, "Experiments on Six Commercial TCP Implementations Using a Software Fault Injection Tool." Software Practice and Experience, vol. 27, no. 12, pp. 1385-1410, Dec. 1997.
- G. Robert Malan, Farnam Jahanian, and Sushila Subramanian, "Salamander: A Push-based Distribution Substrate for Internet Applications." Proceedings of the USENIX Symposium on Internet Technologies and Systems, Monterey, California, Dec. 1997.
- C. Labovitz, G.R. Malan, and F. Jahanian, "Internet Routing Instability." Proceedings of ACM SIGCOMM, Best Student Paper Award, Sept. 1997. (Extended version in ACM/IEEE Transaction on Networking, Oct. 1998.)
- A. Mehra, J. Rexford, and F. Jahanian, "Design and Evaluation of a Window-Consistent Replication Service." IEEE Transactions on Computer, vol. 46, no. 9, Sept. 1997.
- H. S. Shim, R. Hall, A. Prakash, and F. Jahanian, "Providing Flexible Services for Managing Shared State in Collaborative Systems." Proceedings of the European Conference on Computer Supported Cooperative Work (ECSCW 97), Lancaster, UK, Sept. 1997.
- W. Feng, F. Jahanian, and S. Sechrest, "An Optimal Bandwidth Allocation Algorithm for the Delivery of Compressed Video." ACM/Springer Verlag Multimedia Systems Journal, pp. 297-309, Sept. 1997.
- M. Brockmeyer, F. Jahanian, C. Heitmeyer, B. Labaw, "A Flexible, Extensible Simulation Environment for Testing Real-Time Specifications." Proceedings of IEEE Real-Time Technology & Applications Symposium, Montreal, pp. 125-35, June 1997.
- G. Robert Malan, Farnam Jahanian, and Peter Knoop, "Comparison of Two Middleware Data Dissemination Services in a Wide-Area Distributed System." Proceedings of the 17th IEEE International Conference on Distributed Computing Systems, Baltimore, MD, pp. 411-419, May 1997.
- K.-J. Lin and F. Jahanian, "Requirements and Issues of Real-Time Database Systems," in Real-Time Database Systems: Issues and Applications, ed. by Sang Son, Kluwer Academic Publishers, 1997.

- R. W. Hall, A. G. Mathur, F. Jahanian, A. Prakash, and C. Rasmussen, "Corona: A Communication Service for Scalable, Reliable Group Collaboration Systems." Proceedings of the ACM Conf. on Computer Supported Cooperative Work (CSCW '96), 1996.
- S. Dawson, F. Jahanian, and T. Mitton, "ORCHESTRA: a probing and fault injection environment for testing protocol implementations." Proceedings of IEEE International Computer Performance and Dependability Symposium, Sept. 1996.
- W. Feng, F. Jahanian, S. Sechrest, "Providing VCR Functionality in a Constant Quality Video-On-Demand Transportation Service." IEEE Multimedia Computing Systems, Hiroshima, Japan, pp. 127-135, June 1996.
- T. Abdelzاهر, A. Shaikh, F. Jahanian, and K. Shin, "RTCAST: Lightweight Multicast for Real-Time Process Groups." (Best Student Paper Award) IEEE Real-Time Technology and Applications Symposium, pp. 250-259, June 1996.
- S. Dawson, F. Jahanian, T. Mitton, and T.-L. Tung, "Testing of Fault-Tolerant and Real-Time Distributed Systems via Protocol Fault Injection." Int. Symposium on Fault Tolerant Computing (FTCS-26), pp.404-414, June 1996.
- D. Stuart, F. Jahanian, and A.K. Mok, "A Methodology for Specification and Analysis of Real-Time Systems," Journal of Software Engineering and Knowledge Engineering, vol. 6, no.3, pp. 401-426, 1996.
- A.K. Mok, F. Jahanian, and D.A. Stuart, "Specification and Analysis of Real-Time Systems: Modechart Language and Toolset," in Trends in Software Engineering: Formal methods in Real-Time Computing, ed. by C. Heitmeyer and D. Mandrioli, John Wiley and Sons, 1996.
- S. Dawson and F. Jahanian, "Probing and Fault Injection of Dependable Distributed Protocols," The Computer Journal, Vol. 38, No. 4, pp. 286-300, 1995.
- S. Dawson, F. Jahanian, and T. Mitton, "A Software Fault Injection Tool on Real-Time Mach." Proceedings of IEEE Real-Time Systems Symposium, pp. 130-140, Dec. 1995.
- W. Feng, F. Jahanian, and S. Sechrest, "A Network Cost Model for the Critical Bandwidth Allocation Approach", International Conference on Distributed Multimedia Systems and Applications, Stanford, CA, pp. 33-36, Aug.1995.
- S. Dawson and F. Jahanian, "Probing and Fault Injection of Protocol Implementations." Proceedings of Int. Conf. on Distributed Computer Systems, pp. 351-359, May 1995.
- J. Rexford, A. Mehra, H. Ang, and F. Jahanian, "Design and Evaluation of Window-Consistent Replication Service," Real-Time Technology and Application Symposium, pp. 182-191, May 1995.
- S. Dawson and F. Jahanian, "Deterministic Fault Injection of Protocol Implementations," In Unifying Theory and Practice of Distributed Computing, Lecture Notes in Computer Science 938, ed. by Birman et. al., Springer-Verlag, pp. 178-96, 1995.
- F. Jahanian, "Run-Time Monitoring of Real-Time Systems," in Advances in Real-Time Systems, Chapter 18, ed. Sang H. Son, Prentice-Hall, Englewood Cliffs, NJ, 1995.
- F. Jahanian, R. Rajkumar, and S. Raju, "Timing Constraints Monitoring in Distributed Real-Time Systems," in Responsive Systems, ed. by M. Malek, Kluwer-Academic Publishers, Norwell, MA, 1995.
- F. Jahanian and A.K. Mok, "Modechart: A Specification Language for Real-Time Systems," IEEE Transactions on Software Engineering, vol. 20, no. 12, pp. 933-947, Dec. 1994.
- J. Rexford, A. Mehra, J. Dolter, and F. Jahanian, "Window-Consistent Replication for Real-Time Applications," Workshop on Real-Time Operating Systems and Software, Seattle, Washington, May 1994.
- S. Chodrow, F. Jahanian, and M. Donner, "Run-Time Monitoring of Real-Time Systems," in Monitoring and Debugging in Distributed and/or Real-Time Systems, ed. by J. Tsai and J. Yang, IEEE CS Press, 1994.
- F. Jahanian, R. Rajkumar, and S. Raju, "Monitoring Timing Constraints in Distributed Real-Time Systems," Real-Time Systems Journal, vol. 7, no. 3, pp. 247-273, July 1994.
- F. Jahanian, S. Fakhouri and R. Rajkumar, "Processor Group Membership Protocols: Specification, Design and Implementation," Proceedings of Symposium on Reliable Distributed Systems, Princeton, NJ, pp. 12-20, Oct. 1993.

- S. Raju, R. Rajkumar and F. Jahanian, "Monitoring Timing Constraints in Distributed Real-Time Systems," Proceedings of Real-Time Systems Symposium, pp. 57-67, Dec. 1992. Reprinted in Monitoring and Debugging in Distributed and/or Real-Time Systems, ed. by J. Tsai and J. Yang, IEEE CS Press Tutorial, 1994.
- F. Jahanian and W.L. Moran, Jr., "Strong, Weak, and Hybrid Group Membership Protocols," Proceedings of Replicated Data Management-II, Monterey, CA, Nov. 1992.
- W.L. Moran, Jr. and F. Jahanian, "Cheap Mutual Exclusion," in USENIX Review, Proceedings of Summer USENIX Conference, San Antonio, TX, pp. 55-62, June 1992.
- S. Chodrow, F. Jahanian, and M. Donner, "Run-Time Monitoring of Real-Time Systems," Proceedings of Real-Time Systems Symposium, San Antonio, TX, pp.74-83, Dec. 1991.
- F. Cristian and F. Jahanian, "A Timestamp-Based Checkpointing Protocol for Long-Lived Distributed Computations," Proceedings of 10th Symposium on Reliable Distributed Systems, pp. 12-20, Sept./Oct. 1991.
- F. Jahanian and A. Goyal, "A Formalism for Monitoring Real-Time Constraints at Run-Time," 20th Fault-Tolerant Computing Symposium, Newcastle upon Tyne, U.K., pp. 148-155, June 1990.
- F. Jahanian and D.A. Stuart, "A Method for Verifying Properties of Modechart Specifications," Proceedings of Real-Time Systems Symposium, Huntsville, AL, pp. 12-21, Dec. 1988.
- F. Jahanian and A.K. Mok, "A Graph-Theoretic Approach for Timing Analysis and its Implementation," IEEE Transactions on Computers, vol. C-36, no. 8, pp. 961-975, Aug. 1987.
- F. Jahanian and A.K. Mok, "Safety Analysis of Timing Properties in Real-Time Systems," IEEE Transactions on Software Engineering, SE-12, no. 9, pp. 890-904, Sept. 1987.
- F. Jahanian and A.K. Mok, "A Graph-Theoretic Approach for Timing Analysis in Real Time Logic," Proceedings of Real-Time Systems Symposium, New Orleans, LA, pp. 98-108, Dec. 1986.