# MI4107

## Microbiomes underpinning Agriculture

### Module Description:

Microorganisms play a critical role in agriculture, representing a key resource that underpins the agri-food sector. Soils, plants and animals all have a unique microbiome (the community of microorganisms in a given habitat) and these agricultural microbiomes perform an array of pivotal functions essential to system health, sustainability and productivity. The advent of novel molecular technologies has transformed this field, making it possible to study microbiomes in greater depth than ever before. In this module we will describe what microbiomes are and their importance to agriculture, particularly focusing on their key roles in three environments (soils, forage plants, animals' respiratory and gastrointestinal tract).

In this module, we will show that an enhanced understanding of these agricultural microbiomes will provide opportunities towards managing agricultural systems in a manner that harnesses the natural power of microbes to provide solutions to global challenges of food safety and security, resource limitation and climate change, which is essential to move towards more efficient and sustainable food production systems

### Learning Outcomes:

- LO1 Critically evaluate the importance of microbiomes to agricultural processes
- LO2 Discuss in details the role of ruminant microbiomes to key processes such as nutrient digestion, animal health and the environment
- LO3 Explain the importance of the microbial communities in soil for nutrient cycling, soil fertility, sustainability and nutrient provision to plants
- LO4 Critically discuss the role of microbiomes in the plant life cycle, nutrient cycling, and protecting crop performance against environmental change or diseases
- LO5 Analyse best practice to perform sample collection and identify the key technologies and strategies to study agricultural microbiomes from a range of different environments including the animal, soil and plants.

### When and where?

Semester 2 (weeks 1 to 6)

Coordinator: Sinead Waters

Lecturer: Sinead Waters and Alex De Mendes

Email: sinead.waters@universityofgalway.ie

### Module Assessment:

The assessment of this modules is through on continuous assessment and written examination.

CA – Students will have an in class MCQ exam. Weight: 30% of the final mark.

Written examination – Students will sit a semester 2 paper on Microbiomes underpinning Agriculture. Weight: 70% of the final mark.

## Who are the lecturers?

### Sinead Waters

Interests: ruminant microbiomes and their interactions with the host animal to improve animal health, productivity and enviornment

Sinead Waters - University of Galway

### Alex de Mendes

Interests: drivers of microbial ecosystem function, particularly in the soil environment but also in the mammalian rumen

Alexandre De Menezes - University of Galway