DOCTORATS INDUSTRIALS

EL PLA DE DOCTORATS INDUSTRIALS

PROJECTE DE DOCTORAT INDUSTRIAL
EXPEDIENT 2015 DI 088

DADES DE L'EMPRESA I DE L'ENTORN ACADÈMIC

Títol del projecte
Innovative Architectures, Wireless Technologies and Tools for High Capacity and Sustainable 5G Ultra-Dense Cellular Networks.

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BREU DESCRIPCIÓ DEL PROJECTE DE RECERCA

5G technology is currently under study and it defines and optimizes radically-changing architectures and technologies, leading to a wholesale re-thinking of cellular operational principles and architectures, network topologies, transmission technologies and methods to their analysis, design and optimization. According to the 5GPPP recently launched by the EC, 5G systems need to be capable of providing 1000 times higher capacity and a 90% reduction in energy consumption compared to today standards, in order to cope with the impressive increase of mobile data traffic and to reduce the ever increasing carbon emission footprint of mobile communications. There is also the possibility that 5G networks will enable digital sensing, communication and processing capabilities to be ubiquitously embedded into everyday objects, turning them into the Internet of Things (IoT) or Machine-to-Machine (M2M) systems.

The research objective of this thesis will be twofold: 1) to develop new medium access channel (MAC) and scheduling protocols that take advantage of full-duplex transmission in multi-user multi-hop 5G wireless networks, and 2) to introduce interference-awareness, by exploiting interference statistics for achieving close-to-one frequency reuse with high energy efficiency. Within the thesis, the student is expected to acquire new knowledge on the fundamental benefits of full-duplex, beyond the physical-layer twofold increase of spectral efficiency, and to integrate full-duplex operation modes into ultra-dense cellular network deployments. The

developed building blocks will be tested in the system level simulator of the company and they will enhance it´s functionalities.

We are looking for highly motivated, enthusiastic junior scientists, with an MSc in electrical engineering or related fields, aiming at significantly improving their career perspectives in both public and private sectors. A background in mobile networks, wireless communications theory, signal processing, information theory, and stochastic geometry would be positively considered. Excellent research skills and analytical abilities are required, fluency in English (spoken and written), proactive communication skills and problem solving as part of a team, strong record keeping, great work ethic and initiatives are essential characteristics.