

Title: Call for Expressions of Interest for the submission of MSCA-IF projects in Power Electronics for advanced RES integration

Job Description

IREC, in Barcelona, Spain, is interested in receiving Expressions of Interest of potential candidates for the Marie Skłodowska-Curie Actions – Individual Fellowship (MSCA-IF) 2020 call. The Power Systems group encompasses a wide-spectra of engineering disciplines (as electrical, electronic, energy, communications, control, among other) required to comply with such evolving electrical system and sector. The aim of the group is to become an international reference in the R&D sector; with special emphasis in in the field of power Systems, grid Integration and Renewable energies.

The Power Systems Group research lines are focused on the resolution of challenges of the future power systems, allowing larger integration of renewable energy sources, energy storage, as well as power converters and electric vehicles. Power systems are evolving from passive networks to active systems with multiple power electronic converters and smart grid technologies, which are changing the way we understand the power systems as a whole from generation up to consumption; becoming a completely new energy paradigm.

The group is working in close relationship with industrial companies in both technological transfer projects and research oriented projects.

The Power Systems Group of the Catalonia Institute for Energy Research (IREC), announces the interest on hosting a MSCA IF to work on the field of “Power Electronics for advanced RES integration”.

This project is of great relevance due to the large renewable penetration, aiming to provide new solutions towards a zero inertia stable grids, ensuring it through the proper control of the novel generation assets. The project will produce models of RES for control development, in addition to centralized and distributed controls for ensuring grid stability from RES, and holistic control designs of hybrid energy systems, i.e. RES+ESS. In addition, it will work on the development of required capabilities as Grid Forming to ensure the creation of islanded/isolated grids after disconnection.

This work will include modelling and control of different energy systems. Implementation of low order and structure to identify and control existing dynamics as well as RES+ESS control, communication and management. Additionally, experimental activities experimental set ups with IREC’s lab facilities are expected.

The extensive use of Renewable power plants (including wind, solar and tidal energy) and the connection of additional devices based on PE, requires advanced controllers to ensure grid stability and security. The project will include:

1. Modelling RES and ESS for control design purposes.
2. Analysis of advanced control schemes for AS provision and coordination of different RES and ESS.
3. To propose a controller for a grid-forming ESS which is capable of dealing with unbalance voltage conditions (in grid-connected mode) and unbalance currents (Island-connected mode).

4. Analysis of control schemes limitations in a 100% RES generation scenarios and stability aspects on the network to ensure novel capabilities of power electronics..

Qualifications and experience required:

Essential:

- PhD in Industrial Electronics, Automatic Control, Electronics, Electrical engineering or similar.
- Experience with power electronics and electrical networks modelling.
- Experience with simulation software.

Preferred:

- Experience in applications with renewable energy, energy storage systems, electric mobility and grid integration are expected.
- Experience with Control design and Applied Mathematics.
- Experience with control boards
- Control and operation of power converters.
- Experience with robust control and system identification methods.

Language required:

Fluent in English.

Personal Skills:

- Team Worker
- Flexibility
- Results-oriented
- Analytical and synthesis capabilities

Benefits

The annual budget includes funding for salary, research costs and a contribution to the management and overheads of the project. The salary will be in accordance with the H2020 Marie Skłodowska-Curie rates.

Fellows will be based at the IREC headquarters in Barcelona.

Elegibility criteria:

According to the MSCA-IF-2020 call, the fellows, at the deadline for the submission of the proposals:

- Must be experienced researchers, i.e., e in possession of a doctoral degree or have at least four years of full-time equivalent research experience.

- May not have resided or carried out their main activity (work, studies, etc.) in Spain for more than 12 months in the three years immediately before September 9th 2020.

Application:

Researchers willing to apply should check that they meet the eligibility requirements and send the expression of interest, including:

- Their CV
- A motivation letter
- A summary of their research proposal

Expressions of interest should be sent by email directly to the KTT Office (ktt@irec.cat) indicating "Call for Expressions of Interest for the submission of MSCA-IF projects in PE for advanced RES integration" in the subject.

Nr of positions available: 1

Research Fields

Advanced Control

Power Electronics

Modelling and Power Systems

Researcher Profiles

Recognised Researcher (R2)

Established Researcher (R3)

Application Deadline: 15/07/2020