Thursday, Jan. 24th
Scaife Hall Auditorium
Room 125 at 4:30 p.m.
Refreshments at 4:00 p.m.

Dr. Aranya Chakrabortty
Electrical & Computer Engineering
North Carolina State University

Dr. Aranya Chakrabortty received his Ph.D degree in Electrical Engineering from Rensselaer Polytechnic Institute, Troy, NY in 2008. From 2008-2009 he was appointed as a postdoctoral research associate in the Aeronautics and Astronautics department of the University of Washington, Seattle. From 2009-2010 he served as an Assistant Professor at Texas Tech University. Since Fall 2010 Aranya has joined the Electrical and Computer Engineering department of North Carolina State University, Raleigh, NC as an Assistant Professor, where he is also affiliated to the NSF FREEDM Systems Center. His research interests are in the areas of power system dynamics, modeling and control using Wide-area Measurement Systems. He received the NSF CAREER Award in 2011.

Decentralized Algorithms for Wide-Area Monitoring and Control of Large Power Systems Using Synchronized Phasor Measurements

In this talk I’ll present several model identification algorithms for constructing detailed dynamic models of the US west coast power system using spatially distributed Synchrophasor measurements. Our models will start from the major generation clusters in Alberta, Washington and Oregon to the load clusters in Southern California, Montana and Arizona. It will illustrate the so-called wide-area or clustered view of the WECC system, breaking the entire interconnection into these well-defined, coherent regions that oscillate with respect to each other in face of various disturbances. Such oscillations are well-studied for the traditional operating conditions of the WECC. However, with gradual expansion in transmission infrastructure as well as tremendous penetration of renewable power in the west coast over the next decade, several dynamical properties of the WECC grid will change significantly, and so will the characteristics of the interarea oscillations and their stability margins. Such projected changes are neither well-understood from an analytical perspective nor well-established from an experimental point of view. Our goal in this talk will be to bridge this gap by investigating how Synchrophasor-enabled wide-area models can be used to predict and monitor power oscillations due to such unforeseen contingencies and intermittency of renewable generation, and furthermore, how these oscillations can be controlled using wide-area PSS and FACTS controllers with Synchrophasor feedback. The final part of the talk will show experimental validations of these results using our WAMS-RTDS testbed recently developed at NC State.