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## Faculty Research Colloquium

Presented by



### Dr. Elyes Bdira

Department of Electrical, Electronics and Communications Engineering (EECE)  
School of Engineering

## “Cognitive Networking: Application to Wireless Sensor Networks”

**Tuesday, February 03, 2015 at 3:00 PM**  
**Conference Room - Building D**

#### *Abstract*

Wireless Sensor Networks (WSN) are complex dynamic systems that are composed of a large number of distributed nodes and involve an increasing demand for more challenging applications. In general, such applications demand Quality of Service (QoS) support and target multiple conflicting objectives. To address these requirements, cognitive techniques have shown great potential in improving the network performance and achieving its end-to-end goals. In this presentation an in-depth overview of cognitive approaches in wireless sensor networks is provided. Investigation the main cognitive WSN models and architectures, including the cognitive loop, the knowledge plan and distributed intelligence. Furthermore, several applications and implementation examples of the cognitive framework, including: adaptive sleep and adaptive modulation, cognitive diversity routing, distributed data fusion, network planning, conducting negotiations, learning and decision making in dynamic networks, etc., are presented. Some simulation results are selected to clearly illustrate the superiority of these cognitive approaches to their non-cognitive counterparts.

#### *About the Speaker*

Dr. Elyes Bdira received a Ph.D. in Electrical Engineering, from Concordia University, Montreal, Canada in 1995, M.S. Electrical Engineering, from Purdue University, and B.S. (honors) in Electrical Engineering, from University of Florida. In 2012, he joined the American University of Ras Al Khaimah. Between 2002 and 2012, he had been with Taibah University, KSA, Queen's University, Canada, and the University of Sharjah, UAE. Before 2002, Dr. Bdira was in telecommunication industry as a Senior Architect in the Wireless Division of Nortel Networks, Ottawa, Canada. He held also a position of Research Associate, in INRS-Telecom, University of Quebec, Canada. His current Research Interests are in Self-Configuring and Cognitive Wireless Sensor Networks with applications in Agriculture, Environment, Transportations, Health Services and Asset Management. He also conducts research in the general wireless area with contributions in the following subjects: Macro-Diversity techniques in Multihop 4G cellular networks, Simulation and Modeling of Cellular Channels and New Wireless Network Architectures and Protocols. Dr. Bdira is a Senior Member IEEE.