

1. Interested institution:

Universitat Politècnica de Catalunya (<http://www.upc.edu/>),
Departament of Electronic Engineering (<http://www.eel.upc.edu/>),
Castelldefels School of Telecommunications and Aerospace Engineering
(<http://eetac.upc.edu/>),
Electronic Circuits and Transducers group (<http://futur.upc.edu/E-CAT>)

2. Brief Description of the Institution

The Universitat Politècnica de Catalunya (UPC) is a public university that specializes in the fields of architecture, engineering, merchant seamanship, economics, health sciences and applied mathematics. The UPC is very active in post-graduate education, with an offer of 65 Masters Adapted to the European Higher Education System (including 13 Erasmus Mundus master's programs funded by the European Commission), and 51 doctoral programs with "Mention of Quality" (25 of which with a distinction of excellence awarded by the Spanish Ministry of Education and Science and 7 Erasmus Mundus Joint Doctorates). These educational programs have traditionally attracted Spanish and Latin American students, although more recently, the increased visibility of Erasmus Mundus programs and an active policy of the University have secured a steady flow of excellent students from Europe and Asia.

UPC continues its commitment to economic development and strengthening its continuing education programs through the UPC Foundation. UPC's Technology Transfer Center (TTC) is a substantial R&D contributor to Catalonia's industrial sector. UPC is currently working in over 250 research areas, and we have a growing number of specific research centers and regional technology centers focusing on current research needs. Regarding the **transfer of knowledge** domain, it is to highlight that the main goals of the Technology Transfer Center:

- Fostering innovation and technological progress in industry by transferring results and technology.

- Enhancing the participation and performance of UPC researchers in technological research and development projects

The center is responsible for the management and the administration of the research projects participated or lead by UPC researchers, along with those projects in which the UPC is acting as host institution, such as Marie Curie Actions. TTC works closely with **Innova Program** the unit in charge of the promotion of innovation and entrepreneurship throughout the university community researchers, allowing the creation of new businesses and result evaluation instruments knowledge. Innova together with UPC Legal Services plays an important role in the management of IPR and the design of exploitation plans for the research results. A wide portfolio of services is offered to the researchers in disseminating, protecting or commercializing these results, as for example Specific training courses, Advice on the patentability of the technology or Assessment and commercialization of research results closer to the needs of the business research groups, and vice versa.

UPC makes available to enterprise, research groups of the UPC and other public and private

“EXPRESSION OF INTEREST” FOR HOSTING MARIE S. CURIE FELLOWS IN SPANISH INSTITUTIONS (CALL MSCA IF 2015)

institutions and research centers, the scientific and technical services of the UPC to support research and innovation. The webpage of the Scientific and technical services (<http://www.upc.edu/sct/en/>; <http://futur.upc.edu/>) of the UPC offer an internet search engine of services in different thematic of the UPC’s research. The objective of this internet search engine is to offer a quickly access to installations, laboratories and forefront equipment of the UPC for the enterprise and the provisions of services and promote relations between university-enterprise:

Welcoming the fellow

The European Projects Office of the TTC, the Human Resources Department and the International Relations Service of UPC provide support to the researchers at the incoming phase to UPC as in the case of researchers who benefit from Marie Curie Actions. UPC has endorsed **the European Charter and Code for researchers** and is currently working (internal evaluation process according the HRS4R) in obtaining the **HR Excellence in Research** badge. Once the project has been awarded, four UPC services coordinate its work in order to provide the best possible assistance to the incoming fellow:

- **The Office of European Projects** provides support to researchers in legal and administrative issues regarding its contract with the commission (filling in the GPF, checking the budget, processing of signatures, contact the Commission for any doubt or question ...) <http://www.upc.edu/euresearch/>
- **The Human Resources Department** assists the researchers along the execution of their employment contract . On the other hand, this department is the responsible for the fellows employment contract. Therefore the HHRR department will inform the researcher about the legal requirements for his/her stage in the University.
- The Staff Development Service** at the UPC organizes workshops to provide new staff members with an introduction to the University and include presentation by the University central services covering a variety of information relevant to the staff. It is also an opportunity to socialize with other recently recruited researchers
- **The International Relations Office** advises the investigator about all matters related to his transfer to Spain, as regards social benefits, support in finding accommodation such as: online resources for language learning, courses on official languages, social activities, sports clubs and associations for international cooperation. All this to facilitate the social integration of researchers during their stay in college.

UPC is located In Barcelona, Catalonia, where the Spanish and the Catalan languages are co-official. The University offers both Catalan and Spanish modules, specially designed for international students.

3. Please tick the areas of research (as established in Marie Skłodowska Curie Actions)

- | | |
|---|---|
| <input type="checkbox"/> Chemistry (CHE) | <input type="checkbox"/> Environmental Sciences and Geology (ENV) |
| <input type="checkbox"/> Social Sciences and Humanities (SOC) | <input type="checkbox"/> Life Sciences (LIF) |
| <input type="checkbox"/> Economic Sciences (ECO) | <input type="checkbox"/> Mathematics (MAT) |
| <input checked="" type="checkbox"/> Information Science and Engineering (ENG) | <input type="checkbox"/> Physics (PHY) |

4. Research / Project Description

The aim of the host group (Electronic Circuits and Transducers group, e-CAT) is the research and design of new electronic circuits applied to transducers, for signal and power processing, with the goal of developing **energy-autonomous smart sensors** with application to any field. The focus is put on low-power and low-cost microcontroller-based circuits and on new techniques and methods for maximizing the harvested energy (optical/solar, mechanical, thermal, radiofrequency).

The **specific research objectives** of the e-CAT group are:

1. Design of **circuits for radiofrequency energy harvesting**.

Radiofrequency (RF) energy can be harvested either from the surrounding environment or from dedicated sources (e.g. as in RFID tags). An RF harvester is mainly composed of an antenna, a matching network, and a rectifier. For low incoming powers, power efficiencies are rather low. The host group aim is the proposal of techniques and circuits in order to increase the power efficiency at low power levels.

2. Design of **circuits for inductive power transfer**.

Wireless power transfer via inductive links has been proposed both for high and low power. For low power, the embraced applications have been RFID devices, biological implants, and mobile devices. The host group aim is to propose techniques and circuits for maximizing the power transfer and efficiency.

3. Design of **circuits for maximum power point tracking and for power management** of energy harvesters.

Any energy transducer has a maximum power point (MPP). There are circuits and techniques for tracking the MPP. These MPP trackers mainly consist of a DC-DC converter and an MPP controller. The host group aim is to design circuits with extremely low power consumption and high tracking efficiency, thus maximizing the harvested power from environmental sources (solar, thermal ...).

4. Design of **microcontroller-based low-power measurement circuits**.

Direct sensor-to-microcontroller circuits have been widely proposed and tested, in particular by the e-CAT group. Advantages over classical electronic interfaces for sensors are low cost and low power consumption. Up to date, they have been mainly applied to resistive and capacitive sensors. The host group aim is to extend its use to other type of sensors such as: inductive, photodiodes, and impedance sensors.

Some of the above circuits will be prone to be implemented as **microelectronic circuits**, being this a transversal objective.

5. Who can apply?

At the deadline for the submission of proposals (10/09/2015), researchers (*):

- shall be in possession of a doctoral degree or have at least four years of full-time equivalent research experience.
- must not have resided or carried out their main activities in the country of Spain for more than 12 months in the 3 years immediately prior to the abovementioned deadline.

6. Contact person

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7. Applications: documents to be submitted and deadlines

CV and letter of motivation

Please note that:

- Deadline of the next call for proposals for Marie Skłodowska – Curie Individual Fellowships is **September, 10th 2015**.
- Oficina Europea is only responsible for the display of the expressions of interests received by the institutions; further contact and information requests will take place directly between the host institutions and the interested researchers.

(*) Further details on the Call and additional eligibility criteria can be found at the [Participants' Portal](#)