
Electrical & Computer Engineering
S E M I N A R
Louisiana State University

**Frontiers of Advancing the State of
the Art in Power System Protection**

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Abstract—Advances in sensing, communication, and computing have potential to refine, or even redefine the conception and implementation of Power System Protection. Increased computing power at low cost has provided opportunities to implement more computation-intensive methods/algorithms in real time. At the same time, Phasor Measurement Units (PMUs) providing faster and diverse synchronized measurements over a wide area and new communication options have also emerged. These advances have the potential to be enablers of new paradigms in Protection. Due to the availability of system-wide high-quality high-volume data in real time, improved System Integrity Protection Schemes (SIPS) and adaptive the same have become possible. Big Data analytics have the potential to detect and locate events, analyze system integrity, and take corrective action for more reliable protection. At the same time, processing and communication delays, bad data, and cyber-attacks pose challenges to security as well as dependability of protection. Novel methods using advanced computing are promising, but should not compromise the clarity and simplicity of the underlying system models and concepts. In this talk, I will present my research on 1) adaptive optimal protective relays coordination in power grid, and 2) a digital relaying power flow calculation algorithm for the wide area measurement to augment/supervise local protection. In addition, I will introduce my research activities on developing the fundamental research in power system protection and its application in the generation, transmission, distribution, and communication systems.

Bio—Masoud Barati received his Ph.D. degree in Electrical Engineering from Illinois Institute of Technology, Chicago, in 2013. In IIT, he worked at the Robert Galvin Center for Electricity Innovation for 4 years. He was a Visiting Professor in University of Chicago in Summer and Fall 2014. He is currently a Research and Instructional Assistant Professor in University of Houston, Houston, where he joined the Electrical and Computer Engineering department in Fall 2013. He is the co-chair of “Microgrid Protection Systems” subcommittee of “Power System Relaying & Control Committee”. He is the recipient of IEEE Certificate of Appreciation Award for establishment of a workshop on Harmonic Power System in IEEE Chicago section with S&C Company. He has supervised/co-supervised 5 PhD students and has taught more than 10 courses in University of Houston. Also, he has established High Voltage Engineering lab and Real-time Power System Protection Simulation lab and an online master program in power systems (IPS Program) in the ECE department at University of Houston. He has chaired/co-chaired more than 4 sessions in IEEE conferences. He has more than 10 years of experience in industry, academics and research. His research interests include developing mathematical model and algorithms for wide area monitoring and main protection to improve system integrity protection schemes.

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