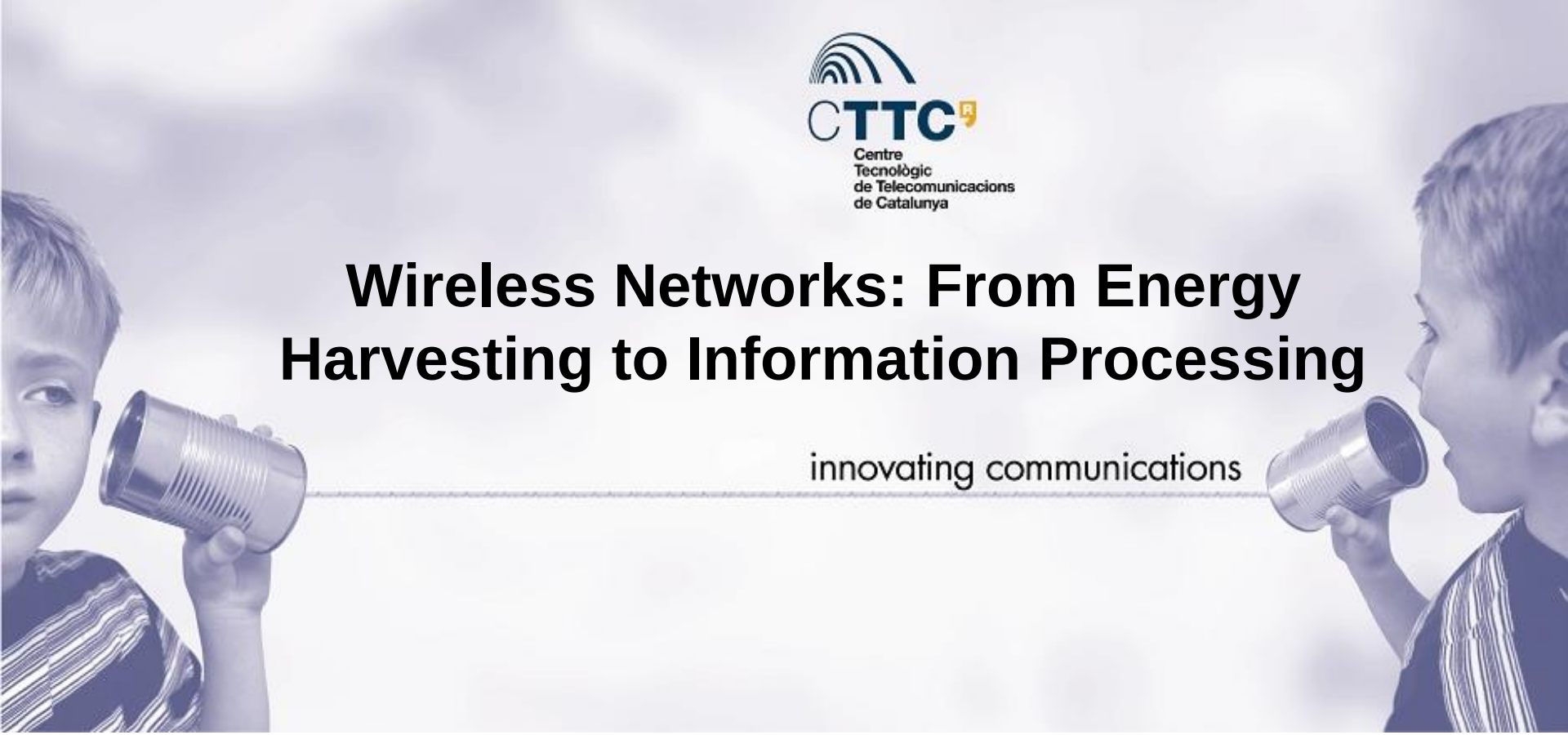

Wireless Networks: From Energy Harvesting to Information Processing

COST IC1301 and European School of Antennas Ph. D. programme

9th - 13th November 2015

Centre Tecnològic de Telecomunicacions de Catalunya

Castelldefels – Barcelona

WIPE
COST IC1301

Introduction

Dr. Apostolos Georgiadis

WIPE COST Coordinator

Communication Technologies Division

http://www.cost-ic1301.org/

Dr. Monica Navarro

ESoA Coordinator at CTTC

Communication Systems Division

http://www.antennasvce.org/Community/Education/Courses/Locations

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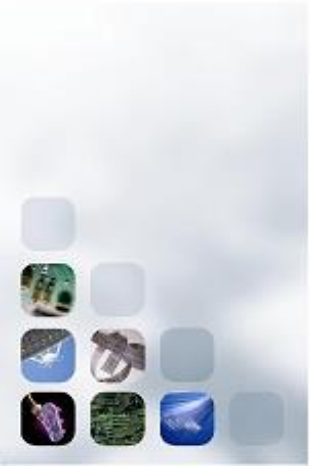

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Introduction

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Course Contents

Part I : Overview of energy harvesting techniques for autonomous devices

- provide an understanding of the HW technologies and RF aspects involved
- Energy harvesting
- theoretical principles of wireless power transfer technologies
- signal optimization and rectenna design for electromagnetic energy harvesting and wireless power transfer

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Course Contents

Part II: Overview of Information processing

- Review the basic principles of communications & information theory
- Provide an overview of recent developments in the design of energy management policies for EH communication systems (analytical models)
- Introduce cooperative principle (relay channel) and coding aspects related to networks (coded cooperation, network coding, PHY NC, coded random access)

Course Contents

Assessment

- RF design work assignment (70% of course assessment) + theory test (30%)
- Rectenna design using commercial software Keysight ADS 2015.
- Form up to 5 teams of 4 members. Full details this afternoon.
- Written design report (4-5 pages), used as the basis of the competition. Reports due Thursday Nov. 12 15:00. The winner will be announced on FRI NOV 13.

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Instructors

Prof. Jenshan Lin, University of Florida, Gainesville, FL, USA

Prof. Naoki Shinohara, Research Institute for Sustainable Humanosphere, Kyoto University, Japan

Prof. Alessandra Costanzo, University of Bologna, Italy

Dr. George E. Ponchak, NASA Glenn Research Center, US

Prof. Nuno B. Carvalho, Institute of Telecommunications, University of Aveiro, Portugal

Dr. Apostolos Georgiadis, Centre Technologic de Telecomunicacions de Catalunya

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Instructors

Dr. Deniz Gunduz, Imperial College, London, UK

Dr. Stephan Pfletschinger, DLR, Germany

Dr. Monica Navarro, Centre Technologic de Telecomunicacions de Catalunya

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Schedule

Time	Monday, 9th Nov.	Tuesday, 10th Nov.	Wednesday, 11th Nov.	Thursday, 12th Nov.	Friday, 13th Nov.
9:00-9:30	**Registration**	**UWB -UHF circuit and system solutions for simultaneous wireless powering, tracking and sensing at ultra-low power** *Alessandra Costanzo* *University of Bologna*	**Optimal signal selection and rectenna design for electromagnetic energy harvesting and wireless power transfer** *Apostolos Georgiadis* *CTTC*		
9:30-10:00	**Welcome and Introduction** *Monica Navarro* *CTTC*			**Energy Harvesting Communication Network Design** *Deniz Gunduz* *Imperial College*	**From Network Coding to Uncoordinated Multiple Access** *Stephan Pfletschinger* *DLR*
10:00-11:00	**Basics of Communication theory** *Monica Navarro* *CTTC*	**Wireless Power Transfer: From Far Field to Near Field** *Jenshan Lin* *University of Florida*	**Passive Radio Communications combining backscatter with WPT** *Nuno Borges Carvalho* *Institute of Telecom. (Univ. of Aveiro)*		
11:00-11:30	Coffee break				
11:30-13:00	**Energy harvesting and wireless power transfer for autonomous sensors and RFIDs** *Apostolos Georgiadis* *CTTC*	**Design Method of High Efficiency Rectenna for Microwave/Millimeter Wave Power Transfer and Energy Harvesting** *Naoki Shinohara* *Kyoto University*	**How to Write a Paper for IEEE MTT-S Journals and Navigate the Review Process** *George Ponchak* *NASA*	**Cooperation and Coding** *Monica Navarro* *CTTC*	**Final assessment** **Student questionnaire**
13:00-14:30	Lunch break				
14:30-17:00	**Work assignment: Rectenna design student design project** *Apostolos Georgiadis* *CTTC*	**Work assignment: Rectenna design student design project** *Apostolos Georgiadis* *CTTC*	**Work assignment: Rectenna design student design project** *Apostolos Georgiadis* *CTTC*	**Work assignment: Rectenna design student design project** *Apostolos Georgiadis* *CTTC*	**End of the Course**
17:00-17:30		**BUS departure**			
17:30-18:30		**Visit to Barcelona Supercomputing centre**			
20:30		**Dinner**			

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Organization

- Lunch
  - At campus restaurant
  - Tickets provided with your course material
- Registration receipts and attendance certificates provided by Friday
- Lecture material

  http://esoa2015.cttc.cat/

  user: lectures, pwd: EsoA2015
- WiFi: **cttc-web**, user: **cttc, pwd:**NTJRxzcc

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Special Events

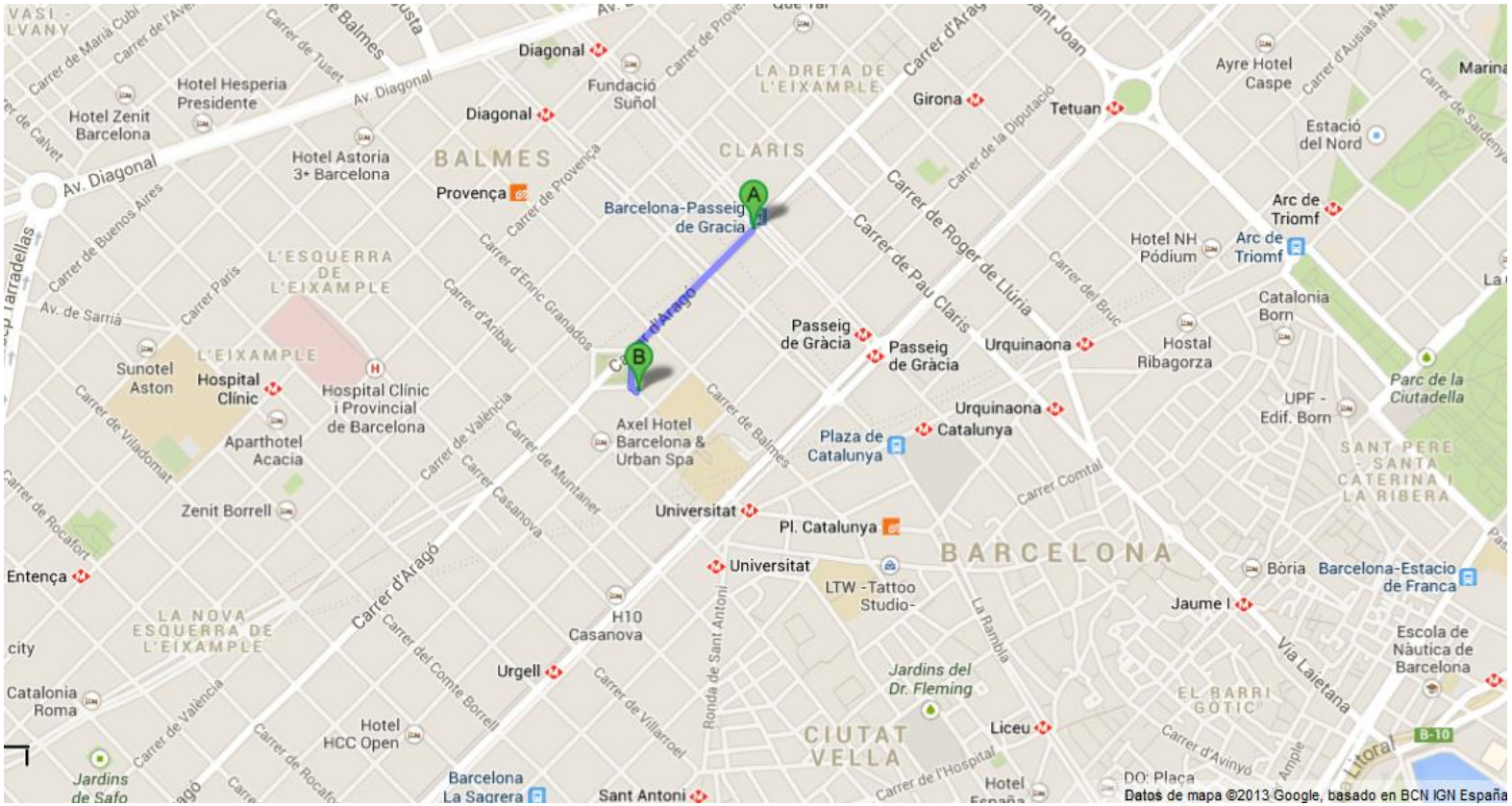
1. Visit to Barcelona Supercomputing Center
2. Dinner
   - When? Tuesday 10th
     - BUS departure at 16:45
     - BUS return to Castelldefels after dinner

Dinner

FLAMANT Restaurant @ 20:30

Enric Granados, 23, Barcelona

Train (or Metro) Station Passeig de Gràcia



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Metro

Origen : Barcelona-Passeig de Gràcia
Destino : Castelldefels

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nics

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Trains Barcelona Passeig de Gràcia-Castelldefels

http://www20.gencat.cat/portal/site/rodalies/

English:

http://rodalies.gencat.cat/en/index.html

R2 line

Stations

Castelldefels

Barcelona:

Barcelona – Passeig de Gràcia

Barcelona – Sants Estació

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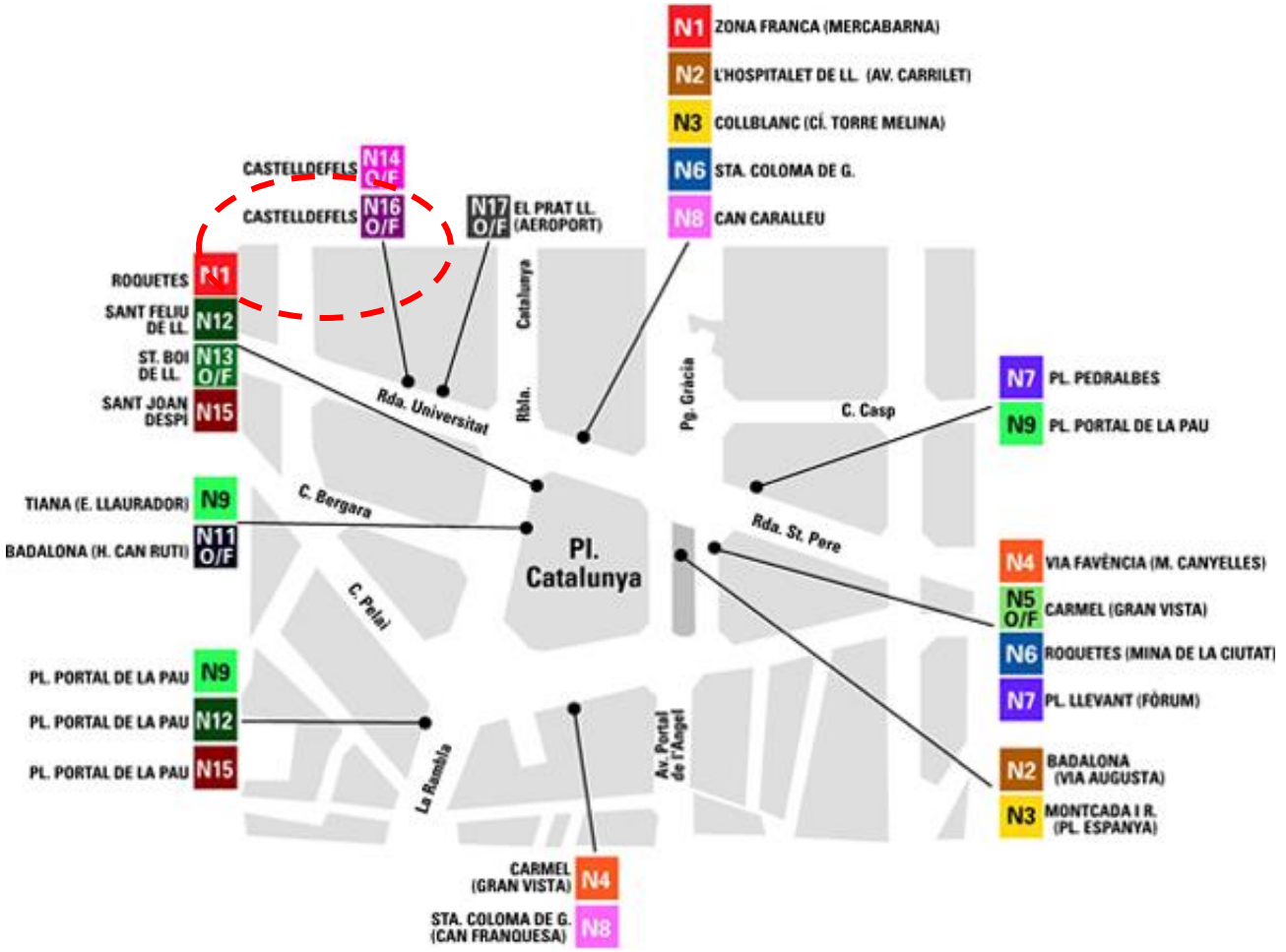
Nit bus stop in Barcelona
Plaça Catalunya, Metro L3



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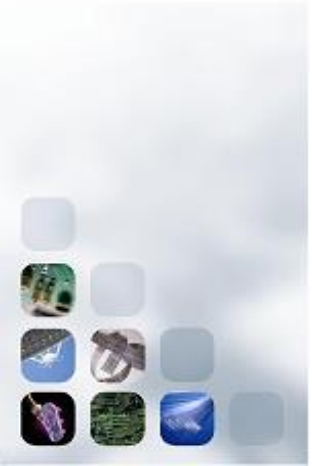

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