

**Sahra Sedigh Sarvestani**  
**Associate Professor of Electrical and Computer Engineering**  
**Associate Professor of Computer Science**

**Title:**

Towards quantitative modeling of reliability for sustainable critical infrastructure: challenges and advances

**Abstract:**

Critical infrastructure systems are increasingly reliant on cyber infrastructure that enables intelligent real-time control of physical components. This cyber infrastructure utilizes environmental and operational data to provide decision support intended to increase the efficacy and reliability of the physical system and facilitate mitigation of failure. Correctly implemented, the ultimate result of these efforts is more sustainable use of non-renewable resources and reduction of environmental impact. However, realistic imperfections such as corrupt sensor data, software errors, or communication outages can cause failure in an otherwise functional physical infrastructure, defying the purpose of intelligent control. As such, justifiable reliance on cyber-physical critical infrastructure is contingent on rigorous investigation of the effect of intelligent control, including modeling and simulation of failure propagation within the cyber-physical infrastructure. We discuss challenges in and recent advances towards development of quantitative models and accurate simulation methods for cyber-physical critical infrastructure systems, with focus on the reliability of smart grids and intelligent water distribution networks.

**Short bio:**

Dr. Sahra Sedigh Sarvestani is an Associate Professor of Electrical and Computer Engineering and Computer Science and a Research Investigator with the Intelligent Systems Center at the Missouri University of Science and Technology. She received the B.S. degree from the Sharif University of Technology and the M.S. and Ph.D. degrees from Purdue University, all in electrical engineering. Her current research centers on development and modeling of dependable networks and systems, with focus on critical infrastructure. Her projects include research on dependability of the electric power grid, large-scale water distribution networks, and transportation infrastructures. Her past and present research sponsors include the US and Missouri Departments of Transportation, the Department of Education, the National Security Agency, and the EU FP7 Program on Smart Monitoring of Historic Structures. She is a Fellow of the National Academy of Engineering's Frontiers of Engineering Education Program and held a Purdue Research Foundation Fellowship from 1996 to 2000. She is a member of HKN, IEEE, and ACM.