



THE WSU-PNNL ADVANCED GRID INSTITUTE

GRIDSANDBOX: AUTOMATED WORKFLOW MANAGEMENT FOR END-TO-END GRID ANALYTICS

~ by ~

ANURAG SRIVASTAVA, Energy Systems Innovation Center/WSU &
Chair, Computer Science & Electrical Engineering Department, WVU

ZHENYU (HENRY) HUANG, Pacific Northwest National Laboratory

DEXIN WANG, Pacific Northwest National Laboratory

SANJEEV PANNALA, Energy Systems Innovation Center/WSU

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ABSTRACT

The growing complexity of aging electric power infrastructure and the integration of intermittent distributed energy resources (DERs) pose a significant challenge to the system operation and control. New solutions (including architectural designs, control schemes, communications protocols etc.) are required for enhanced situational awareness and decision support with the increasing grid complexity. These solutions need to be validated for different possible scenarios before deploying in the field. End-to-end cyber-physical power system modeling and analytics allows for such evaluations and validations but require intensive investment in hardware, software, and labor. The goal of GridSandbox is to enable researchers with limited expertise on simulators and other software in related domains to explore, develop, and validate potential solutions with automated workflow management via a user-friendly web interface. This talk aims to introduce GridSandbox, transmission-distribution-cyber modeling, the web interface, and relevant use cases including synchrophasor data analytics and transactive energy systems.

BIO

Anurag Srivastava is an adjunct professor at the Washington State University and senior scientist at the Pacific Northwest National Lab. He is currently serving as the Raymond J. Lane Professor and Chair of the Computer Science and Electrical Engineering Department at the West Virginia University. He received his PhD in electrical engineering from the Illinois Institute of Technology in 2005. His research interests encompass: data-driven algorithms for power system operation and control including resiliency analysis. In past years, he has worked in a different capacity at the Réseau de transport d'électricité in France; RWTH Aachen University in Germany; PEAK Reliability Coordinator, Idaho National Laboratory, 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.



Dr. Srivastava serves as chair of the IEEE Power & Energy Society's (PES) PEEC committee, co-chair of the microgrid working group, vice-chair of power system operation SC, chair of PES voltage stability working group, chair of PES synchrophasors applications working group, co-chair of distributed optimization application in power grid, vice-chair of tools for power grid resilience TF, and member of CIGRE C4C2-58 Voltage Stability, C4.47/ C2.25 Resilience WG. He is serving or has served as an editor of the IEEE Transactions on Smart Grid, IEEE Transactions on Power Systems, IEEE Transactions on Industry Applications, and Elsevier Sustainable Computing and guest or past editor for numbers of other IEEE Transactions and IET Journal. Additionally, Dr. Srivastava is the author of more than 300 technical publications, including a book on power system security, and possesses four patents.



Zhenyu (Henry) Huang (Ph.D., P.E., F.IEEE) is Laboratory Fellow at Pacific Northwest National Laboratory (PNNL), Richland, WA, and Research Professor at Washington State University, Pullman, WA. He served as Technical Advisor at the US DOE EERE Solar Energy Technologies Office (SETO) from 2019-2020. His research focuses on advancing analytical methods for understanding and managing the emerging complexity in the power grid with a new mix of generation and consumption. Dr. Huang has over 190 peer-reviewed publications in the areas of modeling, computing, simulation, optimization and control for power and energy systems. He is a Fellow of IEEE and is active in several IEEE Power and Energy Society (PES) technical committees. He is the recipient of the 2008 PNNL Ronald L. Brodzinski's Award for Early Career Exceptional Achievement and the 2009 IEEE Power and Energy Society Outstanding Young Engineer Award. Dr. Huang is a registered Professional Engineer in Washington State. Dr. Huang received his B. Eng. from Huazhong University of Science and Technology, Wuhan, China, and Ph.D. degree from Tsinghua University, Beijing, China

Dr. Dexin Wang is an Electrical Engineer in the Optimization and Control Group at PNNL. He received his Ph.D. degree in Electrical Engineering with a focus on telecommunications systems from Colorado State University, Fort Collins, CO, in 2019. His research interest includes power system resilience, energy storage systems, and transactive control, with a special focus on communication-dependent grid functions, co-simulations, and optimizations.



Sanjeev Pannala is working as a Post-Doctoral Research Associate at Energy System Innovation Center, Washington State University Pullman. His research interests include distribution system resiliency, event detection algorithms, ADMS, and microgrids. He worked on the India-UK HEAPD project from October 2014-January 2018 to earn his Ph.D. degree at the Indian Institute of Technology Roorkee (IITR), India. Later, he joined as a research associate (RA) under the UIASSIST Project at the Indian Institute of Technology Roorkee (IITR), India, from Feb 2018-May2019. He received the Doctoral POSOCO Power System Award in 2020 for contributions during Ph.D.