



Dr. Massoud Amin

Director, Technological Leadership Institute

STRATEGY • INNOVATION • EXCELLENCE

For more than a decade, the University of Minnesota **Technological Leadership Institute (TLI)** has been led by its director, Dr. Massoud Amin, a world-renowned technology expert, considered by many to be the 'father of the smart grid.' Dr. Amin holds the Honeywell/H.W. Sweatt Chair, is a professor of electrical and computer engineering, and a University Distinguished Teaching Professor Award recipient at the University of Minnesota.

As director, Dr. Amin provides direction and oversight of TLI's academic, financial and administrative functions. He also leads seven endowed chairs and more than 60 associated senior faculty members to execute the Institute's mission of developing leaders through TLI's three Master of Science degree programs.

Dr. Amin has led the **Master of Science in Management of Technology degree (MOT)** program as its director of graduate studies since 2003, founded the **Master of Science in Security Technologies (MSST)** degree program in 2009, and served as its director of graduate studies from 2009 to 2013. He also founded TLI's newest graduate degree program, **Master of Science in Medical Device Innovation (MDI)** in 2013. In addition to his work for TLI, Dr. Amin is chairman of the IEEE Smart Grid, a fellow of the IEEE and ASME, and a member of two utility industry regional entities that oversee reliability: the Texas Reliability Entity (as board chairman) and the Midwest Reliability Organization (as a board member).

Before joining the University of Minnesota, Dr. Amin was with the Electric Power Research Institute (EPRI) in Palo Alto, Calif. He pioneered research and development in smart grids in 1998, led the development of 24 technologies that transferred to industry and, after 9/11, directed all security-related R&D for U.S. utilities. At EPRI, he twice received the Chauncey Award, the Institute's highest honor. He is the author of more than 200 peer-reviewed publications, editor of seven collections of manuscripts and serves on the editorial boards of six academic journals.

Dr. Amin holds B.S. (cum laude), and M.S. degrees in electrical and computer engineering from the University of Massachusetts-Amherst, and M.S. and D.Sc. degrees in systems science and mathematics from Washington University. He has been recognized by both colleges, receiving the 2011 Distinguished Alumni Achievement Award at Washington University and the 2013 Outstanding Senior Alumni Award at the University of Massachusetts.

**Innovator, strategist, mathematician, academic, 'father of smart grid,'
advocate, philanthropist, humanitarian, visionary, leader**



Active Research Areas of Focus

Massoud Amin, D.Sc.

University Distinguished Teaching Professor

In addition to his work at the **Technological Leadership Institute (TLI)**, Dr. Amin has maintained an active research program as a University Distinguished Teaching Professor in the department of Electrical and Computer Engineering at the University of Minnesota. Dr. Amin has made significant contributions in predictive system identification methods coupled with analytical and multi-domain modeling, fast simulation, optimization and testing methodologies, and applies them to complex and large dynamical systems.

A major part of his R&D work is focused on enabling smarter, more secure, sustainable and resilient critical infrastructures for interdependent power and energy; computer and communications networks; logistics and transportation; and finance and economic systems. His research focuses on two areas:

1. Global transition dynamics to enhance resilience, agility, security and efficiency of complex dynamic systems. These systems include national critical infrastructures for interdependent energy, computer networks, communications, transportation, financial networks and economic systems. Projects and results for potential technology transfer:
 - Distribution Systems: Self-organizing microgrids with integration and optimization of storage devices and PHEVs with the electric power grid. Assessments performed on several IEEE test cases as well as on the UM-Morris Campus, combined with practical costs, risk and reliability analyses.
 - End-to-End Power Generation, Transmission and Distribution Systems Overlaid with Communication Networks and Markets: Fast power grid simulation and risk assessment; and distributed state estimation and implementation of smart software agents as distributed computer.
 - Cyberphysical Security: Security of cyberphysical infrastructure, development of resilient real-time system for a secure and reconfigurable end-to-end power system; and security analyses of autonomous microgrids: Analysis, modeling and simulation of failure scenarios, and development of attack-resistant architectures.
 - Smart Grid Assessments for Communities, UM-Morris, and UMore Park: University microgrid projects offer very practical environments for testing smart grid systems. We employ a holistic systems approach to build consensus on issues such as microgrid configuration, cost-effectiveness, and security.
2. Strategic technology analyses and foresight: Technology scanning, mapping, and valuation to identify new science and technology-based opportunities that meet the needs and aspirations of today's consumers, companies and the broader society. This thrust builds coherence between short- and longer-term R&D opportunities and their potential socio-technological and economic impact.

Dr. Amin's research and expertise transcends his contributions to the University of Minnesota. Since 2003, he has given four briefings at the White House and nine Congressional briefings on smart grids, security and leadership in scientific R&D. He was one of the three external faculty members on behalf of the Engineering directorate at the National Science Foundation (NSF) to create the content and foci for the Cyberinfrastructure division at the NSF in Computer and Information Science and Engineering. He has also served as a U.S. delegation representative to several world engineering and scientific congresses, and is regularly interviewed by the media to share his subject matter expertise.