



Funded PhD position at University College Dublin - Ireland

Title: CO₂, H₂O and CH₄ exchange in varying grassland agriculture systems

Start date: September 2024 or as soon as possible thereafter

Project Description:

This PhD project is part of a wider project on Carbon sequestration from Agricultural soils from different Land-uses, Managements and Soil types (CALMS) in collaboration between Teagasc (lead organisation), NUI Maynooth, UCD, and Trinity College Dublin

Soil type plays an important role in determining soil CO₂ emissions. In addition, soil type also greatly affects the storage, transport, and availability of liquid water to plants. Soil water content further influences microbial activity and, hence, soil CO₂ and CH₄ emissions. With the increased likelihood of intense flooding and drought events expected under future climate conditions in Ireland it is increasingly important to understand the interconnections between soil type, sward composition and soil water content and consequent impact on GHG emissions and sequestration. Recent research has indicated that more species diverse grassland swards have the ability to cope better with drought stress.

In addition, land cover and species composition can have a significant impact on water exchange, especially in peatlands with further implications on carbon exchange and water use efficiency. The interconnections and feedbacks of the plant-soil carbon-water nexus are currently poorly understood but becoming increasingly important under future climate change scenarios. How alternative grassland swards impact the plant and ecosystem water cycling, carbon sequestration potential, overall carbon and water balance, and the carbon-water trade-off of these agricultural systems on different soil types is still unclear. This research will help deepen our insights in this regard.

The PhD student will investigate the interaction between soil type and sward composition on soil and plant CO₂, H₂O and CH₄ emissions/uptake using chamber measurements and EC tower based measurements. They will be exploring isotopic techniques for H₂O exchange analysis to understand evapotranspiration partitioning across soil types and species. The impact of soil type on water use efficiency within and across species will also be investigated.

Qualifications: Minimum educational background: BSc (honours) or MSc degree at 2.1 grade or above (or equivalent) in Environmental Science/Atmospheric Physics/Biological Sciences/Environmental Chemistry/Plant Biology/Soil Science or related discipline. Computational skills and experience with programming in Matlab, R, and/or Python (or similar) are required.



Desirable: experience with eddy covariance measurements (field work and/or data analysis) or other trace gas flux measurements, experience with isotopic techniques for gas exchange measurements

The successful candidate should be enthusiastic, self-motivated and willing to learn new tools and technologies.

Stipend: The student will receive a tax-free stipend of €25,000 per year, full coverage of tuition fees and funds for conference travel. If desired, the student will have the opportunity to serve as demonstrator (Teaching Assistant), which will be paid on top of the stipend at the hourly rate (<https://www.ucd.ie/hr/pay/hourlypaidemployees/hourlypaidrates/>).

Equality and diversity: UCD is committed to creating an environment where diversity is celebrated and everyone is treated fairly regardless of gender, age, race, disability, ethnic origin, religion, sexual orientation, civil status, family status, or membership of the travelling community (<https://www.ucd.ie/equality/>). Applications from all suitably qualified candidates will be considered.

About UCD: UCD, located in the cosmopolitan city of Dublin, Ireland, is one of the top universities in Europe - and is also ranked in the top 1% of higher education institutions worldwide. Our students love the UCD campus, a huge, spacious campus with lakes, woodland walks and wildlife close to Dublin's city centre. UCD is the most international university in Ireland and welcomes hundreds of new international students every year. Specific information and support for international applicants including visa requirements is available here: <https://www.ucd.ie/global/study-at-ucd/>

Informal enquiries are welcome and should be made to Dr Elke Eichelmann (elke.eichelmann@ucd.ie).

To apply please e-mail ecometlabucd@gmail.com a **single pdf** document with

- a detailed curriculum vitae describing any previous research experience,
- a cover letter (max 2 pages) detailing your research interests and goals, and
- the contact details (e-mail and phone number) of at least two academic referees.

Please reference “PhD Application – Grassland water exchange” in the subject line of the email.

Evaluation of applicants will commence on **June 4, 2024**, and will continue on a rolling basis until the position is filled. Only shortlisted candidates will be contacted.

Funding Notes: This project is funded by the Irish Department of Agriculture, Food and the Marine Project 'Carbon sequestration from Agricultural soils from different Land-uses, Managements and Soil types (CALMS) 2023RP948'.