

PhD Walsh Scholarship

Ref: 2021229

INTEGRITY: Integrated crop- ruminant livestock systems as a strategy to increase nutrient circularity

Background: Agriculture is the single largest contributor (~30%) to overall Greenhouse Gas (GHG) emissions in Ireland accounting for the majority of methane emissions produced primarily due to ruminant livestock production. Methane, a GHG 28 times more potent than carbon dioxide, is released as a by-product of rumen microbial fermentation and from stored manure and slurry on farm. Under recent national legislation, Ireland has committed to reduce GHG emissions from agriculture by 25% by 2030, compared to 2018 levels. Hence there is an urgent requirement for innovative strategies to ensure that these targets are met. INTEGRITY, an EU ERA GAS funded research project, involving nine countries from three continents (America, Europe, and Oceania) aims to evaluate alternative management of mixed crop-ruminant livestock systems to increase the potential of carbon and nutrient circularity in diverse agro-climatic regions. Whole system GHG emissions from integrated crop-ruminant production systems will be measured directly under different conditions including, within Ireland, the effect of feeding alternative forages and crop by-products within the context of a circular economic approach. The overall aim of this multidisciplinary project is to develop novel farm-ready technologies to reduce GHG emissions from ruminant fermentation and stored manure and slurry.

Project Aim: Specifically, in this PhD project we will investigate the potential of novel forage and crop by-product based dietary approaches to mitigate methane emissions from ruminant livestock production, while simultaneously monitoring their effects on animal productivity and soil health and nutrient dynamics using both *in vitro* and animal based *in vivo* trials. The successful candidate will learn state of the art animal, soil and laboratory based scientific approaches designed to provide a fundamental understanding of mechanism of action of the various interventions employed on enteric and manure fermentation dynamics, soil health and animal, manure and soil microbial composition.

Requirements: Applicants should have a primary degree (First or upper Second Class Honours) or M.Sc. in an appropriate discipline (e.g. microbiology, biological science, animal science, biotechnology, etc.). The successful candidate should be highly self-motivated and be prepared for some field work for sample collection, laboratory work and microbiological and molecular analyses using bioinformatics and biostatistics. English require a minimum score of IELTS 6.05 for entry into postgraduate programmes.

Award: The PhD Scholarship is part of a joint research project between NUIG and Teagasc, which is funded by the FACCE ERA-GAS Joint Programme Initiative administered in Ireland under the auspices of the Department of Agriculture, Food and the Marine. The student will be registered at NUIG, but based mainly at the Animal and Bioscience Research Department, Teagasc, Grange, Co. Meath but will also enrol in modules and spend some time at NUIG. The student will be under the joint supervision of Prof Vincent O'Flaherty (NUIG) and Prof David Kenny (Teagasc). The Scholarship will commence in October 2022. The 4-year Scholarship provides an annual stipend of €18,000 plus university fees up to a maximum of €6,000. Informal contact to make enquiries about the PhD is welcome to Prof O'Flaherty (vincent.oflaherty@nuigalway.ie) or Prof Kenny (david.kenny@teagasc.ie).

Application Procedure: Please send a one-page letter briefly outlining your reasons for applying for this PhD and a current two-page CV detailing your education and research experience, and including the names of two referees to Prof Kenny (david.kenny@teagasc.ie) and Prof O'Flaherty (vincent.oflaherty@nuigalway.ie).

Closing Date for Applications: 2nd September 2022.

Provisional Interview Date: 12th September 2022.

PhD Start Date: 3rd October 2022.