TEXAS A&M UNIVERSITY
Department of Electrical & Computer Engineering

TRANSFORMING ENGINEERING EDUCATION

ENERGY & POWER GROUP SEMINAR

Enhancing Power Grid Resilience Against Cyber-Physical Threats: A Scalable Simulation Tool and Secure Data Management Using IPFS and Multichain Technologies

Abstract

The increasing vulnerability of modern power systems to cyber-physical attacks highlights the urgent need for enhanced grid resilience. This requires a scalable discrete event simulation tool capable of assessing and optimizing power grid networks under both normal and adversarial conditions. Applied to three large-scale synthetic cases, the tool leverages convex optimization techniques to efficiently analyze critical nodes, delivering reliable, real-time insights. Additionally, the integration of the InterPlanetary File System (IPFS) and Multichain technology provides secure, scalable data storage and management. By utilizing encryption for tamper-proof, traceable cyber-physical data, these innovations offer significant contributions toward strengthening the resilience of power systems.

Khandaker Akramul Haque
Ph.D. Student
Electrical & Computer Engineering
Texas A&M University

Friday, October 18
11:30 am
241 ZACH

Biography

Khandaker Akramul Haque is currently pursuing a Ph.D. in Electrical and Computer Engineering at Texas A&M University under the supervision of Dr. Katherine Davis. He holds a Master's and a Bachelor's degree in Electrical and Electronic Engineering from Bangladesh University of Engineering and Technology (BUET). His research interests focus on cybersecurity, machine learning, reinforcement learning and modeling of large cyber-physical system. Professionally, he worked as an Assistant Engineer at both Dhaka Power Distribution Company Limited (DPDC) and North-West Power Generation Company Limited (NWPGCL) in Bangladesh. Additionally, he has served as a lecturer at Stamford University Bangladesh. He has published numerous peer-reviewed articles on cyber-physical system, grid resilience and photovoltaic device in prestigious journals and has contributed to multiple international conferences. With extensive technical skills in programming and various technologies, Akram is actively involved in cutting-edge research funded by the U.S. Department of Energy and Sandia National Laboratories.

FACULTY CONTACT:
Xin Chen
xin_chen@tamu.edu