

3 Marie Curie Ph.D. Positions at Barcelona

Three Early Stage Researcher (ESR) / Ph.D positions are offered in the context of the H2020 Innovative Training Network project 5G-Wireless, focused on Innovative Architectures, Wireless Technologies and Tools for High Capacity and Sustainable 5G Ultra-Dense Cellular Networks.

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.

These positions are fully funded for 3 years by the European Commission under the H2020 Marie Curie Innovative Training Network Programme. The recruited ESRs will be highly encouraged to enroll to the Ph.D. programme of the Signal Theory and Communications (TSC) department at UPC (<http://www.tsc.upc.edu>).

RESEARCH TOPIC

5G-Wireless is the first integrated and multi-disciplinary training-through-research network of ESRs and Senior Supervisors, fully committed to re-architecting current cellular principles aiming at making 5G a reality. It will define and optimise 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 optimisation.

The 5G-Wireless project involves 5 leading universities/research institutions and 5 industrial partners from 6 different EU countries, offering an inter-sector training approach by exploiting the scientific and the industrial expertise of the consortium. 5G-Wireless will recruit 15 ESRs having the objective of conducting top-notch research at national, European and international levels. All recruited ESRs will receive personalized training and will conduct theoretical and applied research on fundamental challenges to the development of 5G networks.

In this context, the following **three Ph.D. positions** are offered at Barcelona (Spain):

- 1) 2 positions in **Universitat Politècnica de Catalunya (UPC)**, Spain, ellik@tsc.upc.edu
 - **ESR1:** Hybrid precoding and channel estimation for mm-wave communications
Description: The research objective of this ESR will be twofold: 1) to develop cost- and energy-efficient precoding schemes for mmWave communications that exploit both digital and analog signal processing, and 2) to develop new channel estimation algorithms that exploit the sparseness of mmWave channels by using compressed sensing techniques. Within the project, the ESR is expected to acquire new knowledge on energy-efficient and high-performance directional beamforming for mmWave communications and understand performance and optimization spaces with practical channel models and interferences.
Mobility requirement: Within the duration of the project, the ESR will perform a secondment of up-to 6 months at SIRADEL SAS (France).
 - **ESR2:** Random shape theory modelling and performance evaluation of blockages in urban environments
Description: The research objective of this ESR will be twofold: 1) to employ random shape theory for accurately modeling blockage effects of mmWave propagation in dense urban environments, and 2) to exploit such modeling for end-to-end performance evaluation, which includes the analysis of coverage, rate, area spectral efficiency and energy efficiency. Within the project, the ESR is expected to acquire new knowledge on modelling blockages by taking into account accurate distance-dependent path-loss models and understand the impact of blockages on the achievable performance of ultra-dense mmWave deployment.
Mobility requirement: Within the duration of the project, the ESR will perform a secondment of up-to 6 months at Educational OTE AE (Greece).

2) 1 position in **Iquadrat Informatica S.L.**, Spain, projects@iquadrat.com

- **ESR3:** Interference-aware Medium Access Control (MAC) protocols for full-duplex communications
Description: The research objective of this ESR will be twofold: 1) to develop new MAC and scheduling protocols that take advantage of full-duplex transmission in multi-user multi-hop 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 project, the ESR 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
Mobility requirement: Within the duration of the project, the ESR will perform a secondment of up-to 6 months at CRNS, France (<http://www.cnrs.fr>).

The recruited ESRs will work in close collaboration with the other academic partners of the project:

- Centre National de la Recherche Scientifique (CNRS)
- Technische Universität Dresden (TUD)
- Linköpings universitet (LiU)
- Heriot-Watt University (HWU)

and will also have the opportunity of collaboration with researchers from industry:

- Ericsson AB, Sweden
- Educational OTE AE, Greece
- SIRADEL SAS, France
- TTI Norte S.L., Spain

ELIGIBILITY

- The recruited researchers should be, at the time of selection, in the first four years of their research careers (measured from the date when they obtained the degree which would entitle them to embark on a doctorate).
- The applicants should not be in possession of a doctoral degree, but they should have the qualifications to embark on a PhD program.
- The applicants (regardless of their nationalities) must not have resided or carried out their main activities (work, studies, etc.) in Spain for more than 12 months in the last 3 years.

FINANCIAL PROVISIONS

Marie Curie ITNs provide competitive financial support to the ESR including:

- a competitive monthly living and mobility allowance,
- coverage of the expenses related to the participation of the ESR in research and training activities (contribution to research-related costs, meetings, conference attendance, training actions, etc.).

The recruited ESRs will have a regular contract with the same rights and obligations as any other staff member of UPC-BarcelonaTECH or Iquadrat, respectively. The ESRs should start within 2 months of the acceptance of the fellowship.

APPLICATIONS

To apply, please provide:

- 1) a cover letter detailing your suitability for the position in question;
- 2) a detailed CV;
- 3) the name and address of two referees to support your application.
 - For the ESR1 and ESR2 positions at UPC-BarcelonaTECH, all applications should be sent by email to ellik@tsc.upc.edu and etn.5gw@gmail.com.
 - For the ESR3 position at Iquadrat, all applications should be sent by email to projects@iquadrat.com and etn.5gw@gmail.com.

All applications will be evaluated by a committee with equality and based strictly on the candidates' skills, whereas issues as gender, ethnicity, disability, etc. will be irrelevant to the selection.

The closing date for applications is 15 May 2015.