

Position Description

1. General Information

Name of the position	Renewable energy integration, modern power systems.
Foreseen enrolment date	September 2025
Position is funded by	<ul style="list-style-type: none"> • COFUND, Marie Skłodowska-Curie Actions (MSCA), Horizon Europe, European Union • Universitat Politècnica de Catalunya (UPC) • RMIT University
Research Host	Universitat Politècnica de Catalunya (UPC)
PhD awarding institutions	Universitat Politècnica de Catalunya (UPC) & RMIT University
Locations	Primary: Barcelona, Spain Secondary: Melbourne, Australia
Salary	26,626.09 EUR annual gross salary (2,218.84 EUR monthly gross salary)
Supervisors	<ul style="list-style-type: none"> • Joan-Marc Rodriguez-Bernuz, Postdoctoral Researcher, UPC • Marc Cheah-Mañe, Associate Professor, UPC • Lasantha Meegahapola, Associate Professor, RMIT University • Kazi Hasan, Senior Lecturer, RMIT University • Industry Partner: eRoots Analytics (Josep Fanals)
Group of discipline	Electrical and Electronic Engineering

2. Research topics (only one of these projects will be funded)

Project 1: *Defining and Analysing Control Structures for Future System Loads*

The possible use of system loads as assets that actively provide grid support could mark a significant shift in the operation of the modern power system since it would place the responsibility for flexibility, synchronism, and stability on the demand side, rather than relying only on traditional generation sources. The potential of this approach is highly promising, but it also raises a wide range of questions regarding which types of loads are suitable and how they should be controlled. A variety of control implementations (e.g. grid-forming structures) can be used, each offering distinct features and capabilities. This thesis aims to explore the different capabilities of controllers designed to provide a broad range of services, such as voltage and frequency support, ride-through, and black-start. The work will focus on defining these controllers, analysing their impact on the system, and examining the role of the loads being considered and how such operation could impact on their performance.



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Research Fields: Renewable Energy, Power Systems

Project 2: *Evaluating Algorithms for Grid Services from Non-Generating Assets*

The energy transition is reshaping power system operation by increasing the penetration of power electronic devices. This shift is driven by the growing share of RES, particularly solar PV and wind, which are essential for replacing fossil fuel generation and achieving decarbonisation. As a result, the dynamics of the power system are changing, with traditional electrical generators being replaced by the dynamics of power electronics-based devices. While this represents a significant paradigm shift, it also opens up new opportunities for redefining system behaviour. One promising approach is the potential use of non-generating assets (eg. electrolysers, heating systems, EV chargers, etc.) as active participants in the regulation of the network. This thesis will explore this concept by evaluating decentralised control algorithms that can integrate these system assets, enabling them to provide essential services to the grid while ensuring their resilience and functionality in this new role.

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Research Fields: Renewable Energy, Power Systems

Project 3: *Advanced Control Strategies for Converters in Modern Power Systems*

Modern networks present new opportunities in the race towards the power system decarbonisation. The integration of RES requires innovative solutions to ensure the stability and reliability of the power system. While conventional grid-interfaced converters have typically relied on grid-following controllers' structures to guarantee MPPT, future system operations will require alternative structures to maintain proper system operation. In this context, grid-forming structures emerge as a promising solution for the future power system. However, their implementation may require displacing some RES generation to maintain stable system operation. This thesis aims to explore novel solutions to optimise power system resources while optimising RES generation and minimising energy curtailment. Specifically, it will investigate potential control algorithms based on grid-forming solutions to respond to the evolving structure of future power networks. This will be done by considering any system asset interfaced through power converters that could help to provide grid flexibility and any other potential service.

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3. Employment Benefits and Conditions

Universitat Politècnica de Catalunya (UPC) offers a 48-month full time work contract. The total working hours per week is 37.5.

The remuneration, in line with the European Commission rules for Marie Skłodowska-Curie grant holders, will consist of a **gross annual salary** of yearly 26,626.09 EUR (which is of monthly 2,218.84 EUR). Of this amount, the estimated net salary to be perceived by the Researcher is 1,819.00 EUR per



This project has received funding from the European Union's Horizon Europe research and innovation programme under the Marie Skłodowska-Curie grant agreement N° 101179842

month. However, the definite amount to be received by the Researcher is subject to national tax legislation and the personal situation.

Benefits include

- Becoming a Marie Skłodowska-Curie fellow and be invited to join the Marie Curie Alumni Association
- Access to all the necessary facilities at UPC and RMIT University
- Tuition fees exemption at both PhD awarding institutions
- Travel allowance to cover flights and accommodation for participating in DREAM+PLAN events
- Up to 12 months in Australia
- 22 days paid holiday leave
- Social security coverage
- Sick leave
- Parental leave

4. PhD enrolment

Successful candidates for this position will be enrolled by the following institutions and must comply with their specific entry requirements, in addition to DREAM+PLAN's conditions.

Universitat Politècnica de Catalunya (UPC)

To enrol in a Doctorate program you must meet the general conditions, namely:

As a rule, applicants seeking admission to an official doctoral programme must hold a Spanish bachelor's degree or equivalent and a Spanish master's degree or equivalent, provided they have passed at least 300 ECTS credits on the two degrees. Any of the following applicants may also gain admission:

- Holders of official Spanish degrees or equivalent Spanish qualifications, provided they have passed 300 ECTS credits in total and they can prove they have reached Level 3 in the [Spanish Qualifications Framework for Higher Education](#).
- Holders of degrees awarded in foreign education systems in the European Higher Education Area (EHEA), which do not require homologation, who can prove that they have reached Level 7 in the Spanish Qualifications Framework for Higher Education, provided the degree makes the holder eligible for admission to doctoral studies in the country in which it was awarded. Admission on this basis does not imply homologation of the foreign degree or its recognition for any purpose other than admission to doctoral studies.
- Holders of degrees awarded in a country that does not belong to the European Higher Education Area, which do not require homologation, on the condition that the University is able to verify that the degree is of a level equivalent to that of official university master's degrees in Spain and that it makes the graduate eligible for admission to doctoral studies in the country in which it was awarded. Admission on this basis does not imply homologation of the foreign degree or its recognition for any purpose other than admission to doctoral studies.
- Holders of another doctoral degree.



- University graduates who, having previously been awarded a training post in the entrance examination for specialised health training posts, have passed and obtained a positive assessment in at least two years of training on a programme leading to an official qualification in a Health Sciences specialisation.

Specific requirements and admission procedure:

Each doctoral programme may have specific requirements for admission in addition to the general requirements. The additional specific requirements that must be met for admission are listed on the web pages for each programme.

More information: https://doctorat.upc.edu/en/future-doctoral-candidates/access-and-admission/general-entrance-requirements?set_language=en

RMIT University

Visit the website: <https://www.rmit.edu.au/research/research-degrees/how-to-apply>

