**ECE Seminar**

**Wednesday, January 15, 2014 3:00-4:00 102 ATRC**

***Refreshments and discussion after***

**Topic: Distribution System Modeling, Analysis and Optimization**

**Abstract:** Transmission system analysis tools use Newton Raphson, Gauss Seidel and Fast Decoupled techniques that sometimes fail to converge when applied to distribution systems due to their higher resistance/reactance (R/X) ratio of the lines, making them ill conditioned. Distribution systems typically have a radial topological structure where the loads are not always constant power. Growth of Distributed Generation (DG) leading to high penetration, results in series of complex operations requiring advances in algorithms and models to handle uncertainty in power generation, reverse power flows and high variation in voltages. With the rapid renewable energy installations like wind, solar, fuel cell, hybrid electric vehicle and storage there is a key need to include these models in the unbalanced distribution power flow

analysis. Shipboard power systems are different from terrestrial distribution systems as they are tightly coupled and have multiple generators. Apart from renewable sources there are other Demand Responsive (DR) sources that are being utilized at distribution voltage levels for mitigating overloading and improving voltage profile. This talk will cover modeling of DR sources that have been integrated into standard comprehensive distribution test feeders as well as utility distribution feeders and their impact on system voltage profile and losses. Yet another resource that is being integrated is electric vehicle for which a unified framework of technologies will be examined in the talk to obtain a sustainable, fullyautomated Smart Transit System (STS) which will operate in grid connected and transit mode on fixed pathways. With the introduction of smart grids with distributed resources and different controls the system is prone to cyber-attacks thus implementation of new attack detection and learning method will be

discussed for frequency response of the islanded distribution system.

**Biography:** Sarika Khushalani Solanki received B.E. in electrical engineering from Nagpur University,

Nagpur, in 1998, M.E. in electrical engineering from Mumbai University, Mumbai, in 2000, and the

Ph.D. degree in electrical and computer engineering from Mississippi State University, Mississippi State,

MS, USA in 2006. She is currently an Assistant Professor in Lane Department of Computer Science and

Electrical Engineering at West Virginia University, Morgantown, WV, since August 2009. Prior to that,

she worked for Open Systems International Inc, Minneapolis, MN as a Senior Engineer for three years.

Her research interests are smart grid, power distribution system, computer applications in power system

analysis and power system control. She is an active reviewer and panelist of National Science Foundation,

Department of Energy and IEEE journals. She is a senior member of Institute for Electrical and

Electronics Engineers and Society of Women Engineers since 2009. She has organized and chaired

several panel sessions in leading national and international conferences and she is secretary of IEEE PES

Distribution System Analysis subcommittee and treasurer of IEEE upper Mon subsection.

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