



# PhD Opportunity

## Probabilistic Seasonal Forecasting and Climate Projections for Wind and Solar Energy in Ireland

<b>College / Management Unit:</b>	Engineering and Architecture
<b>School / Unit / Institute:</b>	Energy Institute
<b>Post Title:</b>	PhD
<b>Post Duration:</b>	4 years
<b>Research Project:</b>	NexSys Programme
<b>Reports to / Principal Investigator:</b>	
<b>Competition Ref. No:</b>	
<b>HR Administrator:</b>	

### Position Summary

This PhD project aims to improve our understanding of Renewable Energy Sources (RES, wind and solar) in Ireland over two timescales: forecasting RES generation from hours to months into the future, and studying past and future climates to quantify projected changes in RES generation.

The decarbonisation of the Energy System will play a vital role in reducing greenhouse gas emissions and help mitigate the impacts of Climate Change. The technical and societal challenges inherent in decarbonisation are set to be enduring challenges of the mid-21st century and ones that will require a whole of society approach, encompassing academia, industry, government, and citizens.

NexSys is a newly established All Island SFI Strategic Partnership Programme focussed upon the transition to a net zero carbon energy system. It is a unique partnership bringing together a multidisciplinary research team, industry, and policy makers to tackle fundamental research questions to be addressed as part of the transition to net Zero. Hosted by UCD Energy Institute, NexSys brings together academics from nine institutions across the Island of Ireland (UCD, TCD, DCU, ESRI, Maynooth University, UCC, NUI Galway, Ulster University and Queen’s University Belfast) to work together to meet the unprecedented scale and complexity of the challenges associated with the energy transition.

A key challenge in the transition to decarbonisation is the efficient use of RES for electricity generation.

This PhD project will use physical models of the atmosphere (Numerical Weather Prediction and Climate Modelling) alongside historical observed data and new-generation satellite data to drive the development of new forecasting methods and energy climate datasets. We are interested in two timescales. The first, forecasting, aims to develop new “seamless” probabilistic RES forecasts with time horizons from hours to months into the future. The second, climate projections, will develop high spatial (~1km) and temporal (hourly) resolution RES data for onshore wind, offshore wind and PV from 2000-2050, using historical system data and ensembles of recent atmospheric model data such as M3RA, ERA5, and ICHEC-CMIP6. We will use this RES data to investigate generation and security of supply for different climate scenarios, and different proposed RES infrastructures.



### Equality, Diversity and Inclusion

UCD is committed to creating an inclusive environment where diversity is celebrated, and everybody is afforded equality of opportunity. To that end the university adheres to a range of equality, diversity and inclusion policies. We encourage applicants to consult those policies here <https://www.ucd.ie/equality/>. We welcome applications from everyone, including those who identify with any of the protected characteristics that are set out in our Equality, Diversity and Inclusion policy.

**Stipend:** 18500 per annum plus PhD registration fees.

### Principal Duties and Responsibilities

The candidate will be required to:

- Work on their PhD project on campus in person, full time, 5 days per week.
- Give tutorials to undergraduate students, and help with other teaching activities.
- Take part in training and development events
- Take part in public engagement and outreach events

### Selection Criteria

Selection criteria outline the qualifications, skills, knowledge and/or experience that the successful candidate would need to demonstrate for successful discharge of the responsibilities of the post. Applications will be assessed on the basis of how well candidates satisfy these criteria.

#### Mandatory

- MSc or Primary degree (First or Upper Second Class Honours) in Mathematics, Physics, Mechanical Engineering or related quantitative discipline.
- Strong mathematical skills, in particular with Partial Differential Equations.
- Excellent coding skills in Python (R or Matlab are also acceptable).
- Experience with data analysis and visualisation.
- Excellent English communication skills.
- Excellent interpersonal skills.
- Good report writing experience.
- Attention to detail and strong organisational skills.
- Ability to manage a complex workload and work to tight deadlines.
- Willingness to work as part of a team of researchers at UCD and
- Willingness to work closely with a wider cohort of stakeholders and collaborators.
- Awareness of equality, diversity and inclusion agenda.

#### Desirable

- Understanding of and experience with computational fluid dynamics (CFD)
- Experience of coding with Machine Learning techniques.
- Experience of analysing large, multi-dimensional datasets.
- Linux skills.
- Well developed research skills, both qualitative and quantitative.

## Further Information for Candidates

### Equality, Diversity and Inclusion:

UCD is committed to creating an inclusive environment where diversity is celebrated, and everyone is afforded equality of opportunity. Diversity is highlighted in the university's strategic plan as one of the core values of UCD, and its EDI commitment is further demonstrated through the strategic objective relating to the attraction, retention, and development of an excellent and diverse cohort of students, faculty and staff. We welcome applications from everyone, including those who identify with any of the protected characteristics that are set out in our Equality, Diversity and Inclusion policy. The university adheres to a range of equality, diversity

and inclusion policies. We encourage applicants to consult UCD's equality, diversity and inclusion policies here <https://www.ucd.ie/equality/>.

UCD's Equality, Diversity and Inclusion Strategy 2018-2020-2025 sets out the University's objectives aligned to UCD's ten equality grounds. [Link](#)

UCD's Vice President for Equality, Diversity and Inclusion chairs the University EDI Group which works across UCD's ten equality grounds in collaboration with College Vice Principals for EDI and EDI School Representatives. UCD's Equality, Diversity and Inclusion Unit supports the mainstreaming of EDI through the EDI Group and these roles and leads on the delivery of the EDI Strategy through a range of initiatives including policy development, awareness raising and training, internal and external relationship building, collation and analysing of data, establishing peer support groups and networks, attainment of accreditations such as Athena SWAN and supporting and promoting an environment of mental health and wellbeing and dignity and respect.



UCD has EDI staff networks which are a great opportunity to meet colleagues, network and engage with equality, diversity, and inclusion initiatives in UCD.

UCD's EDI Staff Networks include:

- UCD staff disability network
- UCD LGBTI staff network
- UCD Women@STEM
- Multicultural Employee Network UCD (MENU)

You can join UCD's EDI Staff Networks here: <https://www.ucd.ie/equality/groups/edinetworks/>

UCD is also engaged with the following initiatives:



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### Athena SWAN at UCD

University College Dublin has received its second Athena SWAN Bronze institutional award in recognition of the university's work towards gender equality. To achieve this accreditation, an institution must demonstrate that it has undertaken a thorough self-assessment of gender equality challenges and has developed a detailed action plan to tackle them. The [UCD Gender Equality Action Plan 2020-2024](#) was prepared by the [Gender Equality Action Group](#) and its Working Groups, in a process that involved external benchmarking, an EDI employee survey, focus groups and consultation across the university. It includes actions relating to recruitment, promotions, leadership, work practices, organisation and culture. The implementation of the Plan is already underway and includes mechanisms to track progress on each of the actions. This action plan includes the actions that arose from the review of the university's policy and procedures on Dignity and Respect.

### Age-Friendly University

University College Dublin is proud of its designation as an **Age-Friendly University** as part of the AFU Global Network. The principles of an Age-Friendly University are: To encourage the participation of older adults in all the core activities of the university, including educational and research programmes.

### University of Sanctuary

UCD was awarded **University of Sanctuary** status in 2018, (UoSI) is an Irish initiative to encourage and celebrate the good practice of universities, colleges and other education institutes welcoming refugees, asylum seekers and other migrants into their university communities and fostering a culture of welcome and inclusion for all those seeking sanctuary.

### Open Doors Initiative

UCD has joined a group of over 95 companies and NGOs, who work with government to create pathways to employment for marginalised people. These can be internships, scholarships, training courses, aiding entrepreneurs or full/part time employment, from a range of backgrounds and abilities.

These can be developed out on a bespoke basis with organisations to include specific projects. This group work with refugees, asylum seekers and migrants, people with disabilities and disadvantaged youth (including those from a traveller background, LGBTIQ+ etc).

They offer online training, mentorships, assisted learning, seminars, inhouse training for existing employees on a range of subjects and can assist with funding for training courses you run. They have ongoing meet ups with other companies and supporting partners who are working to create diversity and inclusion within their organisations. More details are available on our website here: [www.opendoorsinitiative.ie](http://www.opendoorsinitiative.ie)

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### Supplementary information

The University:	<a href="http://www.ucd.ie/">http://www.ucd.ie/</a>
UCD Strategy 2020-2024: Rising to the Future	<a href="https://strategy.ucd.ie/">https://strategy.ucd.ie/</a>
UCD Energy Institute	<a href="http://www.ucd.ie/energy">www.ucd.ie/energy</a>

