Ollscoil na Gaillimhe
University of Galway

MSc in Biomedical Genomics

Clinical applications of genomics are at the forefront of precision medicine. It is now possible to diagnose rare genetic diseases from genomic sequence data, while the sequencing of tumours has become an important means of refining therapeutic choices in cancer treatment.

This has led to a growing need for scientists, who can both analyse genomic data and interpret the results, based on a strong understanding of biological and clinical contexts.

Students enrolled in this programme will acquire practical skills in the generation of genomic data, using the latest sequencing technologies, and will learn the computational and statistical techniques necessary for their analysis.

Biomedical Genomics (MSc)

Course level: Level 9

Duration: 1 year

Prerequisites: Applicants must have achieved a First or strong Second Class Honours degree in a relevant discipline.
Qualifying degrees include, but are not limited to: biochemistry, biomedical science, genetics, and biotechnology.

Fees: Visit universityofgalway.ie/courses/fees-and-funding/fees.html for more information.

Applying: Applications are made through the University of Galway's postgraduate portal, see universityofgalway.ie/courses/how-to-apply/

Course Code: MSC-BMG

Closing date: Places will be awarded on a rolling basis, so candidates are advised to apply as early as possible.

Enquiries to:
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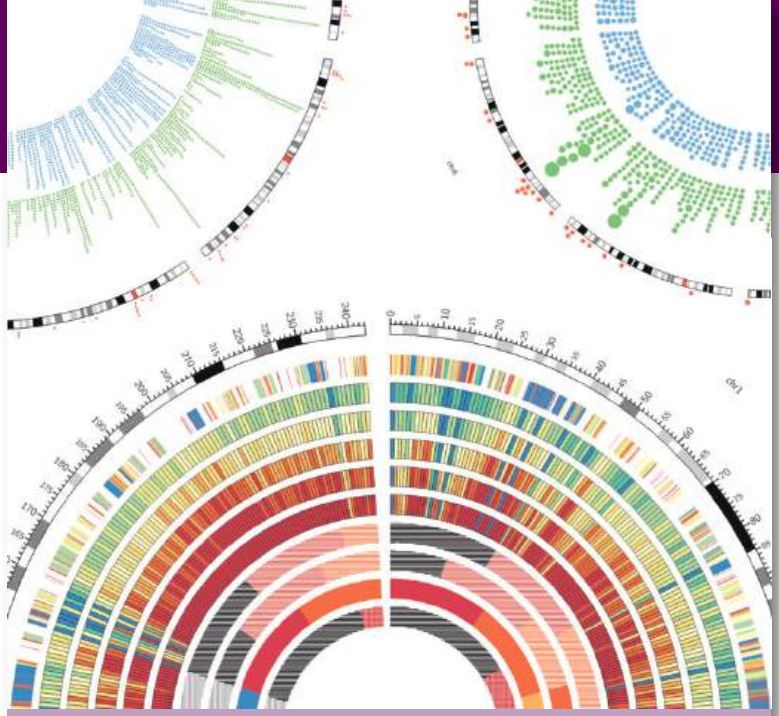
www.universityofgalway.ie/courses/taught-postgraduate-courses/biomedical-genomics.html



Why study this programme?

Rapid advances in the technologies used to sequence DNA and RNA have resulted in an increase in the breadth of application of sequence-based genome technologies, ranging from fundamental scientific discovery in the life sciences to clinical applications in precision medicine. Graduates of this degree programme will be highly skilled in relevant scientific principles and technologies and have acquired the quantitative and computational skills that allow them to analyse big data sets generated using the latest genomics techniques.

Career Opportunities

This is an exciting programme that will provide graduates with a highly marketable and transferable combination of computational and analytical skills, as well as specialist knowledge of the application of these skills to the generation and analysis of genome data. As advances in precision medicine take hold, it is anticipated that the need for genomic scientists in healthcare, the pharmaceutical industry, and academic research organizations will continue to rise, leading to opportunities for employment within each of these areas. The data analytics skills acquired will also allow graduates to transition to data scientist roles outside of genomics.

Programme Outline

The course comprises 90 credits, with 60 credits obtained from taught modules, and the remaining 30 credits from a research project, which is done on an individual basis under the supervision of an academic.

Students will enroll in five core modules—all with focus on genomics—and a range of optional modules, all with focus on foundational skills relevant to biomedical genomics. The optional modules include topics like medical genomics, genomics data analysis, statistics for health science data, statistical computing for biomedical data, machine learning & deep learning in genomics, bioinformatics, mathematical molecular biology, programming, data visualisation, networks, and applied and advanced immunology.

Core Modules

- Genomics at Scale
- Genomics Techniques I
- Genomics Research Methods
- Pathogen Genomic Epidemiology & Surveillance
- Genomics Project

Optional Modules

- Introduction to Molecular & Cellular Biology
- Graduate Course in Basic & Advanced Immunology
- Medical Genomics I: Genomics of Common & Rare Diseases
- Medical Genomics II
- Genomics Data Analysis I
- Genomics Data Analysis II
- Genomics Professional Experience
- Mathematical Molecular Biology II
- Introduction to Bioinformatics
- Probabilistic Models for Molecular Biology
- Statistics for Health Science Data
- Statistical Computing for Biomedical Data
- Introduction to Bayesian Modelling
- Machine Learning & Deep Learning for Genomics
- Introduction to Programming
- Networks
- Data visualization
- Web and Network Science

Eamon McAndrew,
MSc Biomedical Genomics 2019–20

"I graduated with a degree in industrial biochemistry, so my background was mostly lab-based, with a focus on the development and manufacture of biopharmaceuticals. I became interested in this degree after learning about the enormous potential of precision medicine to revolutionise many areas of healthcare and I wanted to develop the skills needed to be a part of that transformation.

The short course format at the beginning of the MSc is a very effective style of teaching; it brings everyone up to a standard level of knowledge in the underlying biology and the ability to read and write code, while also establishing an understanding of the mathematics underpinning many of the methods used in the field of genomics. With limited knowledge of computer science and mathematics, I found it challenging but the small course size was invaluable because help was always on hand from my peers and tutors, allowing for instant feedback and discussion, which I found excellent for developing and reinforcing an in-depth understanding of the concepts I had not encountered before.

The skills developed in this course are not only applicable to the field of genomics but also to any profession with big data science at its core. As the demand for many of the skills taught in this course are only projected to grow, I would recommend this course to individuals interested in a career transition and to those wishing to develop skills to maximize employability in the long term."

www.universityofgalway.ie/courses/taught-postgraduate-courses/biomedical-genomics.html

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