

## Reliability and the Smart Grid: Issues and Methods

The electric power grid is changing. In the last decade, new technologies like smart phones, tablets, and plug-in hybrid electric vehicles have added new, dynamic, and stochastic loads to this mission-critical system. In response to these changes (and the aging of this vital infrastructure), new concepts like the smart grid have been proposed, promising to bring efficient management, improved performance, and greater convenience while simultaneously adding new layers of complexity, particularly through the addition of cyber-physical systems. Yet, the question of how the power grid will maintain its current levels of availability and reliability under this increased complexity and added strain remains an open issue. Accordingly, this talk will focus on the major issues of availability and reliability, new challenges facing the power grid, and the probabilistic reliability evaluation of electric power systems – a complex and highly dimensional problem that often requires a large amount of computational resources. Issues and methods surrounding the modeling and evaluation of this complex system will be reviewed along with a strong focus on the application of intelligent methods and high performance computing.



Robert Green received his B.S. from Geneva College in Computer Science & Applied Mathematics in 2005 and his M.S in Computer Science with a focus in Operations Research from Bowling Green State University in 2007. From 2007 until 2009 he served as a Senior Interactive Developer at Hart Associates, Inc. in Maumee, OH. He received his Ph.D. in Engineering from the University of Toledo in 2012 and currently serves as an Assistant Professor at Bowling Green State University. His research interests include the application of High Performance Computing and various Optimization Techniques to evaluate and optimize Complex Systems, particularly the power grid, smart grid, and cloud computing systems.