Farnam Jahanian heads the National Science Foundation Directorate for the Computer and Information Science and Engineering (CISE). In this post, serving as a member of the NSF leadership team, Jahanian leads CISE in its mission to uphold the nation’s leadership in scientific discovery and engineering innovation through its support of fundamental research in computer and information science and engineering and transformative advances in cyberinfrastructure. Jahanian oversees the CISE budget of over $890 million, directing programs and initiatives that support advances in research and in the Nation’s 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.

During his tenure at NSF and working with the White House Office of Science and Technology Policy, CISE has led several national research and development (R&D) initiatives including the National Robotics Initiative, the National Big Data R&D Initiative, and US Ignite. CISE has also led the development of several cross-directorate or cross-agency programs including Secure and Trustworthy Cyberspace (SaTC) and Exploiting Parallelism and Scalability (XPS), and has contributed to the significant expansion of the Cyber Physical Systems (CPS) program. Jahanian also serves 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 overall coordination for the R&D activities of 17 government agencies.

Jahanian holds the Edward S. Davidson Collegiate Professorship at the University of Michigan, where he served as Chair for Computer Science and Engineering from 2007 – 2011 and as Director of the Software Systems Laboratory from 1997 – 2000. He founded Arbor Networks in 2001 and served as its Chief Scientist and Chairman 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. Over the last two decades at the University of Michigan, Jahanian has led several transformative, large-scale research projects studying the dependability and security of Internet infrastructure. In the 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. Furthermore, this
work inspired significant new work by numerous networking researchers over the last decade. The centerpiece of this work was recognized with an ACM SIGCOMM Test of Time Award in 2008.

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 spots 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. Jahanian’s research at the University of Michigan has been sponsored by NSF, DHS, DARPA, NSA, ONR, Cisco, Intel, Google, Boeing, VeriSign, Hitachi, Hewlett-Packard, and IBM.

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), which Jahanian co-founded with former UM graduate student G. Robert Malan in 2001. During a two-year leave, 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. The Internet security solutions developed by Arbor Networks have been widely deployed by hundreds of Internet Service Providers, wireless carriers, and numerous mission-critical networks around the globe including AT&T, Verizon, British Telecom, Comcast, NTT, Telecom Italia, Vodafone, Internet2, Yahoo and Cisco. Today, 70 percent of Internet backbone transit traffic is protected by Arbor Networks’ technology. Jahanian served as Chairman of Arbor Networks until its acquisition by Tektronix Communications, a division of Danaher Corporation, in 2010.

The author of over 100 research papers, Jahanian has served on dozens of national advisory boards and government panels. He is a member of the National Governors Association’s Cybersecurity Advisory Council. Jahanian has testified before Congress on a broad range of topics, including cybersecurity and Big Data. He has received numerous awards for his research, commitment to education, and technology commercialization activities, 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 an ACM SIGCOMM Test of Time Award (2008). 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 frequently lecturing on the topic. He was named “Distinguished University Innovator” at the University of Michigan in 2009, and “Entrepreneur of the Year” by New Enterprise Forum in 2010.

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).
Links:

Jahanian’s University of Michigan Website: www.eecs.umich.edu/~farnam/
Jahanian’s Research Group Website: nsrg.eecs.umich.edu

Jahanian’s National Science Foundation Website: www.nsf.gov/cise/bios/farnam.jsp

Arbor Networks, founded by Jahanian: www.arbor.net
FARNAM JAHANIAN
Edward S. Davidson Collegiate Professor of EECS
Computer Science and Engineering
University of Michigan
Ann Arbor, MI 48109-2121
e-mail: farnam@umich.edu
www.eecs.umich.edu/~farnam

EDUCATION

UNIVERSITY OF TEXAS AT AUSTIN

UNIVERSITY OF TEXAS AT SAN ANTONIO
Bachelor of Science in Mathematics, Computer Science, and System Design (Summa cum Laude), 1982.

PROFESSIONAL EXPERIENCE

NATIONAL SCIENCE FOUNDATION
Directorate for Computer and Information Science and Engineering (March 2011–Present)

UNIVERSITY OF MICHIGAN
Edward S. Davidson Collegiate Professor of EECS
Chair, Computer Science and Engineering (July 2007–February 2011)
Director, Software Systems Research Lab (1997–2000)
Professor, EECS Department (2001–Present)
Associate Professor, EECS Department (1995–2001)
Assistant Professor, EECS Department (1993–1995)

ARBOR NETWORKS
Chairman of the Board, 2003–2010
Founder and Chief Scientist, 2000–2002 (on leave from UM)

IBM T.J. WATSON RESEARCH CENTER
Senior Manager, Research Division, 1991–1993
Research Staff Member, 1989–1991

Research Assistant with the Real-Time Systems Group

MICROSOFTWARE DEVELOPMENT ASSOCIATES, INC. (1982–1983)
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).
- 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.
- College of Engineering Teaching Excellence Award, University of Michigan, 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.
- 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.
RESEARCH PROJECTS  (nsrg.eecs.umich.edu)

• “In-Cloud Security Services for Mobile Devices,” National Science Foundation, Farnam Jahanian (PI), Michael Bailey, 2009-2013.

• “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.


• “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.


• “Lighthouse Project: Detecting and Surviving Large-Scale Network Infrastructure Attacks,” Sponsored by DARPA, Farnam Jahanian (PI) and Paul Howell (Merit Network), 1999-2003.


• “Experimentation with Multi-Threaded, Distributed Routing Technology in the Internet,” National Science Foundation, Farnam Jahanian (PI) and Craig Labovitz (Merit Network), 1997-2000.


• 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.


• “Enabling Multimedia-Based Collaboration over Computer networks,” Sponsored by the AT&T Foundation, Atul Prakash (PI) and Farnam Jahanian.

REPRESENTATIVE PROFESSIONAL ACTIVITIES AND SERVICES

Recent Broad Memberships and Advisory Committees

- National Governors Association’s Cybersecurity Advisory Council, Member, 2012-present.
- Co-chair, Networking and Information Technology R&D Subcommittee of the National Science and Technology Council’s (NSTC) Committee on Technology, 2011-present.
- National Advisory Board, UM Office of Technology Transfer, 2006-present.
- IEEE Dependable Systems and Networks, Steering Committee, 2008-present.
- IFIP Working Group 10.4 on Dependable Computing and Fault-Tolerance, Member.
- UM Center for Entrepreneurship, Advisory Board, 2008-present.
- 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.
- Wayne State University, Computer Science Department Advisory Committee Member, 2005-2010.
- Ann Arbor IT Zone, Board Member, 2004-2008.
- Member of NSF Working Group 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.
- Program Chair, IEEE Int. Conf. on Dependable Systems and Networks (DSN), 2002.
- Program Committee Vice Chair, Fault-Tolerance Track, 21st ICDCS, 2000.
- Associate Editor, Real-Time Systems Journal, 1997-present.
- Program Committee Vice-Chair, Distributed Real-Time Systems, 16th ICDCS, 1996.
- Over 30 program committees of technical conferences and symposia, including:
2007 IEEE Internet Measurement Conference.

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.

MAJOR UNIVERSITY COMMITTEE ASSIGNMENTS

- Selection Committee, Distinguished University Innovator Award, 2013.
- Center for Entrepreneurship, Advisory Board, 2008-present.
- Chair, Computer Science and Engineering, 2007-2011.
- Chair, Executive Committee, CSE Division, 2007-2011.
- EECS Awards and Honors Committee, 2007-2011.
- National Advisory Board, Office of Technology Transfer, 2006-present.
- Faculty Search Committee, CSE Division, 2005-2011.
- University IT Governance Council, 2010-2011.
- IOE Chair Search Advisory Committee, Chair, 2008-2009.
- UM Office of Technology Transfer National Advisory Board, 2006-present.
  - Chair, Committee on “Business Engagement Center,” Fall 2007.
- Chair, EECS Internal Review Committee, Chair, 2004.
- Faculty Advisory Board, CoE Technology Transfer and Commercialization, 2002-2004.
  - Chair, subcommittee on IT Infrastructure.
- Co-chair with John Laird, subcommittee on Research.
- Faculty Associate to OVPR, IBM Relationship, 1997-2000.
- Member, EECS Departmental Review Committee, 1996-1997.
SELECTED INVITED TALKS AND KEYNOTE (2005-Present)

- “From Data to Knowledge to Discovery,” Keynote Address, Research Data Alliance Launch, Gothenburg, Sweden, March 2013.
• “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.


• “The Promise of Smart Health,” Keynote Address, Wireless Health Annual Conference, San Diego, CA, October 2011.


• “CPS Past and Future,” Cyber Physical Systems Principal Investigator Meeting, National Harbor, MD, August 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.


• “Securing the Internet Cloud: A Perspective on Seeding Innovation and Technology Transfer,” New Enterprise Forum Entrepreneur of the Year Speech, NEF 25th Anniversary Gala, February 2011.

• “Securing the Internet: Research to Reality,” Edward S. Davidson Collegiate Professorship Lecture, University of Michigan, February 2010.

• “Securing the Internet Cloud: A Perspective on Seeding Innovation and Technology Transfer,” Distinguished University Innovator Award Ceremony and Lecture, University of Michigan, April 2009.


• Panel on “Dependability in the cloud: Challenges and opportunities.” IEEE Dependable Systems and Networks Conference (DSN), June 2009.

• “Managing the Growth of New Ventures,” UM Ross School of Business, April 2009.


• NSF Invitational Workshop on Future Directions for the CyberTrust Program, Pittsburgh, PA, October 2006.


• “Worm research and Internet Motion Sensors,” Colloquium for Information System Security Education, Georgia Tech University, June 2005.
DOCTORAL COMMITTEES CHAIRED

- Wu-chi Feng – August 96  
  “Video-on-Demand services: Efficient Transportation and Decompression of Variable Bit Rate Video”

- Scott Dawson – December 97  
  “Message Level Fault Injection in Distributed Systems”

- Monica Brockmeyer – May 99  
  “Monitoring, Testing, and Abstractions of Real-Time Specifications”

- Craig Labovitz – August 99  
  “Scalability of Internet Backbone Routing Infrastructure”

- Hengming Zou – December 99  
  “Dynamic Active-Passive Replication”

- G. Robert Malan – May 2000  
  “Transparent Measurement and Manipulation of Internet Protocols”

- Scott Johnson – December 2001  
  “Scalable Group Composition”

- David Watson – May 2004  
  “Measurement and Analysis of Routing Protocol Behavior on Production Networks”

- Junghee Han – December 2004  
  “Enhancing End-to-end Availability and Performance by Leveraging Internet Redundancy”

- Michael D. Bailey – May 2006  
  “A Scalable Hybrid Network Monitoring Architecture for Measuring, Characterizing, and Tracking Internet Threat Dynamics”

- Evan Cooke – May 2007  
  “Exposing Internet Address Use to Enhance Network Security”

- Sushant Sinha – August 2009  
  “Context-Aware Network Security”

- Jon Oberheide – December 2011  
  “Leveraging the Cloud for Software Security Services”

- Yunjing Xu – December 2013  
  “Characterizing and Mitigating Virtual Machine Interference in Public Clouds”

- Supervised 50+ undergraduates in my research group since joining UM.
## TEACHING RECORD

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* Maximum score of 5.
SELECTED REFEREEED PUBLICATIONS
(Full list of research group’s publications at nsrg.eecs.umich.edu/publications.html)


- 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.


• J. Han, D. Watson, and F. Jahanian, “Topology Aware Overlay Networks,” IEEE Infocom, Miami, FL, Mar. 2005.


