



NUI Galway
OĒ 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.

With backgrounds ranging from the molecular life sciences to mathematics, statistics, physics and computer science, graduates of this programme will gain a shared set of core skills in genomics techniques and analysis as well as practical experience of applying these skills to biological samples and data.

Contact information / Enquiries to:

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Biomedical Genomics (MSc)

Course level: Level 9

Duration: 1 year

Entry Requirements:

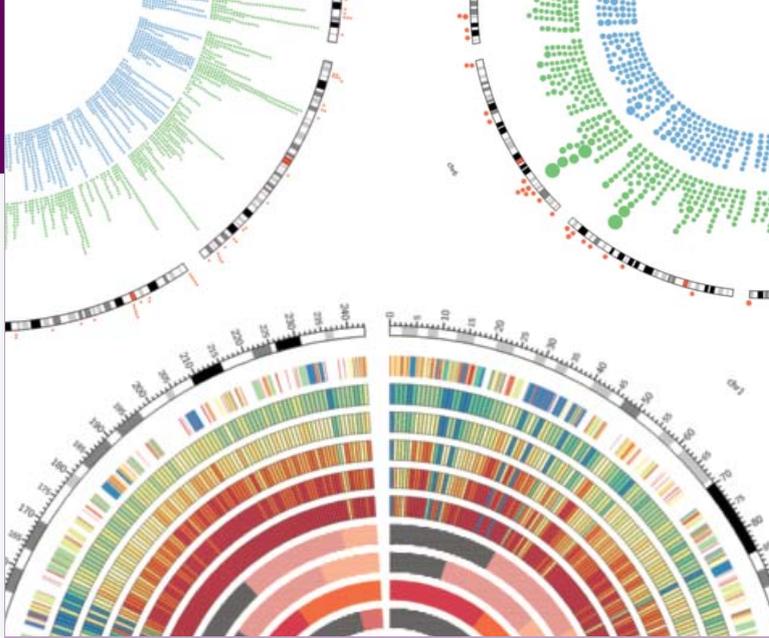
Applicants must have achieved a second class honours degree or better in a discipline relating to one of two entry streams for the programme – i.e. in the molecular life sciences or quantitative/computational science. Qualifying degrees include, but are not limited to, biochemistry, genetics, biomedical science, biotechnology, mathematics, statistics and computer science.

Fees: €6,815 (EU) €13,750 (non-EU)

Applying: www.pac.ie/nuigalway

PAC code: GYS31

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



Why study this programme?

This course will provide postgraduate training in genomics relevant to medicine. 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, with applications ranging from fundamental scientific discovery in the life sciences to clinical applications in precision medicine. All of these require a new generation of highly trained scientists with an understanding of the underlying scientific principles and technologies, together with the quantitative and computational skills to analyze large data sets generated using the latest genomics techniques.

Employment & 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. Graduates can seek employment in the new area of precision medicine and will be very well placed to take advantage of further developments in the application of genomics technologies to health and in biotechnological research in industry.

Programme Outline

The course comprises 90 credits; 60 credits will be obtained from taught modules and 30 from an individual research project. Students with a life sciences background will undertake foundation modules in computer programming and quantitative techniques. Students with a background in the quantitative or computational sciences will undertake training in molecular biology. All students will take a shared set of specialist modules including advanced techniques for genomics data analysis as well as specialist modules on medical applications of genomics. An advantage of the programme is that students from different backgrounds bring complementary perspectives to shared specialist modules.

Core modules

- Introduction to programming for biology (biological stream)
- Overview of molecular biology/genetics concepts (quantitative stream)
- Introduction to statistical computing in R
- Algorithms for molecular biology
- Medical genomics I: genomics of rare and common diseases
- Medical genomics II: the cancer genome
- Genomics techniques I: sequencing library preparation
- Genomics techniques II: genomics data analysis

Optional modules include

- Scientific visualization
- Probabilistic models for molecular biology
- Molecular and cell biology of cancer
- Advanced and applied immunology
- Stochastic processes
- Machine learning
- Applied statistics
- Advanced probability with applications
- Linear modeling
- Bayesian Modeling

John Greally, NUI Galway graduate and Director of the Einstein College of Medicine Center for Epigenomics



“My work incorporates both clinical care of patients and research within a genomics laboratory - this means that on a daily basis I can see how contributions from genomics scientists in areas such as the discovery of new drugs and diagnosis of rare genetic diseases are transforming the field of medicine. I am really excited by this programme because it provides the unique combination of molecular and analytical skills that are critical in order to take advantage of the current wave of innovation in genomics-based technologies. There have always been strong links between genomics in Galway and my lab in New York, and by continuing to take advantage of developments on both sides of the Atlantic, I can see NUI Galway establishing itself in the next few years as a major centre for biomedical genomics training and research in Europe.”

bioinf.nuigalway.ie

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