



## Power Systems Engineering Research Center

# Cyber-physical Interactions and Power Grid Reliability

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**Description:** Legacy protection systems with hardwired architecture are being gradually replaced by computer and communication networks consisting of multi-functional and smart Intelligent Electronic Devices (IEDs). The enhanced use of cyber technologies will provide more flexibility but also increase complexity increasing the risk of wide spread outages. With the increasing penetration of these technologies, one issue is cyber-security where deliberate attacks can cause wide spread outages or other dysfunctions. The other issue is impact of inherent malfunctions and failures in the cyber on the power grid. This talk will be focused on the latter. The state of art of the power system reliability methodologies will be reviewed indicating the need for including cyber-physical interactions in the grid reliability evaluation. A systematic methodology for considering the effect of cyber malfunctions on the power system reliability will be explored and future research issues will be indicated. The need for data and information for conducting such analysis will be discussed.

**Biography:** Chanan Singh is a Regents Professor and Irma Runyon Chair Professor in the Department of Electrical and Computer Engineering, Texas A&M University, College Station, Texas, USA. He has also served as Program Director at the National Science Foundation of USA and a Guest Professor at Tsinghua University, Beijing, China. His research and consulting interests are in the application of probabilistic methods to power systems. He has consulted with many major corporations and given short courses nationally and internationally. Dr. Singh is a Fellow of the IEEE and the recipient of the 1998 Outstanding Power Engineering Educator Award given by the IEEE Power Engineering Society. For his research contributions, he was awarded a D.Sc. degree by the University of Saskatchewan, Saskatoon, SK, Canada, in 1997. In 2008, he was recognized with the Merit Award by the PMAPS International Society. In 2010, he was the inaugural recipient of the IEEE-PES Roy Billinton Power System Reliability Award.