



PHD STUDENTSHIP : A fully funded 4-year PhD is offered for a project entitled “Development of imaging models of the Soil/Root interactions for cereal crops – primarily wheat – for use to improve cereal establishment”.

DESCRIPTION

CONSUS Crop Optimisation through Sensing, Understanding & Visualisation

Growth in food production is not matching growth in global population – the world needs new ways of producing more food to meet this massive demand. More efficient and intensive production systems are needed, but so too is a decrease in the environmental impact of such systems. This challenge presents a huge opportunity for Ireland to position itself as a global leader in ‘data-driven’ agriculture, while also delivering a highly competitive and sustainable agri-food industry.

UCD together with Origin Enterprises Plc are establishing a new collaborative research programme, CONSUS, focussed on the application of precision agriculture to crop production with a particular emphasis on optimisation of agri-food production systems leading to more efficient food production with lower environmental impacts. The outcomes from this research programme will deliver a step-change in crop agronomy tools and practices, leading to enhanced global competitiveness.

PhD Project Summary

This PhD is part of a larger research project looking at crop establishment, soil nutrients and crop management. For this particular PhD, times of sowing and cultivation strategy are key related components in cereal production. Seedbed preparation is crucial for crop establishment, growth and ultimately, yield; however, different crops require differing soil physical properties for successful establishment. There is a need to investigate reduced or low disturbance techniques and their capacity to reduce establishment costs, increase sowing capacity and facilitate alternative sowing dates. 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 cereal 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 cereal establishment.

Objective(s).

- To determine the impact of conventional, and low disturbance crop establishment systems on cereal establishment.
- 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, tilth level, tilth depth, soil structure etc.) on cereal root development.

Profile

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.

Requirements

1. BSc (honours) in agricultural sciences, plant science, horticulture, crop science, biology or closely related disciplines
2. Excellent scientific, organisational and project management skills
3. Commitment to research and excellent problem solving skills.
4. Ability to work independently and as part of a multi-disciplinary team focused on delivery of high-quality research.
5. Excellent interpersonal and communications skills.

Stipend: The PhD Scholarship will be €23,500 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

PhD Duration: 4 years

To apply submit an electronic copy of Curriculum Vitae, a letter of interest and names and email addresses of two academic referees to Dr Kevin McDonnell electronically: kevin.mcdonnell@ucd.ie For informal questions and queries please email Dr. Kevin McDonnell or Dr Saoirse Tracy saoirse.tracy@ucd.ie

Closing date:

June 24th 5pm