Title: Climate change adaptation in power grids and interdependent infrastructure systems

Type of award PhD Research Studentship

Department Electrical and Electronic Engineering

Scholarship
Details Minimum £17,668 p.a. in 2022/23 subject to confirmation of eligibility and award

Duration Up to 4 years

Eligibility Home / EU/ Overseas students

Start Date 18 Sept 2023

PhD Topic Background/Description
Climate change is posing unprecedented challenges to critical infrastructure systems, such as power and transportation systems. It has been linked to an increase in the frequency and intensity of extreme weather event categories associated with major disruptions to critical infrastructure systems over the last few years, such as heat and cold waves, hurricanes, and flooding. To make matters worse, such disruptions typically have direct and indirect impacts on other infrastructure systems, for their interdependence, which may lead to cascading failures with unacceptably long recovery times and huge negative effects on the well-functioning of economies and societies worldwide. As a consequence, climate change is also posing additional challenges to net-zero carbon emissions targets, as more resources (energy and materials) are needed for post-disaster service restoration of critical infrastructure. Thus, a holistic approach is required to improve infrastructure resilience to extreme weather events and promote climate change adaptation while facilitating transition to a net-zero energy future.

The proposed project is aimed at investigating and developing new methodologies for climate change adaptation in power systems considering interdependent transportation and urban infrastructure systems. Thus, it will take advantage of climate models for impact assessments of extreme weather events in a changing climate on critical infrastructure systems. Notably, the impacts of weather-related incidents in power networks on transportation/urban networks and vice versa will be considered, including effects on distribution network restoration logistics, electrified transportation, among others. As an outcome, this project will result in new couplings between climate models and distinct infrastructure systems to improve infrastructure resilience and promote climate change adaptation while facilitating transition to a net-zero energy future. Furthermore, the theoretical efforts will be complemented by simulations and experimental validation in realistic scenarios, in which the baseline and improved design scenarios will be evaluated comparatively.

This project supports and builds on the University’s disciplinary and interdisciplinary excellence in tackling global challenges relating to climate, energy, and infrastructure systems. It will be carried out in collaboration with the Department of Electrical and Electronic Engineering, Department of Civil
Engineering, and School of Geographical Sciences. Supervisory support from across all three departments will ensure high quality of the PhD outputs and applicability to national resilience challenges. As an outcome, the successful candidate will be part of the Electrical Energy Management Group and also have the opportunity to interact and collaborate with existing networks of the supervisory team and an interdisciplinary research community.

**Candidate Requirements**
Applicants must hold/achieve a minimum of a master’s degree (or international equivalent) in Electrical Engineering or a related discipline and with knowledge of power systems. Applicants without a Masters qualification may be considered on an exceptional basis, provided they hold a first-class undergraduate degree.

If English is not your first language, you need to meet this profile level:

**Profile E**
Further information about English language requirements and profile levels.

**Skills and knowledge required**
Applicants should have excellent analytical skills and experience with programming languages such as Python and C/C++.

**Scholarship Details**
The PhD Studentship for this research will receive a minimum stipend equivalent to the UKRI tax-free amount (currently £17,668 per annum for 22/23). The funding will also cover tuition fees for the length of the programme at both Home and Overseas student rates.

Funding is subject to eligibility status and confirmation of award.

For eligibility and residence requirements please check the UKRI UK Research and Innovation website.

**Enquiries**
For questions about eligibility and the application process please contact sceem-pgr-admissions@bristol.ac.uk

Informal enquiries, please contact Dr Laiz Souto laiz.souto@bristol.ac.uk, Dr. Maria Pregnolato maria.pregnolato@bristol.ac.uk, Dr. Jeffrey Neal J.Neal@bristol.ac.uk, and Prof. Paul Bates Paul.Bates@bristol.ac.uk

**Application Details**
Applicants are encouraged to contact the supervision team (noted above) prior to application.

To apply for this studentship, submit a PhD application using our online application system [www.bristol.ac.uk/pg-howtoapply]

Please ensure that in the Funding section you tick “I would like to be considered for a funding award from the Electrical and Electronic Engineering Department” and specify the title of the scholarship in the “other” box below with the names of the supervisors.

Interested candidates should apply as soon as possible.

Closing date for applications: 31 January 2023