

Thursday
September 11, 2003

Scaife Hall Auditorium

Room 125

4:00 p.m.

Refreshments - 3:30 p.m.



MARIJA D. ILIC
Carnegie Mellon/MIT

Marija Ilic recently joined as a full professor the faculty of Electrical and Computer Engineering and Engineering Public Policy Departments, Carnegie-Mellon University. She has been a Senior Research Scientist at the EECS Department at MIT since 1987. Her interest is in control and design of large-scale systems. From September 1999 until March 2001, she was a Program Director for Control, Networks and Computational Intelligence at the National Science Foundation. Prior to her years at MIT, she was a faculty at the University of Illinois at Urbana-Champaign and Cornell University. She is a recipient of the First Presidential Young Investigator Award for Power Systems. She is also an IEEE Fellow and an IEEE Distinguished Lecturer. She received her M.Sc. and D.Sc. degrees in Systems Science and Mathematics from Washington University in St. Louis, and her Dipl. Ing. And M.E.E. degrees from her native Yugoslavia, University of Belgrade.

She has co-authored several books on the subject of large-scale electric power systems: Ilic and Zaborszky, *Dynamics and Control of Large Electric Power Systems*, John Wiley&Sons, Inc., 2000; Ilic, Galiana, and Fink (eds.), *Power Systems Restructuring: Engineering and Economics*, Kluwer Academic Publishers, 2nd printing 2000; Allen and Ilic, *Price-Based Commitment decisions in the Electricity Markets*, Springer-Verlag London Limited, 1999; Ilic and Liu, *Hierarchical Power Systems Control: Its Value in a Changing Industry*, Springer-Verlag London Limited, 1996; Skantze and Ilic, *Valuation, Hedging and Speculation in Competitive Electricity Markets: A Fundamental Approach*, Kluwer Academic Publishers, 2001.

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Improving Electric Power System Reliability ***Understanding Causes of Blackouts and the Role of IT in Preventing Them***

Many people have already forgotten about the blackout on August 14, 2003. It affected over 60 million people in the United States and Canada for a day or more. The fact that we can recover and move on from such an event so quickly is both a blessing and a curse. The blessing of course is that our electric power system is organized and engineered such that it can fully recover within a few days. However, if we move on too quickly and fail to take this opportunity to improve the system, we will be cursed with more frequent blackouts as our growing demand for electricity further strains the electric power system. While all actions taken to improve reliability will increase cost, some are more expensive than others. Major investments in generation and transmission lines require much money and years of negotiation around how to finance and where to site them. This talk first describes two root problems characteristic of several blackouts. It then suggests one particularly effective yet inexpensive action to overcome these problems by investing in information and control technology.

In particular, a multilayer IT-based framework is presented, showing a system to support the delivery of power between arbitrary generators and consumers. This framework must: (1) allow all system users to adjust to changing conditions; (2) allow all consumers to communicate their short- and long-term demand for power and its delivery; (3) have clearly defined technical and contractual responsibilities for the performance of all users; and (4) monitor and control power exchanges between all utilities and regions. Such a framework would facilitate the evolution of the rigid grid of today to an Internet-like grid in which the users decide when and how to use the system.

The same IT-based framework for power system management can also support forward markets for reliable service by providing current and future system needs for that service. This would mean that the power consumers could purchase ahead of time increased level of reliability at a slightly higher price, and directly benefit from what they are paying for. The money paid for reliable service could be invested in the information and control technology required to implement it. 