



## Cognitive Radios and Networks: Theory and Practice

### *International Ph.D. Course*

### Course Description

Demand for mobile services is increasing fast, and current wireless network technologies will soon be bottlenecks to the growth of both services and market. Furthermore, the apparent spectrum scarcity does not provide enough space for future wireless communications systems. Cognitive Radio (CR) has developed as a possible solution for coping with such problems, giving the possibility of efficiently using/re-using the spectrum resources in an autonomous and opportunistic way. This topic is much current interest by academia and industry, as demonstrated by ongoing activities in standardization bodies such as ETSI and IEEE.

This course will provide an overview of the possibilities but also the issues that such a powerful concept offers, ranging from theoretical and algorithmic design to practical implementation on research-oriented software-defined radio platforms like Iris and ASGARD.

### Format

- Lecturers:** **Luiz DaSilva**, Trinity College Dublin, Ireland, and Virginia Tech, USA  
**Linda Doyle**, Trinity College Dublin, Ireland  
**Nicola Marchetti**, Trinity College Dublin, Ireland  
**Andrea F. Cattoni**, Aalborg University, Denmark  
**Petar Popovski**, Aalborg University, Denmark
- Dates:** 13-16 May 2013
- Place:** Trinity College Dublin, Ireland
- Info contact:** Hamed Ahmadi, [Ahmadih@tcd.ie](mailto:Ahmadih@tcd.ie)
- Cost:** The participation is free for Ph.D. students and post-doctoral researchers. Details are available upon request.
- To register:** Fill the registration form and email to [Ahmadih@tcd.ie](mailto:Ahmadih@tcd.ie)

**Registration deadline:** 5<sup>th</sup> May 2013

## Tentative topics covered by the course

- ✓ Overview of cognitive radio concept and applications
- ✓ Techniques for determining spectrum availability
- ✓ Dynamic spectrum access: regulatory aspects
- ✓ Information theoretic aspects of cognitive radio
- ✓ Radio resource management
- ✓ Game theoretic models of cognitive radio
- ✓ Machine learning and cognitive radio
- ✓ Cognitive radio and advanced PHY techniques in 4G and beyond
- ✓ Future wireless network architectures
- ✓ Radio rendezvous
- ✓ Testbed implementations and software solutions

**Prerequisites:** general knowledge of communication systems and networks, general knowledge on programming

In cooperation with:

Aalborg University