SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
Faculty of Engineering
Website: https://www.eng.nus.edu.sg/ece/

Area: Machine Learning and Smart Grids

Host: Prof Dipti Srinivasan

Jointly Organized By:
IEEE Power and Energy Society Singapore Chapter and the IEEE Computational Intelligence Society Singapore Chapter

Refreshments will be served after the seminar.

TOPIC	**:**	**Integrating Physics with Machine Learning for Enabling the Resilient Electric Power Grid**
SPEAKER	**:**	**Dr. Anurag K Srivastava** **School of Electrical Engineering and Computer Science,** **Washington State University**
DATE	**:**	**10 January 2020, Friday**
TIME	**:**	**3pm to 4.30pm**
VENUE	**:**	**EA-02-14, Engineering Block EA, Faculty of Engineering, NUS**

ABSTRACT

Recent events such as Ukraine attack and Hurricane Maria has exposed the vulnerabilities of the cyber-physical electric grid against extreme events. There is a need for a flexible and resilient grid to minimize the impact of component failures given adverse events. Data from massive sensors deployment and availability of distributed resources enables new monitoring and control strategies such as early alarm and diagnosis, event classifications, predicative analysis, distributed and decentralized control, flexible and adaptive control for restoration. Phasor measurement units (PMUs) provide enhanced situational awareness and decision support in transmission systems. Availability of additional sensor data brings its own challenges including data anomalies, real time processing and cyber-security management. This talk will focus on integrating physics with machine learning and data analytics to develop tools and enhance situational awareness and decision support for enabling resiliency of the bulk power grid and associated challenges and opportunities. Additionally, working with human operators for cyber-physical-human nexus in control room tools for monitoring resiliency will be discussed.

BIOGRAPHY

Anurag K. Srivastava is an associate professor of electric power engineering at Washington State University and the director of the Smart Grid Demonstration and Research Investigation Lab (SGDRIL) within the Energy System Innovation Center (ESIC). He also has a joint appointment as a Senior Scientist with the Pacific Northwest National Lab (PNNL). He received his Ph.D. degree in electrical engineering from the Illinois Institute of Technology in 2005. In past years, he has worked in different capacity at the Réseau de transport d´électricité in France; RWTH Aachen University in Germany; PEAK RC, Idaho National Laboratory, Pacific Northwest National Lab, PJM Interconnection, Schweitzer Engineering Lab (SEL), GE Grid Solutions, Massachusetts Institute of Technology and Mississippi State University in USA; Indian Institute of Technology Kanpur in India; as well as at Asian Institute of Technology in Thailand. His research interest includes data-driven algorithms for power system operation and control including resiliency analysis. Dr. Srivastava high impact research projects resulted in tools installed at the utility control center supported for more than $50M by US Department of Energy, National Science Foundation, Siemens Corporate Research, Electric Power Research Institute, Schweitzer Engineering Lab, Power System Engineering Research Center, Office of Naval Research and several National Labs.

BIOGRAPHY

He is a senior member of the IEEE, vice-chair of the IEEE Power & Energy Society's (PES) PEEC committee, co-chair of the microgrid working group, secretary of power system operation SC, chair of PES voltage stability working group, chair of PES synchrophasors applications working group, past-chair of the IEEE PES career promotion subcommittee, past-chair of the IEEE PES student activities committee, and past vice-chair of the IEEE synchrophasor conformity assessment program. He organized NSF sponsored "Data analytics workshop for the power grid resiliency" in 2018, Siemens sponsored "data analytics for the smart grid" workshop in 2017, North American Power Symposium in 2014, and IEEE sponsored workshop on Testing and validation of synchrophasor devices and applications in 2012. He also co-organized Workshop on "Modeling and simulation of Cyber-Physical Energy Systems" supported by IEEE and IES in 2016, 2017, 2018 and 2019. Dr. Srivastava is an editor of the IEEE Transactions on Smart Grid, IEEE Transactions on Power Systems, IEEE Transactions on Industry Applications, and Elsevier Sustainable Computing. He is an IEEE distinguished lecturer and has delivered 30+ keynotes/ tutorials in more than 15 countries. He is author of more than 300 technical publications including a book on power system security and 3 patents.