Ancient DNA and Proteomics

Module Information

2022.01, Approved

Summary Information

Module Code	7201NATSCI
Formal Module Title	Ancient DNA and Proteomics
Owning School	Biological and Environmental Sciences
Career	Postgraduate Taught
Credits	20
Academic level	FHEQ Level 7
Grading Schema	50

Teaching Responsibility

LJMU Schools involved in Delivery
Biological and Environmental Sciences

Learning Methods

Learning Method Type	Hours
Lecture	27
Practical	2
Workshop	15

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-CTY	CTY	September	12 Weeks

Aims and Outcomes

Aims	During the last decade, the development of ancient DNA methodologies has enabled the sequencing of thousands of genomes from archaeological human remains. This data has profoundly transformed our understanding of past population movements and produced crucial information for answering long-standing questions in archaeology.This module is designed to provide students with a solid understanding of the key findings in the Ancient DNA and Proteomics fields, what kind of information can be obtained from Ancient DNA, and issues and limitations surrounding DNA preservation and recovery.A large component of this module is focused on the laboratory and computational methods involved in the generation, processing and analysis of Ancient DNA data. The students will have the opportunity to acquire skills and experience in various computational/bioinformatics techniques. These include evaluating Ancient DNA sample preservation and authenticity, determining the sex of ancient human remains, characterizing autosomal and uniparental ancestry and jointly interpreting results of genetic analyses with archaeological and anthropological data.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Demonstrate critical knowledge about the key Ancient DNA and Paleoproteomics findings from the last decade.
MLO2	2	Apply Ancient DNA and Paleoproteomics research to study past demography and population history.
MLO3	3	Critically evaluate different laboratorial techniques involved in the generation of sequence data from ancient human remains, taking into account their advantages and limitations.
MLO4	4	Analyse Ancient DNA data using a variety of computational methods and interpret the resulting findings.

Module Content

Outline Syllabus	Ancient DNA as a tool for investigating past migrations and population history. Overview of the main Ancient DNA findings in Africa, Europe, Asia and the Americas. The genetic impact of cultural transition (with a focus on the European Neolithic and Bronze Age periods). Neanderthal and Denisovan genetics. Kinship and social organisation. Paleoproteomics. DNA preservation and recovery. Laboratory techniques for Ancient DNA extraction and sequencing. Computational methods for processing and analysing Ancient DNA and Proteomics data.
Module Overview	
Additional Information	Ancient DNA is an extremely powerful tool for understanding the population history of our species. Recent methodological advances have led to a rapid expansion of the field and to its establishment as a vital component to other bioarchaeological methods for analysing ancient human remains. In this module, students will acquire critical knowledge about the main ancient DNA findings which have emerged in the last decade. Emphasis will be given to the acquisition of computational skills for the analysis of genetic data which are in high demand in both academic and industrial settings, therefore increasing the students' future job prospects.LJMU’s Faculty of Biological Sciences has several well-equipped laboratories, including one exclusively dedicated to Ancient DNA work and multiple molecular biology laboratories, which can be used to support teaching activities. Computational workshops will take place in the IT room or using remote access VPN connections if necessary

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Exam	50	2	MLO1, MLO2, MLO3

Report	Case Report	50	0	MLO2, MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Rui Leite Portela Martiniano	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings