# THE CHINESE UNIVERSITY OF HONG KONG
## Department of Information Engineering

*Seminar*

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## Cognitive wireless mesh networks
## for multimedia applications
### by
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### University of Quebec
### Montreal, Canada

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Date    **:**    **5 January, 2010 (Tue.)**

Time    **:**    **11:00am-12:00noon**

Venue  **:**    **Room 833, Ho Sin Hang Engineering Building**
               **The Chinese University of Hong Kong**

### Abstract

Wireless mesh networks have emerged as a new technology that has a potential to provide low cost means for flexible and fast deployment of Internet based services in diverse environments. At the same time the concept of cognitive radios brings a promise of increased bandwidth availability at a minimum cost. The purposes of these two technologies fit each other in a very complementary way and in this presentation we describe some initial results of the project that is focused on the design of next generation cognitive wireless meshed networks that can support multimedia and emergency services. After the project overview, we will present three particular topics. In the first one we consider pairs of mesh nodes communicating with each other by making opportunistic access to a spectrum licensed to primary users (PUs). The objective is to maximize the sum-rate of the cognitive mesh network by optimally allocating power and bandwidth at the mesh nodes while maintaining the interference at the PUs below a predefined threshold value. The second topic addresses the issue of quality of service (QoS) guarantees in face of available capacity fluctuations in the cognitive wireless mesh networks. We propose a novel architecture that is based on the concept of soft capacity and protection classes. The last topic addresses the issue of routing and adaptive channel allocation based on traffic measurements. Here we applied an economical framework derived from Markov decision theory that allows optimal reallocation of the channels among the nodes. Initial numerical results will be presented.

### Biography

Zbigniew Dziong received his M.Sc. and Ph.D. degrees from the Warsaw University of Technology, Poland, both in Electrical Engineering. After graduation he was with the Warsaw University of Technology as an Assistant Professor. During this period, he was on sabbatical leaves at the Centre National d'Etudes des Telecommunications, Paris, France, and at the Department of Communication Systems, Lund Institute of Technology, Sweden. From 1987 to 1997 he was with INRS-Telecommunications, Montreal, Canada, as a Professor. From 1997 to 2003 he worked for Performance Analysis Department at Bell Labs, Lucent Technologies, Holmdel, New Jersey, USA. Since 2003 he is with École de technologie supérieure (University of Quebec), Montreal, Canada, where he teaches on both undergraduate and graduate level as an Associate Professor.

Zbigniew Dziong is an internationally recognized expert in the domain of performance, protocol, architecture and resource management for data, wireless and optical networks. He participated in research projects realized for many leading companies including Bell Labs, Nortel, Ericsson, and France Telecom. His research achievements are documented in over 100 scientific publications and 15 patents and patent applications. He won the prestigious STENTOR Research Award (1993, Canada) for collaborative research in the domain of resource management for broadband networks. His monograph ``ATM Network Resource Management`` (McGraw Hill, 1997) has been used in several universities for graduate courses. Currently he is engaged in several research projects supported by industry and government agencies.

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