The IEEE Ottawa Section, IEEE Power and Energy Society Ottawa Chapter (PES), and Instrumentation & Measurement Society Ottawa Chapter (IMS), Reliability Society and Power Electronics Society Joint Chapter (RS/PELS), Communications Society, Consumer Electronics Society, and Broadcast Technology Society Joint Chapter (ComSoc/CESoc/BTS), and IEEE Ottawa Educational Activities (EdA) in conjunction with NRC Electrical Power Measurements are inviting all interested IEEE members and other engineers, technologists, and students to a Distinguished Lecture on

**Measurement, Control and Protection in a Robust Smart Grid with a Reference to Energy Management Systems for Smart Buildings in a Smart City**

By

Professor Saifur Rahman
Director, Virginia Tech Advanced Research Institute, USA

**DATE:** Thursday, October 19, 2017

**TIME:** 11:00 a.m. – 12:00 p.m.

**PLACE:** NRC, M-36, Kelvin Room, 1200 Montreal Road, Ottawa, ON Canada K2G 1V8

**Admission:** Free Registration. To ensure a seat, please register by e-mail contacting: Branislav Djokic or Wahab Almuhtadi

**Abstract**

A smart grid is a modern electric system. It has its own architecture, communications, sensors, metering, automation, computing hardware and software to improve the efficiency, reliability, flexibility and security of the electric power supply system. In particular, the smart grid, when fully deployed, will facilitate the (i) increased use of digital information and measurement, control & protection technologies, (ii) deployment and grid-integration of distributed energy resources (DERs), (iii) operation of demand response and energy efficiency programs, and (iv) integration of consumer-owned smart devices and technologies.

The smart grid requires advanced control at both component and system levels. Different non-linear controls, such as back-stepping control, feedback linearization, model predictive control, and sliding mode control are applied to control DERs, and their grid integration. Another control technique gaining application in the smart grid space is based on multi-agent systems (MAS) which provide autonomy, reactivity and proactivity. MAS are complex systems composed of several autonomous agents with only local knowledge and limited abilities, but are able to interact in order to achieve a global objective. As speedy communication facilities, such as fibreoptics, microwave, GSM/GPRS, 3G/4G are becoming the integral parts of the functioning smart grid, the integration of MAS in smart grid applications is becoming simple and feasible. This lecture focuses on the measurement & control issues of the smart grid and how MAS can provide an efficient tool to address such issues. In addition, an overview of the related challenges and opportunities for energy efficient building operation and management with deployment experience in the US will be provided.

**Biography**

Professor Saifur Rahman is the founding director of the Advanced Research Institute (www.ari.vt.edu) at Virginia Tech, USA where he is the Joseph R. Loring professor of electrical and computer engineering. He also directs the Center for Energy and the Global Environment (www.ceage.vt.edu). He is a Life Fellow of the IEEE and an IEEE Millennium Medal winner. He is the president-elect of the IEEE Power and Energy Society (PES) and will serve in this role in 2018 and 2019. He was the founding editor-in-chief of the IEEE Electrification Magazine and the IEEE Transactions on Sustainable Energy. In 2006 he served on the IEEE Board of Directors as the vice president for publications. He is a distinguished lecturer for the IEEE Power & Energy Society and has lectured on renewable energy, energy efficiency, smart grid, electric power system operation and planning, etc. in over 30 countries. He served as the chair of the US National Science Foundation Advisory Committee for International Science and Engineering from 2010 to 2013. He has conducted several energy efficiency related projects for Duke Energy, Tokyo Electric Power Company, the US Department of Defense, the State of Virginia and the US Department of Energy.