**Post Specification**

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| **Post Title:** | PhD Studentship |
| **Post Status:** | Full-time or Part-time. |
| **Research Group / Department / School:** | Plant Soil Function Group, School of Natural Sciences, Discipline of Botany, Trinity College Dublin, the University of Dublin |
| **Location:** | Botany Building Trinity College Dublin, the University of Dublin College Green, Dublin 2, Ireland |
| **Reports to:** | Dr Richard Nair |
| **Terms & Conditions:** | 4 year project, annual tax-free stipend of €25,000, as well as project costs and EU student fees (funder constraint). |
| **Hours of Work:** | Full Time |
| **Closing Date:** | Until filled (first review 9th June 2025) |

**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**

Soil respiration is the second biggest carbon flux in the terrestrial biosphere and but the atmosphere but intrinsically difficult understand and predict because it is made up of contributions from various different sources such as plants and soil microbes.

In this position we are seeking a candidate interested in application of modern computational methods to a classic ecological / global change problem. You will work with data from automated 'minirhizotron systems able to make extremely high time frequency images of roots *in situ* in the field (https://doi.org/10.1093/jxb/erac427). The entire, multi-person project will develop instruments and validate these techniques through classical plant-soil ecology interpret the dynamics of root properties in a field site and this post will work on processing

the data/signals from the instruments to dynamically 'partition' soil respiration between the activities of the organisms that contribute to it at scales from seasonal to sub-daily. The results will contribute to our ability to understand and predict this critical component of ecosystem function.

You will work within group spanning ecological science, engineering, and computer science methods. If desired, you will be able to help with fieldwork in this project in Ireland although this is not the focus of this role. There is potential to use data from sites in the UK and Spain. GPU and other computing facilities are available within the wider research group and school. International collaborations, conference attendance and research trips are also expected as part of this project.

**Standard Duties and Responsibilities of the Post**

The candidate will advance image-based interpretation of roots from extremely high frequency image data using machine learning, then use these to dynamically partition the measured soil respiration $CO_2$ flux. They will then apply this knowledge gained to improve process-based ecosystem models and upscale to wider understanding of fundamental partitioning of processes within ecosystems. For this position, <u>prior experience with field data, image-based root data, or ecological settings is not required, but an interest in this setting is essential.</u>

**Funding Information**

Not currently disclosable (under embargo). Please note that due to funding constraints, this project is only eligible for EU/UK student fees. EU student fees (funder constraint). EU fees apply to anyone who has worked or studied in the EU or UK for at least 3 out of the last 5 years, more details here: https://www.tcd.ie/academicregistry/fees-and-payments/applicants/what-are-my-fees/.

**Person Specification**
**Qualifications**

A bachelor's or master's degree in ecology, plant or environmental science, computer science, data science, or applied mathematics, and experience or demonstrable interest in learning the relevant cross-field techniques.

**Knowledge & Experience (Essential & Desirable)**

**Essential**

- Well developed and demonstrable quantitative skills, including in neural network use and application, ideally in Python, R, or a similar language, and an interest in working with high-frequency and high-volume datasets gathered in 'noisy' field settings.

- Demonstrable capacity to think critically and creatively, and develop into a researcher in control of their own hypothesis-driven project

- Demonstrable interest in sustainability, global change, plant or soil science, and application of modern methods such as machine learning/computer vision and image analysis to advancing its understanding.

- Good quality written and spoken English.

- Meet the Trinity College Dublin postgraduate entry requirements

**Desirable**

- Demonstrable experience in interdisciplinary projects or similar settings and a willingness to engage cross discipline.

- Be able to start a PhD in September 2025

**Skills & Competencies**

- Proven ability to work as part of a team and independently.

- Highly motivated individual with the ability to effectively plan, execute, and deliver project outputs within deadlines.

- Effective communication, interpersonal and organisation skills.

- Excellent team working skills with emphasis on equality, diversity, and inclusion.

**Application Procedure**

Applicants should submit a full Curriculum Vitae, including the names and contact details of 2 referees and a a 1-page personal statement detailing why you are interested in the project, to:-

Richard Nair richard.nair@tcd.ie with the subject line '2025 Root Data PhD application'

The first review of candidates will take place on 9th June 2025.

We strive for a bias free recruitment process so we ask you to not send CVs that include a photo or information of a personal nature (e.g. age, marital status, nationality). Statements will be read before CVs. We encourage applications from underrepresented groups in STEM.

Please address all enquiries by email to Dr. Richard Nair, richard.nair@tcd.ie

**Further Information for Applicants**

| Botany at Trinity College Dublin | https://www.tcd.ie/Botany/ |
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| Plant Soil Function Group | https://richardnair.github.io/ |
| 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/](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/](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**