



## PHD SCHOLARSHIP OPPORTUNITY

# “THE IMPACT OF CULTIVATION SYSTEM AND SOWING DATE ON THE ESTABLISHMENT, ROOT DEVELOPMENT AND GROWTH OF FIELD BEANS IN A TEMPERATE CLIMATE”

**Background:** A fully funded four-year PhD is offered for a project entitled “The impact of cultivation system and sowing date on the establishment, root development and growth of field beans in a temperate climate”.

This project is funded by the Department of Agriculture, Food and Marine (DAFM) and feeds into a larger collaborative project between University College Dublin (UCD) and Teagasc entitled “Optimising production technology in Ireland for break crops”.

**Project Summary:** Times of sowing and cultivation strategy are key related components in bean production. Seedbed preparation is crucial for crop establishment, growth and ultimately, yield; however, different crops require differing soil physical properties for successful establishment. Crop establishment is a particular challenge for bean production as it is considered optimal to sow either in November or February, which can prove challenging on medium to heavy textured soils. There is a need to investigate reduced or low disturbance techniques and their capacity to reduce establishment costs, increase sowing capacity and facilitate earlier sowing. The interaction between sowing date and cultivation/sowing system and its effect on soil and root structure needs to be determined. However, direct visualisation of root:soil interactions has been impossible due to roots growing in opaque soil. This task will assess the impact of cultivation systems, sowing times and soil types on the soil structure and bean root systems and ultimately crop yield. It will utilise X-ray CT scanning of soil cores taken from the field plots. X-ray CT is a 3D non-destructive technique that can be repeatedly undertaken on the same soil core; allowing soil structure, soil pores and root system architecture to be simultaneously visualised and quantified at scales relevant to root:soil interactions. In this task X-ray CT will be used to directly visualise soil-seed contact and obtain data regarding the effect that different cultivation methods have on soil structure to gain information regarding the optimum seedbed for bean establishment.

### Objectives:

- To determine the impact of conventional and low disturbance crop establishment systems on bean establishment, growth, development and yield.
- To study the interaction between sowing date and establishment system as assessed by crop establishment, development and yield.
- To investigate the effect of seedbed conditions (sowing depth, tillage level, tillage depth, soil structure etc.) on bean root development, plant development and yield.
- To determine the effect of differing cultivation systems over winter /early spring on soil conditions for plant growth.

**Requirements/Award:** Applications are sought from a highly motivated individual who has a first or upper second class degree in agricultural sciences, plant science, horticulture, crop science, biology or closely related disciplines and a willingness to learn. The PhD Scholarship will be €24,000 per annum for four years from which tuition fees of €6,810 (open to EU students only) will be deducted and the remainder will be paid as a tax-free stipend. The work will be based at University College Dublin, School of Agriculture & Food Science, Belfield, Dublin 4.

**Further Information/Applications:** Submit an electronic copy of Curriculum Vitae, a letter of interest and the names and email addresses of two academic referees to [saoirse.tracy@ucd.ie](mailto:saoirse.tracy@ucd.ie). For informal queries please email Dr Saoirse Tracy or Dr Kevin McDonnell [kevin.mcdonnell@ucd.ie](mailto:kevin.mcdonnell@ucd.ie).

**Closing date:** 1<sup>st</sup> September 2017

**Start date:** September/October 2017