



Trinity College Dublin  
Coláiste na Tríonóide, Baile Átha Cliath  
The University of Dublin



## TEAGASC WALSH SCHOLARSHIPS PHD

Ref: 2020013

“Counterfactual Decision-Making Support for Precision Agriculture”.

Funding for a PhD scholarship (stipend plus fees) is available for a collaborative project between TCD (Professor Ruth Byrne, *School of Psychology & Institute of Neuroscience*), UCD (Professor Mark Keane, *School of Computer Science*) and Teagasc (Dr Laurence Shalloo and Dr Elodie Ruelle, *Animal & Grassland Research and Innovation Centre*), to be hosted at TCD by the School of Psychology ([www.psychology.tcd.ie](http://www.psychology.tcd.ie)) and Institute of Neuroscience ([www.tcd.ie/Neuroscience](http://www.tcd.ie/Neuroscience))

The research focus will be on human explanation and counterfactual thinking for Explainable Artificial Intelligence (XAI). The project focuses on the use of Artificial Intelligence in “*Smart Agriculture*” to support sustainable decisions in farming, taking the “*PastureBase Ireland*” grassland decision-support system as a test case. AI decision-support systems can produce decisions that appear unintelligible to humans and there is a need for them to provide explanations of their decisions to human users, e.g., farmers, agricultural advisors, and researchers, to ensure trust and fairness. The successful Walsh scholar will carry out cognitive science research at the interface of cognitive psychology and artificial intelligence, including experiments with human participants to examine cognitive processes in explanation and counterfactual thinking.

Applicants should have:

- At least 2.1 grade (or equivalent) in an undergraduate or postgraduate degree in psychology, cognitive science, computer science or a cognate discipline (e.g., philosophy, linguistics).
- Expertise in experimental design and testing human participants is a requirement.
- Programming expertise is desired but not a requirement.
- Non-native English speakers require at least IELTS 6.5 or equivalent (see [www.tcd.ie/courses/postgraduate/how-to-apply/requirements/international.php](http://www.tcd.ie/courses/postgraduate/how-to-apply/requirements/international.php))

The PhD student will be registered in TCD and will receive a scholarship valued at close to €90,000, to include a tax-free stipend of €16,000 per year for four years and €6,000 per year towards tuition fees. There will be a contribution to student conference travel by TCD. Students may also have the opportunity to gain relevant experience (and earn extra income) in TCD through teaching activities. The Walsh scholar will participate in activities of the VistaMilk SFI Research Centre including its annual conferences, masterclasses and workshops. The anticipated start-date is 1<sup>st</sup> September 2020.

All enquiries to: [rmbyrne@tcd.ie](mailto:rmbyrne@tcd.ie) (see [www.psychology.tcd.ie/people/rmbyrne](http://www.psychology.tcd.ie/people/rmbyrne)). Interested candidates should read:

Byrne, R.M.J. (2019). Counterfactuals in Explainable Artificial Intelligence (XAI): Evidence from Human Reasoning. *Proceedings of the 28th International Joint Conference on Artificial Intelligence, IJCAI19*. Available at: <https://pdfs.semanticscholar.org/0501/b0661057d745d6bf247b7e100b8c2eac6bb7.pdf>

Kenny, E. M., Ruelle, E., Geoghegan, A., Shalloo, L., O'Leary, M., O'Donovan, M. & Keane, M. T. (2019). Predicting grass growth for sustainable dairy farming. *Proceedings of the 27th International Conference on Case Based Reasoning. ICCBR-19*. Available at: <https://research.idi.ntnu.no/cbr/iccbr2019/KennyEtAl.pdf>