

Position	ESR3.3		
Title	Distributed control strategies for wind farms for grid support		
Centre	Catalonia Institute for Energy Research (IREC, www.irec.cat)		
Location	Barcelona, Spain		
Start date	1 July 2016	Duration	36 months
Closing date for applications	6 March 2016		
Communications of results	15 May 2016		

Job description

Individual Research Project

In general, wind power plants have been modelled as aggregated turbines to represent the behaviour of the entire system in terms of power delivered to the grid. However, these simplified descriptions are not able to capture the complexity of the wind farms behaviour. Each wind turbine faces different wind profiles and interacts with the rest of turbines in the farms. Furthermore, a wind farm is itself a complex electrical grid with a large number of agents and with different control levels interacting with each other. The objective of this Individual Research Project is to propose distributed control strategies for wind farms aimed to regulate the active and reactive power injected into the grid in order to provide support frequency, voltage stability and other grid support services. The aim is to consider the individual behaviour of each turbine in the farm and to achieve a coordinated behaviour to fulfil the TSOs demands. The control strategies will cover the different control levels needed to achieve the previous mentioned objectives.

Tasks

- Modelling of wind farms considering the individual wind turbine limitations.
- Developing distributed control algorithms for wind farms to optimise the global energy capture.
- Developing distributed control strategies to achieve a suitable aggregated behaviour of the wind farm to provide grid support.

Career

In Marie Skłodowska-Curie Actions, ESRs are paid a competitive salary, including a Mobility Allowance and a Family Allowance (subject to family situation). The successful candidate will be working on an Individual Research Project (IRP) at IREC (Electric Engineering Department) and will have secondments related to their research at Delft University of Technology (TU Delft, www.tudelft.nl) and GE Global Research (GE, www.ge.com/research). She/he will be enrolled in a UPC PhD programme and conduct the research corresponding to the IRP at IREC as part of her/his thesis. Tuition fees will be covered by the fellowship and the network will also support training activities and periodical events, which will allow the ERSs to develop their career in a multi-sectorial environment and to obtain a wide knowledge on the control of electrical networks.

PhD Programme

The successful candidates will be enrolled in the PhD programme in Automatic Control, Robotics and Computer Vision at UPC (www.ioc.upc.edu/students/darv).

Supervisor

Fernando D. Bianchi (<http://fdbianchi.github.io/index.html>).

Planned secondments (compulsory)

The ESR will perform secondments at TU Delft (Delft, The Netherlands) and GE (Munich, Germany), which will be less than 30% of the total employment time.



Eligibility conditions

1. The candidate must not have resided or carried out his/her main activity (work, studies, etc.) in **SPAIN** for more than 12 months in the 3 years immediately prior to his/her recruitment under the project (short stays such as holidays are not counted).
2. The candidate must be within 4 years of the diploma granting you access to doctorate studies at the time of recruitment and has not yet been awarded the doctorate degree.
3. The candidate may be of any nationality.
4. The candidate must work exclusively for the project during the employment contract.
5. The candidate must fulfil the conditions to be admitted in the PhD programme - Automatic control, Robotics and Computer Vision at the UPC.

These conditions must be fulfilled at the starting date of the contract. The starting date for each position is tentative.

General requirements

Education Degree

To be eligible for the PhD programme - Automatic control, Robotics and Computer Vision at the UPC, the candidate must be in any of the following circumstances:

1. Individuals holding an official university degree from Spain or any other country in the European Higher Education Area that qualifies holders for master's degree courses, provided they have also completed a minimum of 300 ECTS credits of official university coursework overall, of which at least 60 must be at the master's degree level.
2. Individuals holding a degree from a foreign education system, providing that it can be shown that the university in question offers a level of training equivalent to that of the official Spanish master's degree and that, in the issuing country, individuals holding the degree in question are eligible for doctoral degree courses.

Qualifications

Preference will be given to candidate with a master degree (or equivalent) in Electrical, Electronics or Control Engineering, Applied Mathematics or other relevant disciplines.

Language(s)

- **English:** Good communication skills both oral and written.
- **Spanish:** Basic level (desirable).

Experience

Desirable background in:

- Control systems theory and large-scale systems.
- Wind energy systems and electrical networks.
- Programming and modelling softwares: Matlab, Simulink.
- Computer modelling related to wind turbine operation (desirable)

Skills

- Strong motivation to pursue a PhD degree.
- Ability to work independently and as part of a team.
- Excellent skills in writing and presentation.
- Highly-motivated with the ability to set and meet deadlines appropriate to the progress of the project.
- Willingness to interact closely with the INCITE partners.



Job details

Gross salary	Between €2800 and €3200 per month depending on the family situation (Amounts subject to taxation according to Spanish law). The position covers tuition fees and other training expenses.
Duration	36 months
Type of contract	Full-time
Hours per week	39.5 hours
Place of work	IREC, Jardins de les Dones de Negre, 1, 2 ^a pl., 08930 Sant Adrià de Besòs, Barcelona
Province/State	Barcelona
Local language	Spanish/Catalan
Country	Spain

The contract will be subject to the regulations of the Marie Skłodowska Curie Innovative Training Network Fellowships of the European Commission and in accordance with the work contract regulations of Spain.

Selection criteria

The evaluation committee will take into consideration the academics records, research experience and publications. After the first selection stage, the top five candidates will be invited to a remote interview via video conference.

Equal consideration will be given to female and male applicants.

Applications

All applications must include:

1. The **application form** (INCITE template).
2. A detailed **CV**, including list of publications, a Master thesis summary and the names of two referees (name, title, affiliation, e-mail and telephone number(s)) who are willing to provide detailed recommendation letters about the candidate (INCITE template).
3. One **motivation letter** for each position applied for (INCITE template).
4. **Copies of academic transcripts and degree certificates**, in English.

All applications must be submitted by means of on-line application on the official website of INCITE - www.incite-itn.eu using the templates available in the website.

For further information: coordinator-incite@irec.cat.

