Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Post Specification

Post Title:	PhD Studentship - Developing A Geospatial Digital Twin for Flood Risk Management and Nature-Based Interventions
Post Status:	Full-time
Research Group / Department / School:	Department of Civil, Structural & Environmental Engineering, Trinity College Dublin, the University of Dublin
Location:	Simon Perry Building, Trinity College Dublin, the University of Dublin College Green, Dublin 2, Ireland
Reports to:	Dr John Gallagher
Terms & Conditions:	The student's tuition will be fully paid, and they will receive a €25,000 per annum tax-free stipend for 4 years
Hours of Work:	Full-time
Closing Date:	12 Noon (GMT), Monday 20 July 2026

NOTE: Applicants must have been resident in an EU member state for 3 out of the last 5 years to be eligible for EU fees

Post Summary

We invite applications for a fully funded PhD studentship on developing a living lab digital twin to integrate catchment models and climate adaptation measures for catchment management in Ireland. This PhD is part of a larger interdisciplinary project, *Landscape Living Lab: Catchment Monitoring, Modelling, Memory and Management*, with four PhDs funded through the AIB Trinity Climate Hub Trinity Research Doctorate Award (TRDA) scheme.

Developed under the theme of Nature-based Solutions, the group of PhD students will work together to understand biophysical and socio-economic process for a case study river catchment in Ireland. Each PhD student will focus on one of four intertwined pillars (the "4Ms"), all designed as an integrated system: Monitoring (current dynamics and climate and

nature related risks); Modelling (pathways to future climate and nature resilience); Memory (how vulnerability arose, what historical records are available); and Management (a decision framework for evidenced trade-offs). The primary supervisors are Professor Mary Bourke (Geomorphology, Geography), Associate Professors John Gallagher (Civil, Structural & Environmental Engineering) and Francis Ludlow (Environmental Humanities), and Assistant Professor Catherine Farrell (Business School), respectively.

This PhD will focus on Modelling, under the title of *Visualising Catchment Resilience: Developing A Geospatial Digital Twin for Flood Risk Management and Nature-Based Interventions in an Irish Living Lab*. The PhD student will be supervised by Dr John Gallagher, Associate Professor in Environmental Systems Modelling (School of Engineering), co-supervised by Prof Mary Bourke, Professor in Geography (School of Natural Sciences), and Dr Barnaby Dobson, Assistant Professor (School of Engineering).

Building on a range of TCD-led projects that the project team has contributed to, such as INCASE, Nature+Energy, and ForES, this PhD will develop a geospatial digital twin of a living lab to support catchment modelling, visualisation and management of flood risk, climate adaptation and nature-based solution pathways. It will integrate climate and hydrological modelling, ground observations, remote sensing, historical evidence and stakeholder-informed scenarios.

Standard Duties and Responsibilities of the Post

Using participatory backcasting, the PhD research will define a resilient 2080 vision for the case-study catchment and develop a roadmap for nature-based solutions and complementary engineered measures. The candidate will undertake scenario testing and techno-economic appraisal to evaluate resilience, cost-effectiveness and management trade-offs. The PhD will consider to answer the following research questions through data collection, modelling, and active collaboration with a range of stakeholders:

- How can a geospatial digital twin integrate historical records, ground observations, remote sensing, climate projections and hydrological models to improve catchment modelling, flood risk assessment and spatial visualisation?

- How can participatory backcasting generate a resilient 2080 vision and outline implementation milestones for long-term catchment resilience?
- Which combinations of nature-based solution interventions and engineered measures best reduce flood risk while supporting wider ecological, social and economic resilience?
- What indicators and visualisation outputs are needed to compare scenarios and guide evidence-based management decisions?
- How can a techno-economic appraisal be embedded in the digital twin to evaluate the cost-effectiveness, timing and value of catchment management pathways?

Funding Information

This studentship is funded through the AIB Trinity Climate Hub Trinity Research Doctorate Award (TRDA) scheme, as part of the project Implementing and Evaluating Nature-Based Solutions for Health in Children and Adolescents (2026–2030). The award covers full tuition and a €25,000 per annum tax-free stipend for 4 years.

Person Specification

Qualifications

Essential: Applicants must hold an undergraduate degree (2.1 or equivalent) in one of the following: Engineering, Geography, Environmental Science, Hydrology, GIS, Data Science, Ecology, or another related discipline.

Knowledge & Experience (Essential & Desirable)

Essential

- Be actively interested in flood risk management, climate adaptation, nature-based solutions, catchment resilience, engineered measures and digital twin approaches for catchment management.
- An interest in working across disciplinary boundaries and a willingness to engage in interdisciplinary dialogue.

Desirable

- A master’s degree in a relevant subject area.

- Experience with, or a willingness to develop skills in, model calibration, scenario analysis, geospatial databases, digital twin workflows, visualisation tools and programming tools such as Python or R.
- Ability to apply quantitative and multidisciplinary techniques to hypothesis-driven, scenario-based and backcasting research questions.

Skills & Competencies

- Have strong interpersonal and cross-stakeholder communication skills, and an interest in participatory research, stakeholder engagement and management-relevant outputs.
- Fluency in English (spoken and written).
- Full and clean driver's licence.

Application Procedure

Applicants should submit a full Curriculum Vitae and 1-2 page personal statement to include the names and contact details of 2 referees (including email addresses), by email to Prof. John Gallagher (J.Gallagher@tcd.ie).

Your application should use the Subject line "Trinity College PhD Application – Geospatial Digital Twin" before the application deadline of 12:00 noon (GMT) on Monday 20 July 2026.

Applicants will be shortlisted for interview soon thereafter, with interviews expected in late July. The successful applicant will then have to apply directly to the relevant School following the Trinity College PhD application process.

The project start date will be 1st September 2026.

Further Information for Applicants URL Link to Area	www.tcd.ie
URL Link to Human Resources	https://www.tcd.ie/hr/

Trinity College Dublin, the University of Dublin

Trinity is Ireland's leading university and is ranked 98th in the world (QS World University Rankings 2023). Founded in 1592, the University is steeped in history with a reputation for excellence in education, research and innovation.

Located on an iconic campus in the heart of Dublin's city centre, Trinity has 18,000 undergraduate and postgraduate students across our three faculties – Arts, Humanities, and Social Sciences; Engineering, Mathematics and Science; and Health Sciences.

Trinity is ranked as the 12th most international university in the world (Times Higher Education Rankings 2020) and is also the highest ranked university in Ireland.

The pursuit of excellence through research and scholarship is at the heart of a Trinity education, and our researchers have an outstanding publication record and strong record of grant success. Trinity has developed 19 broad-based multidisciplinary research themes that cut across disciplines and facilitate world-leading research and collaboration within the University and with colleagues around the world. Trinity is also home to 5 leading flagship research institutes:

- Trinity Biomedical Sciences Institute (TBSI)
- Trinity College Institute of Neuroscience (TCIN)
- Trinity Translational Medical Institute (TTMI)
- Trinity Long Room Hub Arts and Humanities Research Institute (TLRH)
- Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN)

Trinity is 1st in Europe for Producing Entrepreneurs for the 7th year in a row and Europe's only representative in the world's top-50 universities (Pitchbook University Report 2021-2022).

Trinity is home to the famous Old Library and to the historic Book of Kells as well as other internationally significant holdings in manuscripts, maps and early printed material. The Trinity Library is a legal deposit library, granting the University the right to claim a copy of

every book published in Ireland and the UK. At present, the Library's holdings span approximately 6.5 million printed items, 400,000 e-books and 150,000 e-journals.
With over 120,000 alumni, Trinity's tradition of independent intellectual inquiry has produced some of the world's finest, most original minds including the writers Oscar Wilde and Samuel Beckett (Nobel laureates), the mathematician William Rowan Hamilton and the physicist Ernest Walton (Nobel laureate), the political thinker Edmund Burke, and the former President of Ireland Mary Robinson. This tradition finds expression today in a campus culture of scholarship, innovation, creativity, entrepreneurship and dedication to societal reform.

Rankings

Trinity College Dublin is the top ranked university in Ireland. Using the QS methodology we are ranked 98th in the world and using the Times Higher Education World University Ranking methodology we are 146th in the World.

- Trinity College Dublin is Ireland's No.1 University
  (QS World University Ranking 2023, Times Higher Education Rankings 2022)
- Trinity is ranked 98th in the World
  (QS World University Ranking 2023)
- Trinity is ranked No.1 in Europe for Producing Entrepreneurs for the 7th year in a row
  Pitchbook 2021-2022

Full details are available at: www.tcd.ie/research/about/rankings.

The Selection Process in Trinity

The Selection Committee (Interview Panel) may include members of the Academic and Administrative community together with External Assessor(s) who are expert in the area. Applications will be acknowledged by email. If you do not receive confirmation of receipt within 1 day of submitting your application online, please contact the named Recruitment Partner on the job specification immediately and prior to the closing date/time.

Given the degree of co-ordination and planning to have a Selection Committee available on the specified date, the University regrets that it may not be in a position to offer alternate selection dates. Where candidates are unavailable, reserves may be drawn from a shortlist. Outcomes of interviews are notified in writing to candidates and are issued no later than 5 working days following the selection day.

In some instances the Selection Committee may avail of telephone or video conferencing. The University's selection methods may consist of any or all of the following: Interviews, Presentations, Psychometric Testing, References and Situational Exercises.

It is the policy of the University to conduct pre-employment medical screening/full pre-employment medicals. Information supplied by candidates in their application (Cover Letter and CV) will be used to shortlist for interview.

Applications from non-EEA citizens are welcomed. However, eligibility is determined by the Department of Business, Enterprise and Innovation and further information on the Highly Skills Eligible Occupations List is set out in Schedule 3 of the Regulations https://dbei.gov.ie/en/What-We-Do/Workplace-and-Skills/Employment-Permits/Employment-Permit-Eligibility/Highly-Skilled-Eligible-Occupations-List/ and the Ineligible Categories of Employment are set out in Schedule 4 of the Regulations https://dbei.gov.ie/en/What-We-Do/Workplace-and-Skills/Employment-Permits/Employment-Permit-Eligibility/Ineligible-Categories-of-Employment/ . Non-EEA candidates should note that the onus is on them to secure a visa to travel to Ireland prior to interview. Non-EEA candidates should also be aware that even if successful at interview, an appointment to the post is contingent on the securing of an employment permit.

Equal Opportunities Policy

Trinity is an equal opportunities employer and is committed to employment policies, procedures and practices which do not discriminate on grounds such as gender, civil status, family status, age, disability, race, religious belief, sexual orientation or membership of the travelling community. On that basis we encourage and welcome talented people from all backgrounds to join our staff community. Trinity's Diversity Statement can be viewed in full at https://www.tcd.ie/diversity-inclusion/diversity-statement.

Application Procedure

Application Procedure

Applicants should submit a 1–2-page Personal Statement and full Curriculum Vitae to include the names and contact details of 2 referees (including email addresses), to:-

Name: John Gallagher

Email Address: J.Gallagher@tcd.ie