

## **Fully funded PhD Opportunity**

Environmental Engineering Research Group  
Dept. Civil, Structural and Environmental Engineering, Trinity College Dublin

### **Modelling the hydrogeology of former lowland production bog for the purposes of engineering restoration design**

Applications are invited from suitably qualified candidates for a full-time PhD (Structured PhD programme) in the field of karst hydrology. The project is co-funded by iCRAG, the SFI Research Centre in Applied Geosciences and Bord na Mona using European Union NextGenerationEU funding.

#### **Project background and description**

Ireland's peatlands, occurring as raised bogs, blanket bogs or fens, host specialised plant and animal communities, which contribute to global biodiversity, carbon regulation and other ecosystem services. However, exploitation has reduced the habitats' distribution and damaged their ecohydrological functioning. This is particularly the case for the lowland raised bogs, which have been used for energy production by Bord na Mona until 2021. A significant proportion of this land (33,000 ha) will be restored to wetland habitat under the Climate Action Scheme (PCAS) between 2021 and 2026. This will significantly reduce carbon emissions from otherwise oxidising peat-soil and develop ecohydrological restoration as a method of carbon capture in order to reduce Ireland's net greenhouse gas emissions. Careful hydrological management is required to maintain and/or restore the peat accumulating plant communities that give rise to the peatland carbon sink function, in addition to other valuable peatland ecosystem services, such as water regulation and biodiversity.

The objectives of this project are to:

- Collect hydro(geo)logical data across several annual cycles on several PCAS sites undergoing restoration engineering work
- Assess whether the existing work is providing appropriate ecohydrological conditions for long term peat formation
- Sample cores from the peat dams to carry out controlled laboratory tests for geotechnical modelling
- Build water balance models to simulate water level depths and duration
- Develop more targeted finite element, variably saturated zone models for different hydrogeological conditions encountered on the former production boglands

- Simulate long term performance of the sites and to provide recommendations
- Predict long term peat accumulation in PCAS sites

### **Candidate requirements**

- Applications are invited from graduates holding a first or 2.1 class honours degree or M.Sc. in Environmental Engineering, Environmental Science or related discipline.
- The successful candidate should be practically and technically minded, and interested in both working in the field as well as in the development of mathematical models of environmental systems.
- The candidate should be self-motivated, prepared for extensive field-based and laboratory work and someone who enjoys data analysis, writing and communicating/disseminating their work.
- Prior experience in hydrology / hydraulics, particularly in modelling of peatland systems would be advantageous.
- A full, clean Irish/European driving licence and fluency in English are essential.

### **Award**

The successful candidate will be enrolled for a 48-month (Structured) PhD programme in the Department of Civil, Structural and Environmental Engineering, Trinity College Dublin. The Fellowship provides University fees and a stipend of **€18,500 per annum over four years**. Funds for project costs are also provided.

### **Application deadline: 20th August 2022 by 5pm (Irish local time)**

**Start date:** The projected start date is September 2022, or as soon as possible thereafter (with a latest start date on the first of January 2023).

### **Further Information**

Prof. Laurence Gill    email: [laurence.gill@tcd.ie](mailto:laurence.gill@tcd.ie)

### **Application Procedure**

Interested applicants should submit, within a single PDF document, a CV with educational background, transcripts of degree results, list of publications and conference presentations, a short (1–2 page) letter of motivation and contact details for 2 referees submitted directly to Prof. Laurence Gill ([laurence.gill@tcd.ie](mailto:laurence.gill@tcd.ie)). The motivation letter should clearly state how the applicant's research interests and skills relate to the research project outlined above.

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