TEAGASC PHD WALSH SCHOLARSHIP OPPORTUNITY

"Investigating Tree Resistance to Pathogens Using Field and Molecular Data: A Case Study on Ash Dieback (E-Path)"

Walsh Scholarship Reference Number: 2024207

Teagasc

Teagasc, the Irish Agriculture and Food Development Authority, undertakes the national land-use research, teaching and advisory activities. Our mission is to support science-based innovation in the agri-food sector and the broader bio-economy that underpins competitiveness and sustainability. The Forestry Development department provides an integrated advisory, research and training programme dedicated on supporting the needs of the farm forestry sector. Our tree improvement research program focuses on enhancing the resilience and productivity of key forestry tree species, with investments in innovative breeding techniques and environmental sciences.

Trinity College Dublin (TCD)

Trinity College Dublin is Ireland's premier university, consistently ranked as the top university in the country and among the top 100 universities globally (QS World University Rankings). Established in 1592, TCD offers a vibrant interdisciplinary environment, supported by world-class resources such as Ireland's largest library and state-of-the-art research facilities. Its PhD programs are structured to provide a balance between rigorous academic training and professional development, supported by a thriving research community of over 200 PhD students. Doctoral candidates benefit from structured programs, personalized mentorship, and professional development opportunities.

The E-Path Project

Tree diseases such as ash dieback caused by Hymenoscyphus fraxineus threaten Ireland's ecosystems. The E-Path project will address these challenges by collecting field data and conducting molecular investigations to understand disease resistance. This research will directly inform management practices for ash trees and other species, contributing to sustainable forestry and biodiversity conservation.

Project Goals and Objectives:

E-Path aims to enhance knowledge of tree resistance mechanisms to pathogens, focusing on ash dieback. The project integrates field data and molecular techniques to assess infection risks and develop practical solutions for managing tree health. The project's overarching goal is to create a robust ecological forecasting tool capable of providing localized, short-term predictions for tree health and disease impact. The PhD candidate will focus on specific objectives within the project, while the development of the forecasting tool will be undertaken in collaboration with a post-doctoral researcher at TCD and the project PI.

Key Objectives:

1. Field Data Collection and Integration: Implement extensive field campaigns at key sites in Ireland to collect biotic and abiotic data, including infection symptoms, tree physiological traits, and environmental parameters. Integrate observations from ground surveys with remote sensing data, enabling scaling of results from individual trees to ecosystem levels.

2. Molecular Investigations and Integration: Employ advanced molecular techniques, including genotyping and quantitative PCR (qPCR), to quantify pathogen load and assess its distribution across diverse ash genotypes. Correlate molecular data with phenotypic measures of tree health to deepen understanding of disease impacts and inform breeding and conservation strategies.
3. Remote Sensing Applications: Utilize drone-based multispectral imaging to monitor tree canopy health and detect infection symptoms efficiently.
4. Stakeholder Engagement and Policy Support: Collaborate with forest managers, policymakers, and conservation organizations translate findings into actionable strategies.

Significance of the Project:
E-PATH seeks to empower policymakers, foresters, and conservationists with tools to mitigate the impact of tree diseases and safeguard biodiversity. By focusing on ash dieback as a case study, this project lays the groundwork for addressing broader ecological challenges posed by plant-pathogen interactions.

Requirements
Applicants should have a First or Upper Second Class Honours with 2-years of relevant experience or M.Sc. degree in an appropriate discipline such as tree improvement, plant pathology, plant science, plant biotechnology, forestry, or a closely related field. A good knowledge and practical experience of molecular biology, tree physiology, plant-microbe interactions, and plant pathology is highly desirable. The candidate should have good communication skills in the English language (oral and written). For applicants whose first language is not English, the English language requirements are available here.

Award
This 4-year PhD position is funded by the Environmental Protection Agency (EPA) in Ireland and is available under the Teagasc Walsh Scholarship Programme in partnership with the Botany Department, Trinity College Dublin, Ireland. The student will be registered at Trinity College Dublin, under the academic supervision of Dr Silvia Caldararu and based at Teagasc Oak Park under Teagasc supervisor – Dr Dheeraj Rathore. The scholarship provides €30,750 annually including a stipend of €25,000 per annum for 4 years and contribution to EU tuition fees of €5,750 per annum.

Further Information
Dr Dheeraj Rathore, Teagasc, dheeraj.rathore@teagasc.ie
Dr. Silvia Caldararu, Trinity College Dublin, CALDARAS@tcd.ie

Application Procedure
Submit **a single PDF file** containing an electronic copy of Curriculum Vitae and a letter of interest to: Dr Dheeraj Rathore (dheeraj.rathore@teagasc.ie). Quote the reference number (2024207) in the subject field.

Closing date: This advertisement will remain open until the position is filled. The first round of shortlisting will take place on **10th January 2024**, followed by interviews. Applications submitted after this date will be reviewed on a rolling basis and may be considered if the position remains vacant.