

# TEAGASC PHD WALSH SCHOLARSHIP OPPORTUNITY

## “Detection and analysis of hidden bacteriophage in food and animal systems by using metagenomics and synthetic biology”

Walsh Scholarship Ref Number: 2022046

### Background

A key challenge in dairy fermentations is the occurrence of viruses that infect bacteria (called bacteriophages, or phages). These bacteriophage infections cause fermentation inconsistencies or failures, leading to economic losses and environment wastage. Bacteriophages have recently been discovered in an undetected pseudolysogenic state within pathogenic bacteria, as well as bacterial cultures used in dairy manufacturing processes. Detecting and isolating those bacteriophages can be challenging, but being able to understand how they are introduced into the process will improve the sustainability of the food sector by reducing the material and energy losses associated with failed fermentations.

Working with an industrial partner, the Walsh Scholar will detect the intracellular bacteriophages using the latest in DNA sequencing and analysis methods, coupled to traditional phage screening approaches. This will allow the PhD candidate to validate these technological approaches, improving our understanding of how non-lysogenic bacteriophages use their hosts as a Trojan horse to interfere with food fermentations. In addition, the methods developed here are applicable to more complex microbiomes. In the latter stages of the project the Walsh Scholar will use their now validated technological approaches to determine phage:host interactions in more a complex environment. This will allow the student to investigate whether the phage can be used as part of a novel SynBio-driven greenhouse gas mitigation strategy.

The student will develop skills in a wide range of molecular techniques including next generation sequencing and analysis, biochemical and biological assays, and bacterial and phage culturing and propagation. The successful candidate will also be involved in wider Teagasc and APC Microbiome Ireland Education and Public Engagement activities.

The successful doctoral candidate will be jointly supervised by Dr John Kenny (Teagasc Food Research Centre, Moorepark, Fermoy, Co. Cork) and Prof Jennifer Mahony (UCC, College Road, Cork). They will be principally located at Teagasc, and will be registered as a PhD student at UCC with periods there for course work, supervisory meetings and specialist laboratory work.

### Requirements

Applicants should have a good primary degree (First or Upper Second Class Honours) or M.Sc. in Microbiology, Genetics, Biochemistry or related discipline. The successful candidate should be highly self-motivated, interactive and willing to learn new techniques. Preferred candidates have very good teamwork abilities and a high level of oral and written English. Applicants whose first language is not English must provide evidence of English language proficiency as per UCC regulations (<https://www.ucc.ie/en/study/comparison/english/postgraduate/>).

### Award

The scholarship funding is €24,000 per annum and includes University fees of up to a maximum of €6,000 per annum and is tenable for 4 years. We offer a 4-year PhD position starting from September 2022. The PhD student will become part of a team that includes other PhD students, postdocs, and research technicians. The PhD student will also avail of Teagasc and UCC support structures, which offer opportunities for courses for scientific, personal and professional development.

### Further Information/Applications

For further information about the project, please contact Dr John Kenny ([john.kenny@teagasc.ie](mailto:john.kenny@teagasc.ie)) or Prof Jennifer Mahony ([J.Mahony@ucc.ie](mailto:J.Mahony@ucc.ie)).

### Application Procedure

Applicants should submit a CV and covering letter detailing their qualifications, experience and contact details for at least two referees simultaneously to both Dr Kenny at [john.kenny@teagasc.ie](mailto:john.kenny@teagasc.ie) and Prof Mahony at [J.Mahony@ucc.ie](mailto:J.Mahony@ucc.ie).

### Closing date

5.00 pm on Friday July 1<sup>st</sup> 2022 with expected interviews in mid-July.