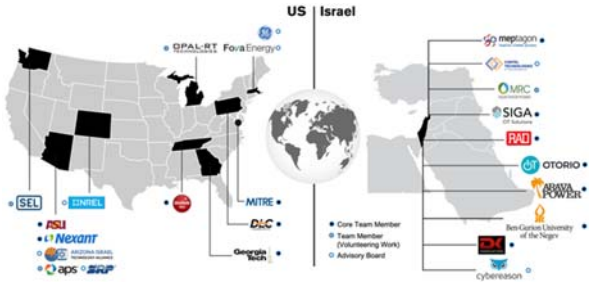

Converging Cybersecurity Solutions for Energy Systems to Practice

Data-assisted Physics-based Modeling and Simulation Approach to Grid Cybersecurity

Amritanshu Pandey

Carnegie Mellon University

August 16, 2022, 7:00 - 8:00 pm, Israeli time

(12:00-1:00 pm EST, 9:00 am-10:00 am AZ/PST Time)

Link: https://asu.zoom.us/j/6712258140

Abstract: I will begin this talk on electric grid cyber-security by motivating the current urgent need for grid cybersecurity research. Next, I will briefly cover the standard threats in literature and discuss how experts seem to be inconsistent in their evaluation of the impact and likelihood of these attacks. I will show that the grid modeling and simulation are at the heart of these inconsistencies. In the second half of this talk, I will cover two of my recent works on grid cybersecurity, first on a novel anomaly detection algorithm: *Dynwatch*. The method combines grid physics with state-of-the-art ML-based data-mining techniques to identify and localize disturbances on the electric grid. In the second ongoing work, I will discuss the development of an ML-based warm-starter to significantly fasten the speed of cyberthreat-based contingency evaluations. We posit that these evaluations will be necessary for the future paradigm of grid operation resiliency against cyberthreat-induced contingencies.

Bio:

Amrit Pandey is a Special Faculty in the Electrical and Computer Engineering Dept. at Carnegie Mellon Univ. with a courtesy appointment in the Engineering and Public Policy Department. He will be joining the University of Vermont starting January 2023. His overarching research goal is to develop electric energy system technologies that will help combat climate change while modernizing the underlying system. He and his team developed a novel circuit-theoretic simulation and optimization framework for power grids during his doctoral work. The project culminated in a new grid analytics tool: Simulation of Unified Grid Analysis and Renewables (SUGAR) that has been commercialized with Pearl Street Technologies, Inc. This work has won several best paper awards, including two best-of-the-best paper awards at IEEE PES General Meeting in 2017 and 2021. The Defense Advanced Research Projects Agency funds his current research on circuit-theoretic simulation and optimization. He leads grid cybersecurity projects funded by the DOE and c3.AI Digital Transformation Institute grants. Before his doctoral research, he spent time in the industry, performing calculations to safeguard nuclear power plants during emergencies and helping wind farms maximize their power output.