Understanding the Biological Drivers of Feed, Environmental and Carcass Efficiency in Beef Cattle

Walsh Scholars Reference Number: 2026040
University: University College Dublin (UCD)
Funding: Teagasc
Research Institution: Teagasc
Location: Teagasc Grange, Co. Meath. Ireland
Proposed Start Date: September 2026

Project Summary

Feed intake accounts for 60–70% of beef production costs and is the primary driver of enteric methane emissions. National breeding objectives differ markedly between dairy and beef systems: dairy cattle are predominantly selected under intensive grazing regimes, whereas beef cattle are typically selected under high-input, concentrate-based systems. Consequently, dairy and dairy-beef progeny often exhibit higher intake potential, but poorer feed conversion efficiency compared with beef-bred cattle. Given that grazed grass represents the lowest-cost feed resource in Irish beef systems, there is a critical knowledge gap in understanding how feed intake, feed efficiency, and environmental efficiency interact under pasture-based production systems.

The aim of this PhD project is to identify the biological mechanisms driving feed efficiency, environmental efficiency, and carcass gain efficiency in beef cattle. Three contrasting genotypes, representative of the majority of cattle used in Irish prime beef production, will be reared from birth to slaughter under a standardised pasture-based system. Comprehensive phenotyping will quantify feed intake and feeding behaviour, rumen fermentation and microbiome composition, nutrient partitioning and nitrogen use efficiency, methane emissions, and growth performance. The project will identify key biological pathways and critical physiological windows that can be targeted to improve animal performance, reduce environmental impacts, and enhance the long-term sustainability of pasture-based beef production.

Supervision

The project will be supervised by Dr Emily Roskam, Teagasc, whose research focuses on enteric methane mitigation, rumen fermentation, and the rumen microbiome in pasture-based beef systems, using in vitro and in vivo approaches. Co-supervision will be provided by Dr Alan Kelly, Assistant Professor in Animal Science at University College Dublin, whose expertise centres on feed intake, growth, energetic efficiency, and the physiological and molecular drivers of nutrient utilisation in cattle. Together, the supervisory team provides complementary expertise across rumen function, nutritional intervention, and the biological drivers of efficiency in beef production.

Research Environment

You will be registered at University College Dublin and based at Teagasc Grange, Animal and Bioscience Research Centre, a national centre of excellence for beef production research, for the duration of your studies. The project provides access to state-of-the-art experimental facilities, comprehensive animal research infrastructure, and an established interdisciplinary research community.

As a Walsh Scholar, you will engage with national and international research networks, participate in regular seminars, and collaborate with researchers working across animal science, genetics, nutrition, and environmental sustainability.

Career and Training Opportunities

The Teagasc Walsh Scholars Programme provides a structured four-year training and development framework designed to support both academic excellence and long-term career readiness. Scholars develop advanced scientific and analytical expertise alongside transferable skills in communication, project

management, and stakeholder engagement through expert-led training, workshops, and tailored professional development.

Opportunities are provided to present research at national and international conferences, supporting professional networking and active engagement with the wider research community. Dedicated final-year career supports focus on preparing scholars for impactful roles across research, industry, advisory services, and policy, in Ireland and internationally.

Through the Teagasc International Training Awards, scholars may undertake an international research placement of up to 12 weeks aligned with their PhD project. Outstanding achievement may also be recognised through the Walsh Scholars of the Year and Gold Medal Awards.

Candidate Profile and Eligibility
Applicants should ideally:

- Hold a First or 2.1 Honours degree (or Master's) in animal science, agricultural science, animal and crop production, environmental science, or a related discipline
- Demonstrate experience in field- and/or laboratory-based research, with strong data handling and analytical skills
- Show the ability to apply multidisciplinary approaches to hypothesis-driven research
- Possess excellent written and verbal communication skills and the ability to work effectively as part of a team
- Meet UCD postgraduate entry requirements, including English language requirements where applicable

Funding Details
This is a fully funded four-year PhD funded by Teagasc, including:

- €25,000 annual stipend
- University fees covered up to €6,000 per annum

How to Apply
Applicants should complete the online application form by **5:00pm on Wednesday, 18 March 2026.** Applications must include a curriculum vitae and a 1–2 page statement of motivation submitted as part of the online application.

Interviews
Shortlisted candidates will be invited to interview in **early to mid-April 2026**. Online interviews can be accommodated.

Further Information
Informal enquiries are welcome and may be directed to: Dr Emily Roskam –Emily.Roskam@teagasc.ie; Dr Alan Kelly – Alan.Kelly@ucd.ie

Further information on the Walsh Scholars Programme is available at:
https://www.teagasc.ie/about/research-innovation/the-walsh-scholars-programme/about-the-programme/