Colorado State University's
Information Science and Technology Center (ISTeC)
presents <u>two</u> lectures by

Mark J. O'Malley

Professor of Electrical Engineering,
Director, Electricity Research Centre,
University College, Dublin

ISTeC Distinguished Lecture
in conjunction with the
Electrical and Computer Engineering Department and
Computer Science Department Seminar Series

"Data: Needs, Importance and Challenges to the Integration of Variable Renewable Energy Sources into Electricity Grids"

Friday, September 14, 2012
Reception: 10:30 a.m., ISTeC Conference Room (Computer Science room 305)
Lecture: 11:00 – 12:00 noon
Location: Computer Science room 130

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Department of Electrical and Computer Engineering Lecture
sponsored by ISTeC

"Grid Flexibility and Research Challenges to Enhance the Integration of Variable Renewable Energy Sources"

Thursday, September 13, 2012
Lecture: 11:00 a.m.
Location: Lory Student Center room 228

ABSTRACTS

"Data: Needs, Importance and Challenges to the Integration of Variable Renewable Energy Sources into Electricity Grids"

Grid integration of renewable energy sources is a topical and challenging area. Data from the variable resource (wind), the grid, other generators, loads, markets, fuels etc. are all critical to understanding and tackling the challenges imposed by the temporal variability and spatial distribution of wind power and the limited data currently available. These challenges will be illustrated from the perspective of some particular research results in the area. The results show that at least 4 years of data in an hourly resolution are necessary for reliable studies and that 40 to 50 evenly distributed stations give an acceptable representation of the total wind power generation in Ireland.

"Grid Flexibility and Research Challenges to Enhance the Integration of Variable Renewable Energy Sources"

Grid flexibility is a characteristic that is proposed to help the integration of variable renewable energy resources. However it has proven very difficult to quantify and this has spurred intense research efforts over the past few years. There are many sources, sinks and enablers for flexibility in the grid and these are all subject to numerous research challenges. Flexibility will be introduced, defined and a number of methods to quantify it will be described. This will be followed by an overview of research into unlocking flexibility in the power system e.g. demand side participation and power system operational strategies. There are potential hidden costs of flexibility and some of these will be highlighted e.g. thermal plant cycling, and mitigation measures to reduce these will be formulated. Concluding remarks will try and give insights into how a future grid with very high penetrations of variable renewable energy may look like.

SPEAKER BIOGRAPHY

Mark O'Malley is the Professor of Electrical Engineering at University College Dublin (UCD), founder and Director of the Electricity Research Centre (http://erc.ucd.ie) an industry supported research group. He has received two Fulbright awards, is a Fellow of the Institute of Electrical and Electronic Engineers (IEEE) and a Member of the Royal Irish Academy. He is recognized as a world leading authority on grid integration of renewable energy and he is actively involved in many different international bodies and organizations advising on this topic. These include the International Energy Agency, European Research Council, European Academy of Sciences Advisory Council, Utility Wind Interest Group (UWIG), US Department of Energy, US National Renewable Energy Laboratory and the Energy Foundation.

To arrange a meeting with the speaker, please contact Prof. Siddharth Suryanarayanan at sid@colostate.edu or (970)491-4632.

ISTeC (Information Science and Technology Center) is a university-wide organization for promoting, facilitating, and enhancing CSU's research, education, and outreach activities pertaining to the design and innovative application of computer, communication, and information systems. For more information please see ISTeC.ColoState.edu.