



## Summary of Professional Experiences and Qualifications

### S. Massoud Amin

Honeywell/H.W. Sweatt Chair and Director of the Technological Leadership Institute (TLI)  
Professor of Electrical & Computer Engineering (ECE) and University Distinguished Teaching Professor  
University of Minnesota

Prof. Massoud Amin holds the Honeywell/H.W. Sweatt Chair in Technological Leadership, is the director of the Technological Leadership Institute (TLI), a University Distinguished Teaching Professor, and a full professor of electrical and computer engineering at the University of Minnesota. Prof. Amin is an expert in and researches/teaches graduate courses on smart grids, complex dynamical systems and controls, critical infrastructure security and protection, emerging and pivotal technologies, S&T Policy, and IP valuation and strategy.

Before joining the university in 2003, he served as head of mathematics and information sciences, directed all Infrastructure Security RD&D after the tragic events of 9/11, Grid Operations/Planning, and Energy Markets at the Electric Power Research Institute (EPRI) in Palo Alto. At EPRI he pioneered RD&D in smart grids, is considered the father of the smart grid, and led the development of over 24 technologies transferred to industry.

### Professional Experience, Qualifications and Impact Summary:

**3/2003-present**

**University of Minnesota, Minneapolis**

- Direction and oversight of all academic, financial and administrative elements of TLI's educational, research and consulting programs. Leads a staff of 5 endowed chairs, 10 professional staff, and 47 associated senior faculty from across the 8 colleges in the University of Minnesota, and from industry and government, who develop local and global leaders for over 300 technology enterprises. Leads educational, R&D initiatives and programs in Energy/Smart Grids and CIP.
- In addition, he serves as the founder and director of graduate studies (DGS) for the security technologies program (2008-present), served as the DGS for the management of technology (MOT) program (2003-2009), and teaches several courses including Smart Grids, Complex Dynamical Systems & Controls, Emerging and Pivotal Technologies, S&T Policy, Global Management of Technology, Intellectual Property Valuation & Strategy, Critical Infrastructure Protection (CIP) and Security.
- His areas of expertise rooted in systems science, mathematics and engineering, have extended to management and leadership, and include the development of national/international energy R&D initiatives, and leadership of organizations focused on enhancing security, resilience and efficiency of critical lifeline infrastructures. His research focuses on two areas:
  - Global transition dynamics to enhance resilience, security and efficiency of complex dynamic systems. These systems include national critical infrastructures for interdependent energy, computer networks, communications, transportation and economic systems.
  - Strategic scanning, mapping, assessment and valuation to identify new science and technology-based opportunities that meet the needs and aspirations of consumers, organizations/companies, and the broader society. This thrust builds coherence between short- and longer-term R&D opportunities and their potential impact.
- Dr. Amin leads world-class programs at the Technological Leadership Institute (TLI): His students have a very high impact on the State's economy by supplying the leadership talent pipeline in Minnesota to globally succeed. As an example, one of the courses in the management of technology (MOT) program is the capstone project undertaken by fast-tracked full-time professionals from Minnesota's high-tech companies. There are about 30-33 Capstones projects completed each year. The dollar impact resulting from companies' increased revenues, cost savings, product or process innovations, or new products per project amount to a range of a few hundred thousand dollars to several tens of millions of dollars.

**1/1998-2/2003**

**Electric Power Research Institute (EPRI), Palo Alto, California**

Head of Mathematics and Information Sciences (1998-2001), and Area Manager of Infrastructure Security, Grid Operations/Planning, and Energy Markets (2001-2003) at EPRI.

- 9/2001-2/2003: In the aftermath of the tragic events of 9/11, he directed all security-related R&D at EPRI (for EPRI members and utilities), including the Infrastructure Security Initiative (ISI) and the Enterprise Information Security (EIS).
- 1/1998-2/2003: Dr. Amin pioneered RD&D in smart grids and self-healing infrastructures in 1998, and led the development of 24 technologies transferred to industry. He is considered the "father of the smart grid."
  - Prior to September 15, 2001, he served as head of mathematics and information sciences at EPRI, where he created and led several initiatives including EPRI/DOD Complex Interactive Networks/Systems Initiatives (CIN/SI), consisting of 108 professors, over 240 graduate students and researchers in 28 U.S. universities, together with participants from over 50 utilities and government agencies-- DOD, DOE, and OSTP. Dr. Amin led strategic research in modeling, simulation, optimization, and adaptive control of national infrastructures for energy, telecommunication, transportation, and finance.

**8/1985-1/1998 Washington University, St. Louis, Missouri**

- Senior Fellow/Lecturer (1985-1989), Assistant Professor (1990-1997), and Associate Professor (1997-1998) of Systems Science and Mathematics, and Associate Director of the Center for Optimization & Semantic Control, at Washington University in St. Louis, Missouri.
- During his twelve years at Washington University, he was one of the main contributors to several projects with United States Air Force, NASA-Ames, Rockwell International, McDonnell Douglas, Boeing, MEMC, ESCO, Systems & Electronics Inc. and United Van Lines. His contributions included:
  - 8/1985-1/1998: Modeling and Control of complex systems near failure, including a damaged F-15 aircraft, aircombat maneuver prediction, aircraft antiskid system; network flow prediction for the USAF Mobility Analysis Support System, semiconductor crystal growth and adaptive tuning of multi-loop controllers.
  - 1/1992-1/1998: Transportation, Optimization and Scheduling Theory: Modeling, simulation and optimization of DoD's large-scale air transport operations (with USAF's Air Mobility Command and the US Transportation Command).
  - 8/1987-12/1994: Learning Control for Game Theory: Developed a Flight & Fire Control System for tactical decision support, situation assessment, navigation and control of a vehicle engaged in evasive maneuvers against multiple pursuers.

**Impact include:**

- The areas of smart grid and self-healing infrastructure, pioneered by Dr. Amin, was recommended in 2005 by the White House Office OSTP and the U.S. DHS as one of three thrust areas for the National Plan for research and development in support of Critical Infrastructure Protection. His work in the above areas has become a leading concept in sixteen ongoing programs at EPRI, NSF, DHS, DOE and DOD. The resultant initiatives that he pioneered continue to be successful and now amount to several billions per year in the electricity sector (including Intelligrid at EPRI, Gridwise/Modern Grid/Smart Grid at the DOE). Defense applications of his work include Network-Centric Objective Force, a part of the Future Combat Systems.
- Dr. Amin continues to work very effectively with diverse groups of stakeholders including federal and state government agencies, congressional staffers, private and public organizations, and higher education institutions, to continue make broad impacts in industry and government. Through his publications (over 190 in peer-reviewed journals, and 7 collections of manuscripts) , presentations (421 during 1990-2010), keynote addresses (82 during 1990-2010), active service on advisory committees and boards (including at the NAE, NAS, Texas RE) he positively influences leaders in business, industry, and government. He has assisted and guided policy and technology advancement for the past 20 years.

**Education**

Storm King School, Cornwall-on-Hudson	High School Diploma	Highest Honors, 1979
University of Massachusetts, Amherst	Electrical Engineering	B.S. (cum laude), 1982
University of Massachusetts, Amherst	Electrical & Computer Eng.	M.S., 1985
Washington University, St. Louis	Systems Science & Mathematics	M.Sc., 1986
Washington University, St. Louis	Systems Science & Mathematics	D.Sc., 1990

## Honors and Awards include:

- **2009 IEEE Power & Energy Society (PES) Technical Committee Award for Perfect Power Systems for Energy Efficiency**, IEEE PES, Power System Operation Committee, November 2009
- **2008 University of Minnesota Award for Outstanding Contributions to Post-baccalaureate, Graduate, and Professional Education**, and induction into the **University's Academy of Distinguished Teachers** "in recognition of excellence in instruction, instructional program development, intellectual distinction, advising and mentoring, and involvement of students in research, scholarship, and Professional development," on April 28, 2008
- **2007 Fellow of the Institute for Infrastructure and Information Assurance (IIIA)** "for contributions to homeland security, scholarly achievements in infrastructure protection and information assurance, effective leadership, and commitment to teaching and mentoring university students." The grade of Fellow is awarded to only a few (2-4) highly distinguished researchers per year by the IIIA to recognize extraordinary contributions and leadership in infrastructure and/or information assurance, National Academies, Washington DC on Tuesday, May 15, 2007
- **2004 ASME Certificate of appreciation** from the American Society of Mechanical Engineers (ASME) for services as a leader of ASME's Critical Asset Protection Initiative (CAPI), launched in February 2002 in the aftermath of 9/11 to help the U.S. government formulate practices and strategies to protect against future attacks, May 2004
- **2002 Chauncey Award**, the highest annual EPRI Award in recognition for "leadership in creation and execution of the Infrastructure Security Initiative," March 2003
- **2002 President's Award** for the Infrastructure Security Initiative, EPRI, Palo Alto, CA, April 2002
- **2000 Chauncey Award**, the highest annual EPRI Award in recognition for "creation of a world-class analytical capability for electricity market design" by the six-member power market design team, 2001
- **Six Performance Recognition Awards (1999-2002) for:** 1) "creating and implementing the Infrastructure Security Initiative," EPRI, Palo Alto, CA, Sept. 2002; 2) "development, preparation and major focusing of the 2003 Power Delivery and Markets R&D programs," EPRI, Palo Alto, CA, Oct. 2002; 3) "outstanding contribution in the development of the Electricity Infrastructure Security Assessment," EPRI, Palo Alto, CA, Dec. 2001; 4) "building the CEIDS R&D plan (Consortium for Electricity Infrastructure for a Digital Society)," EPRI, Palo Alto, CA, 2001; 5) "for commitment to society in the development and advocacy of the Common Information Model (CIM), the Application Program Interface (API) standards and the application of API to Grid Operations and Planning software products," EPRI, Palo Alto, CA, Jun. 2001; 6) "leadership in launching the EPRI/DoD Complex Interactive Networks/Systems Initiative," Electric Power Research Institute, Palo Alto, CA, July 1999
- **1992-93, 93-94, 94-95 Professor of the Year**, School of Eng'g & Applied Science, Washington University
- **1995-96 AGES "Big Fish" Award**, given to the faculty member "who best exemplifies excellence in graduate education" by the Association of Graduate Engineering Students (AGES), Washington University
- **Leadership Award**, Washington University, May 1995
- **Young Professional Award**, American Institute of Aeronautics and Astronautics, St. Louis, May 1991

## Advisory Boards

- Board of Directors of the Texas RE (6/2010-present)
- Board on Mathematical Sciences and Their Applications (BMSA) at the National Academy of Sciences (2006-09)
- Board on Infrastructure and Constructed Environment (BICE) at the National Academy of Engineering (2001- 07)
- Chairman, Advisory Board, Instrumentation, Control & Intelligent Systems (ICIS), Idaho National Lab (2010- )
- Scientific Advisory Committee, Computational Sciences & Engineering Division, Oak Ridge National Lab (2006)
- Vice President of Public Affairs and on the Board of the Int'l Association for Management of Technology (2010-)
- Management of Technology Accreditation Board (MOTAB, 2010-present)
- Senior Advisor, General E.W. Rawlings Chapter in the Air Force Association (2003-2008)
- Advisory board, AISI (2005-2009)
- Advisory board, Full Spectrum (2006-2010)
- IEEE Computer Society's Task Force on Security and Privacy (2002-2006),
- ASME Critical Assets Protection Initiative (2002-2004)
- Board of the Center for Security Technologies at Washington University (2002-2006)
- Several additional advisory committees and review boards at: EPRI, DOE, DOD, DHS, NSF, and the White House Office of Science and Technology Policy (OSTP)

For additional information, presentations, and publications, please see <http://umn.edu/~amin>