



# Maynooth University Ollscoil Má Nuad

## Department of Electronic Engineering

### PhD in the application of spectroscopy to cancer cells Duration 4 Years

#### The University

Formally established as an autonomous university in 1997, but tracing its origins to the foundation of the Royal College of St. Patrick in 1795, the National University of Ireland, Maynooth (Maynooth University) draws on a heritage of over 200 years' commitment to education and scholarship. The last two decades have seen the University grow rapidly in scale, strength and stature. Maynooth University is today a university of international standing, renowned for the quality and value of its research and scholarship, for its dedication to excellent teaching, for providing an outstanding learning experience for its 10,000 students, and as a uniquely collegial environment in which to pursue scholarly work.

Maynooth University is embarking upon a new and exciting phase of its development under the *University Strategic Plan 2012-17* with a vision to consolidate the international reputation of Maynooth University "as a university known for outstanding teaching, excellent research, a global outlook, effective engagement with the society we serve, and our distinctive approach to the challenges facing modern higher education."

The *University Strategic Plan 2012-17* sets seven strategic goals for the university:

- to offer students an outstanding university education, the best available in Ireland, an education which challenges and supports all students to achieve their full potential, and prepares students for life, work and citizenship, and for complexity, diversity and change;
- to be recognised by 2017 as playing a leading international role and being the clear national leader in a number of thematic areas of research that address the major societal challenges of the 21st century;
- to achieve a step change in our international activities, doubling the number of international students on campus and doubling the number of domestic students spending time abroad, in order to create a truly intercultural and multilingual institution;
- to strengthen our engagement with all stakeholders through sustained partnerships with enterprises, communities, civil society and public bodies, to build support for the mission of the university, to serve the needs of society, and to open new opportunities for research and learning;
- to maximise our unique and distinctive contribution to the national system of higher education through a set of purposeful and sustained strategic partnerships at regional and national level, and to extend our international reach through a network of global partnerships;

- to be an excellent place to work, known for a collegial ethos which empowers all staff to contribute fully to the development of the university;
- to enable the achievement of ambitious strategic objectives in challenging circumstances through careful planning, excellent services and infrastructure, and sound governance and management.

The University has distinctive institutional strengths in six thematic priority areas:

- People, Place and Environment;
- Social and Economic Transformations;
- Human Health;
- Mathematics, Communications and Computation;
- Humanities in Practice; Sources, Resources & Discourses;
- Human Cultures, Experience & Creativity.

The University has 27 academic departments which are organised into three Faculties: Arts, Celtic Studies and Philosophy; Science and Engineering; and Social Sciences. The University is also home to a number of multi- and trans-disciplinary research institutes, including the Hamilton Institute, the National Centre for Geocomputation, the National Institute for Regional and Spatial Analysis, and Institute of Immunology.

In a pioneering recent development, Maynooth University, Dublin City University and the Royal College of Surgeons in Ireland have established the 3U Partnership, a new strategic association that brings together the distinctive and complementary strengths of the three institutions.

## **Faculty and Research Institutes**

The Faculty of Science and Engineering comprises the departments of Biology, Chemistry, Computer Science, Electronic Engineering, Experimental Physics, Mathematical Physics, Mathematics and Statistics, and Psychology. The role of the Faculty is to co-ordinate the academic activities of individual departments, to oversee the strategic development of departments and to support interdepartmental programmes. The University has also developed a number of interdisciplinary institutes to support excellent research and to build research capacity across disciplines.

## **Department of Electronic Engineering**

The Department of Electronic Engineering was established by the University in the summer of 1999, as part of the University's response to the increasing need in the Irish and international economies for high-calibre engineering graduates and industrially relevant research output. The Department's priority has been to establish first-rate teaching and research activities, while continuing to innovate in programme offerings, programme structure and delivery methods in support of the remit of industrial relevance.

The Department currently offers undergraduate BE degrees in Electronic Engineering, Electronic Engineering with Communications and Electronic Engineering with Computers. We also offer ME degrees in Electronic Engineering and Renewable Energy Systems, which is available for study full-time or part-time, on-campus or by distance over the internet.

The Department of Electronic Engineering has a vibrant research activity with approximately 30 PhD students working in the areas of electronic systems, wireless communication, biomedical engineering, Dynamical Systems, Distributed Interactive Systems, and Ocean Energy. The Department continues to be very successful in attracting research funding from national and international agencies as well as from industrial partners.

The Department currently comprises 8 academic staff, 2 technical staff and two administrators. It is based in a pleasant, modern building on the North Campus.

Further information on the Department of Electronic Engineering is available at <https://www.maynoothuniversity.ie/electronic-engineering>

## The Project

This is a multidisciplinary project involving researchers from the Department of Biology, the Department of Mathematics and Statistics and the Department of Electronic Engineering in NUIM as well as clinicians from Waterford University Hospital. The project involves elements of optical engineering, biology, statistics and clinical medicine.

Light is playing an increasing role in medicine and recent advances in optical spectroscopy offer the possibility to detect cancer cells earlier, thereby improving patient outcome. The present project sits at the interface between opto-electronics, Raman micro-spectroscopy (RMS), 3D microscopy, and medicine and aims at combining the latest advances of each field in order to develop and validate a novel and less invasive diagnostic tool for the early detection of bladder and prostate cancer, as well as other related diseases. The candidate will benefit from a multidisciplinary environment offered by the hosting groups, strengthened by a close collaboration with a local hospital. The team includes experts on multivariate statistics, opto-electronics, biology, and medicine.

## The Role

The student will play an important role in;

- the design and construction of laser based optical systems for Raman micro spectroscopy and digital holographic microscopy as well as holographic optical tweezers.
- the growth and preparation of adherent cell lines.
- the clinical processing of samples for microscopy.
- statistical analysis of spectra with a focus on multivariate statistical classification.

The ideal student will have

- A degree in the physical sciences; e.g. physics, chemical engineering, electrical/electronic engineering or a related discipline.
- A background in statistics or biotechnology would also be advantageous though not necessary.
- The student should be strong in mathematics as well as theoretical analysis and practical experimentation.
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## Stipend/Fees

Stipend of €18,000 per annum, and fees of €5,500 per annum are provided.

Note: Non-EU citizens will be required to pay an additional €5000 for fees

## Application Procedure

Please forward your applications to [bryanh@cs.nuim.ie](mailto:bryanh@cs.nuim.ie)

Please note applications should be made by sending the following information as **ONE single attachment** (either in PDF or word format) incorporating all of the below required information:

- A Curriculum Vitae, including all qualifications and experience, and a covering letter addressing your interest and suitability for the role;
- The names, email addresses, correspondence addresses and telephone numbers of three referees whom the University may contact.

Closing date and time for application: 12 noon Friday 23<sup>rd</sup> Sept.

The starting date for the PhD is the 1<sup>st</sup> Nov 2016.

**The position is subject to the Statutes of the University**