

PAB2101

AgriBiosciences

Module Description:

Since the origin of agriculture ten thousand years ago, innovations in genetics and agricultural (plant & livestock) biosciences have continued to play a critical role in ensuring future food security and sustainable development on our planet. This module provides cutting-edge training in agricultural biosciences (plants, animals), using case studies of major scientific advances and bio-challenges.

Learning Outcomes:

- **LO1** Understand the genetic and biological origins of agriculture, domestication and human civilisation
- **LO2** Describe and appreciate how conventional and molecular genetics plays a role in provision of food, fibre, feed, fuel and other bio-derived resources supporting humanity
- **LO3** Understand at the molecular level the types of genetic variation and biochemical processes that artificial selection and breeding processes act on for improvement of crops and livestock
- **LO4** Understand how crop and livestock improvement is conducted and the role that current advances in genetics, biochemistry and biosciences are playing in developing improved varieties, breeds and genotypes.
- **LO5** Describe and critically evaluate the major challenges for sustainable agricultural intensification over the decades ahead to meet growing demand.

Lecture Topics

1. Why study plants?
2. Central dogma of molecular biology
3. Genomes and genetic variation
4. Genetics
5. Genetic improvement
6. Agri domestication
7. Plant domestication
8. Developmental process
9. Leaf and root development (if I have time) Animal Breeding and Genomics
10. Leaf and root development
11. Animal Breeding Genomics

Coordinator: Sara Farrona

Lecturers: Sara Farrona, Ronan Sulpice,

Sinead Waters

Email:

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Who are the lecturers?



Sara Farrona

Interests: plant development and adaptation, epigenetics, chromatin.

<http://www.farronalab.org/>



Ronan Sulpice

Interests: plant systems biology, algae, biomass, plant breeding, metabolism.

<https://sulpice-lab.com/>



Sinead Waters

Interests: animal nutrition, rumen microbiome,

GHG emissions, animal breeding

<https://www.universityofgalway.ie/science-engineering/staff-profiles/sineadwaters/>

<https://www.teagasc.ie/contact/staff-directory/w/sinead-waters/>

Module Assessment:

Continuous Assessment

Practicals - Four practical lectures will be hold on Mondays, week 2-6. The class will be divided in 2 groups, 2-4 pm (group 1) and 4-6 pm (group 2). Weight: 25% of the final mark.

Topics:

Lab 1 – Organogenesis and in vitro culture

Lab 2 – Making algal balls

Lab 3 – Understanding photosynthesis with algal balls

Lab 4 – Specialised cells

Videos - Interactive videos will be shared with students through Canvas. Students will be asked to watch these videos and reply to the interactive questions. Interactive videos will be available for the students during the whole semester as a self-assessment tool. Weight: 15% of the final mark.

Written Exam

Exam – The written exam will have 5 questions to answer 3 in essay style. Weight: 60%

