



NUI Galway
Oċ Gaillimh

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 sequences, while 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 results based on a strong understanding of biological and clinical context. Graduates of this programme will gain 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.

Contact information / Enquiries to:

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Biomedical Genomics (MSc)

Course level: Level 9

Duration: 1 year

Entry Requirements:

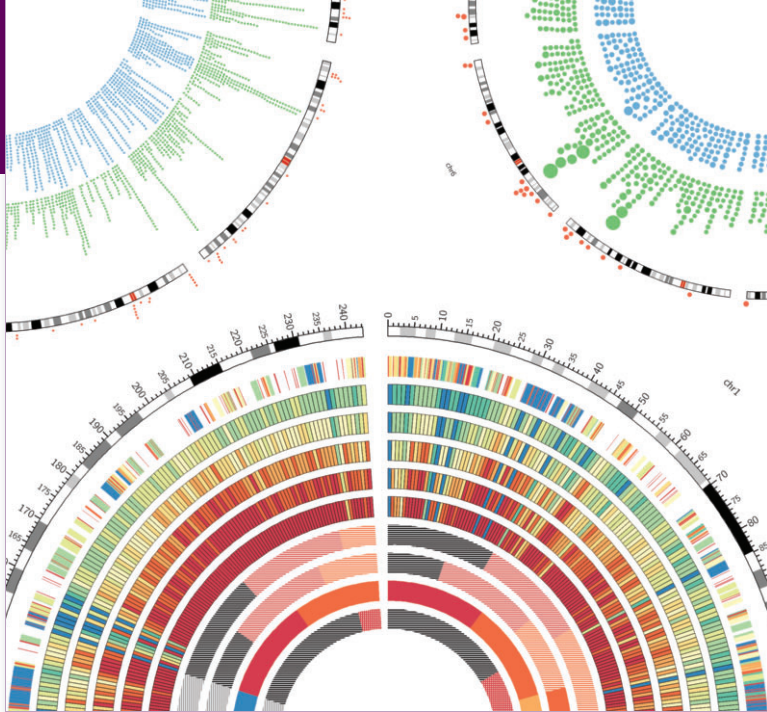
Applicants must have achieved a First or strong Second Class Honours degree in a cognate discipline. Qualifying degrees include, but are not limited to: biochemistry, genetics, biomedical science, and biotechnology.

Fees: See nuigalway.ie/fees for more information.

Applying: Applications are made through the NUIG postgraduate portal, see nuigalway.ie/apply

Course Code: BMG1

Closing date: Places will be allocated on a rolling basis and candidates are advised to apply as early as possible.



Why study this programme?

Rapid advances in the technologies used to sequence DNA and RNA have led to an increase in the breadth of application of sequencing-based genomics technologies, from fundamental scientific discovery in the life sciences to clinical applications in precision medicine. Graduates of this programme will be highly skilled in scientific principles and technologies, and will develop the quantitative and computational skills to analyse large data sets generated using the latest genomics techniques.

Career Opportunities

This is a new and 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 in the generation and analysis of genomics data. As advances in precision medicine take hold, it is anticipated that the need for genomic scientists in healthcare, the pharmaceutical industry and in academic research will continue to grow, generating opportunities for employment in each of these areas. The data analysis skills learned will also allow graduates to transition to data scientist roles outside of genomics.

Programme Outline

The course comprises 90 credits; 60 credits will be obtained from taught modules and 30 from an individual genomics research project. Students will undertake foundational modules in statistical computing, probability for genomics and programming for biology, as well as newly-developed specialist modules in genomics techniques, medical genomics (focusing on population and cancer genomics), and genomics research methods. Students will also choose from a number of optional modules covering topics such as bioinformatics, data visualisation, network science, and applied and advanced immunology.

Core Modules

- Statistical Computing in R
- Introductory Probability for Genomics
- Programming for Biology
- Genomics Techniques
- Genomics Research Methods
- Medical genomics I: Genomics of Common Diseases
- Medical genomics II: The Cancer Genome
- Genomics Data Analysis I: Fundamentals of Genomics Data
- Genomics Data Analysis II: NGS Applications

Optional Modules

- Data Visualization
- Mathematical Molecular Biology
- Probabilistic Models for Molecular Biology
- Bioinformatics
- Web and Network Science

Eamon McAndrew, MSc Biomedical Genomics 2019–20



“My undergraduate degree was in industrial biochemistry, so my background was mostly laboratory-based with a focus on the development of and manufacture of biopharmaceuticals. I became interested in this MSc after learning about the enormous potential of precision medicine to revolutionise many areas of healthcare, and I wanted to develop the skills necessary 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 intuitive understanding of the mathematics underpinning many of the methods used in the field of genomics. With limited knowledge of computer science and mathematics, I did find it challenging, but the small course size was invaluable as help was always on hand from my peers or my tutors, allowing for instant feedback and discussion, which I found excellent for developing and reinforcing an in-depth understanding of the concepts I hadn’t encountered before.

The skills developed in this course are not only applicable to the field of genomics but really to any profession with 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 maximise employability in the long term.”

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

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