PhD Walsh Scholarship

PhD in Bovine Genetics

Background: Bovine respiratory disease (BRD) is the most common economically important disease affecting cattle worldwide and is the largest cause of mortality in calves aged one to five months old in Ireland. Bovine respiratory disease complex (BRDC) encompasses pneumonias in cattle caused by an array of infectious agents (viruses, bacteria and *Mycoplasmas*) and environmental factors. Studies have found that neither immunization nor antimicrobial therapies have significantly reduced the prevalence or severity of BRD largely due to the lack of comprehensive information on the biological mechanisms controlling the host response and the underlying genetic basis of host BRDC resistance and susceptibility. The aim of this project funded by a US-Ireland Tri-partite grant was to discover novel genomic variants located in the key BRDC regulatory regions and integrate these into the national genomics selection breeding programme. Data from this project will ultimately reduce the incidence of BRD both in Ireland and globally and facilitate the selection and propagation of genetically superior, robust, animals and thus enhance the profitability of Irish cattle enterprises.

Project Aim: Application of next generation sequencing for the identification of DNA based biomarkers in regulatory regions of the genome for susceptibility to bovine respiratory disease complex

Project Description: In a controlled challenge study (conducted by our Northern Irish partner, Agri-Food and Biosciences Institute (AFBI)), the influence of the host response of dairy calves to respiratory BRD pathogens, has been examined and a range of tissues have been collected for molecular analysis. In this Walsh Scholarship, the transcriptome of apical lung lobe lesions and mediastinal lymph nodes, the key tissues affected by the disease, will elucidate the molecular mechanisms regulating host response to BRDC in dairy calves. In addition, the key regulatory regions of the genome involved in the immune response to BRDC will be identified in these tissues. These regions will be interrogated for genetic variants associated with susceptibility to BRDC in Irish cattle. Variants will be collated with variants identified by our US partner (Prof Jerry Taylor, University of Missouri) and following validation will be integrated into the national genomics selection breeding programme, ultimately reducing the incidence of BRDC both in Ireland and globally. The project will facilitate the selection and propagation of genetically superior, robust, animals and thus enhance the profitability of Irish cattle enterprises.

Requirements: Applicants should have a primary degree (First or upper Second Class Honours) or M.Sc. in an appropriate discipline (e.g. genetics, biological sciences, bioinformatics, 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 genetic and genomic analyses using bioinformatics and biostatistics.

Award: The PhD Scholarship is part of a joint research project between NUIG, Teagasc and other partners (AFBI, University of Missouri, Irish Cattle Breeders Federation (ICBF)), which is funded by the Department of Agriculture Food and the Marine (DAFM) through a US-Ireland Tripartite R&D grant. The student will be registered and based at NUIG, but may spend some time at the Animal and Bioscience Research Department, Teagasc, Grange, Co. Meath. The student will be working under the joint supervision of Dr Derek Morris (NUIG) and Prof Sinéad Waters (Teagasc). The Fellowship will start in September 2020. The 4-year Scholarship provides an annual stipend of €16,000 plus university fees. Informal contact to make enquiries about the PhD is welcome to Dr Morris (derek.morris@nuigalway.ie) or Dr Waters (sinead.waters@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 Dr Morris (derek.morris@nuigalway.ie).

Closing Date for Applications: 18 May 2020.
Provisional Interview Date: 29 May 2020.
PhD Start Date: 1 September 2020.