



# The Institute of Electrical and Electronics Engineers (IEEE)



## Galveston Bay Section Monthly Meeting Communication Society Chapter and Joint Societies Chapter

April 12<sup>th</sup>, 2017 (Wednesday) Luncheon Meeting

**TOPIC: “Design and Simulation Issues for Secure Power and Communication Networks as Resilient Smart Grid Infrastructures”**

**SPEAKER:** Professor Osama Mohammed, Director, Energy Systems Research Laboratory, Florida International University, Miami [ComSoc Sponsored Distinguished Speaker]

**PRESENTATION:** The increased penetration levels of renewables and distributed energy resources lead to increased challenges in maintaining reliable control and operation of the grid. Integrating a wide variety of systems governed by different regulations and owned by different entities to the grid increases the level of uncertainty not only on the demand side but also in terms of generation resource availability. This complicates the process of achieving generation versus demand balance. Renewable energy sources vary by nature and require intelligent forecasting and prediction systems to determine how and when this energy can be used. Controlling distributed resources that owned by customers which have enough capacity to support the grid during peak hours and provide ancillary service, is another challenge. Most of these distributed resources will be installed on the distribution network, which already in its current state, lacks the proper communication and control network necessary to control the applicable resources. Moreover, the large number and widespread use of these resources makes them difficult to control from a central location.

To overcome these problems, deep integration between intelligent measurement nodes, communication systems, IT technology, artificial intelligence, power electronics and physical power system components will be implemented to manage the modern smart grid resources. On one hand, this type of integration can dramatically improve grid performance and efficiency, but on the other, it can also introduce new types of vulnerability. The risk of vulnerability escalates when the level of integration between physical and cyber components of the power system increases. The design and optimization of such complex systems requires coordination between the cyber and physical components in order to obtain the best performance while minimizing the risk of vulnerability. In other words, the physical power system must be designed as a security-aware system.

**Dr. Osama Mohammed** is a Professor of Electrical Engineering and is the Director of the Energy Systems Research Laboratory at Florida International University, Miami, Florida. He received his Master and Doctoral degrees in Electrical Engineering from Virginia Tech in 1981 and 1983, respectively. He has performed research on various topics in power and energy systems in addition to design optimization and physics based modeling in electric drive systems and other low frequency environments. Professor Mohammed is a world renowned leader in electrical energy systems. He has performed research in the area of electromagnetic signature, wideband gap devices, power electronics, and ship power systems modeling and analysis. He has current active research projects for several Federal agencies dealing with; power system analysis and operation, smart grid distributed control and interoperability, energy cyber physical systems, and co-design of cyber and physical components for future energy systems applications.

Professor Mohammed has published more than 450 articles in refereed journals and other major IEEE refereed international conference records. He also authored a book and several book chapters. Professor Mohammed is an elected Fellow of IEEE and is an elected Fellow of the Applied Computational Electromagnetic Society. Professor Mohammed is the recipient of the prestigious IEEE Power and Energy Society Cyril Veinott electromechanical energy conversion award and the 2012 outstanding research award from Florida International University.

Professor Mohammed has lectured extensively with invited and plenary talks at major research and industrial organizations worldwide. He has served or currently serves as editor of several IEEE Transactions including the IEEE Transactions on Energy Conversion, the IEEE Transactions on Smart Grid, IEEE Transactions on Magnetics, and the IEEE Transactions on Industry Application. Professor Mohammed served as the International Steering Committee Chair for the IEEE International Electric Machines and Drives Conference (IEMDC) and the IEEE Biannual Conference on Electromagnetic Field Computation (CEFC). Professor Mohammed was the General Chair of six major international conferences in his areas of expertise in addition being general chair for two future IEEE major conference. For complete list of publications and the Smart Grid Test Bed, the following link has all the details; <http://www.energy.fiu.edu>

### **Gilruth Recreation Center NASA-JSC, Discovery Room (downstairs)**

Free parking. No security processing required. Easy drive in off Space Center Blvd. See website below for map.

Interested non-IEEE engineers, technicians, scientists, IEEE Members and guests alike are welcome!

**12:00 PM – 1:00 PM - Program and Q&A**

**11:30 AM - Light Lunch with reservation (\$10.00 donation). Please RSVP Before Noon Monday, April 10<sup>th</sup>, 2017**

**Number of lunches is limited. Please reserve early**

Reservations for lunch or to attend this meeting should be made by email to:

[d.k.rutishauser@ieee.org](mailto:d.k.rutishauser@ieee.org)

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