

PhD Project Advertisement

Project title: Nutritional programming in replacement dairy heifers: Future-proofing herd performance, health and behaviour

Project No: FBS2022-70-Arnott

Lead supervisor: Dr Gareth Arnott, School of Biological Science, Queen's University Belfast

Email: g.arnott@qub.ac.uk

Co-supervisors: Dr Sokratis Stergiadis, University of Reading, Dr Omar Cristobal Carballo, Agri-Food and Biosciences Institute, Hillsborough and Dr Leonel Leal, Trouw Nutrition Ruminant Research Centre, The Netherlands

Project background:

The lifetime performance of a dairy calf is impacted by its health, nutrition and environment, with a sub optimal position in any of these factors affecting the animal's ability to achieve its genetic potential. The plane and composition of nutrients provided to calves in early life may be linked to changes in the calf metabolism and have the potential to persist throughout the animal's lifetime, with implications for performance, longevity and welfare. Further, nutrition can impact the gut microbiome, disruptions to which can have a long lasting impact on immune system development and function. This is an important consideration in livestock production systems given the economic impact of disease and accompanying environmental implications. The microbiome has also been linked to behavioural development in adult dairy cattle, with improvements in milk quality and production found in calmer dairy cows. However, little is currently known about the impact of early life dairy calf nutrition on later life, and if certain nutritional regimes can be used to generate positive traits for production, health and welfare.

This research project will extend our understanding of the effects of early life nutrition and help to develop nutritional strategies in calves for metabolic programming of the future dairy herd. This will allow development of strategies for targeted selection of traits which will contribute to an environmentally sustainable, high welfare and productive dairy system.

Project outline:

You will undertake a high impact research project at Queen's University Belfast (QUB) in collaboration with University of Reading (UoR), and will also benefit from the farm animal research facilities at the Agri-Food and Biosciences Institute (AFBI), Hillsborough and Trouw Nutrition Ruminant Research Centre, The Netherlands.

You will assess the impact of pre- and post- wean nutritional regime in dairy calves on performance and behavioural traits at the Agri-Food and Biosciences Institute research farm in Hillsborough. As the calves grow and transition into the dairy herd you will examine the longitudinal stability of metatype alongside the correlation between metatype and animal phenotype (e.g. feed efficiency, milk production, behaviour). You will also evaluate the impact of nutritional regime on metatype and the gut microbiota using the state-of-the-art omics methods at the research facilities in QUB and UoR.

Training opportunities:

This project will provide you with vast experience and cross-cutting training opportunities across various institutes. Extensive training in omics based lab techniques such as NMR-based metabolomics and data analysis will take place at QUB and UoR. At AFBI Hillsborough, you will gain experience in fieldwork and be trained and gain a license for undertaking animal procedures. In addition, you will have the opportunity of a placement at the Trouw Nutrition research facilities.

Student profile:

This studentship is available only to individuals who are eligible for UK fees status. The project would be suitable for students with a BSc degree at 2.1 level or above in agricultural sciences, veterinary medicine, biology, ruminant nutrition or a closely related subject.

Equality Diversity and Inclusion:

The FoodBioSystems DTP is committed to equality, diversity and inclusion (EDI), to building a doctoral researcher(DR) and staff body that reflects the diversity of society, and to encourage applications from under-represented and disadvantaged groups. Our actions to promote diversity and inclusion are detailed on the [FoodBioSystems DTP website](#).

In accordance with UKRI guidelines, our studentships are offered on a part time basis in addition to full time registration. The minimum registration is 50% FT and the studentship end date will be extended to reflect the part-time registration.

Funding particulars:

FoodBioSystems DTP students receive an annual tax free stipend. For 2022/23 this will be £16,062 and this will increase slightly each year at rate set by UKRI.

For up to date information on funding eligibility, studentship rates and part time registration, please visit the [FoodBioSystems website](#).