

**Fully Funded Research Masters Student Position in the Area of  
Deep Learning for Biomedical Applications  
Department of Electronic Engineering  
Maynooth University, Ireland**

The Department of superposition Electronic Engineering at Maynooth University is pleased to announce that 1 Research Masters studentship is available with the start date of mid 2022 in the area of **machine learning for biomedical applications**.

<b>Open position</b>	1 Research Masters Studentship in Deep Learning/Machine Learning for Biomedical Applications
<b>Location</b>	Department of Electronic Engineering, Maynooth University
<b>Duration</b>	2 Years
<b>Funding / Stipend</b>	The position is funded for 2 years, including a monthly stipend and a travel budget to present at international conferences, workshops and seminars. The studentship will cover fees and a stipend of € 18,500 per annum.
<b>Contact</b>	Dr Bryan Hennelly ( <a href="mailto:bryan.hennelly@mu.ie">bryan.hennelly@mu.ie</a> )
<b>Closing Date</b>	March 31 <sup>st</sup> 2022

### **General Research Theme of the Research Masters Project**

Flow cytometry is a cornerstone in clinical diagnostics, and a powerful discovery tool in biotechnology. Clinical applications include phenotyping, immune-oncology, immune-deficiency disease and organ transplant. The pharmaceutical industry uses flow cytometry for drug discovery and invitro toxicity testing. All these applications require a fluorophore that selectively binds to an antibody unique to the target cell that must be tailored to each application. This project aims to overcome this limitation by replacing the fluorescence module with a laser system that can classify cells based on subtle differences in their biochemical composition, potentially opening up new application areas in medicine and research. This Research Masters Project

### **Research Masters Studentship**

The position is funded for 2 years, including a monthly stipend and a travel budget to present the research outputs at international conferences, workshops and seminars. The studentship will cover fees and a stipend of € 18,500 per annum. The successful candidate will be enrolled on the Research Masters programme in the Department of Electronic Engineering at Maynooth University. The successful candidate will write their thesis on topics related to **Machine Learning for Label-free Flow Cytometry and Sorting**, supervised by Dr Bryan Hennelly for the entire duration of their programme.

The successful candidate will be an integral part of the overall research programme that Dr Hennelly is leading around the topic of biomedical microscopy and spectroscopy. The successful candidate will be prepared to work with Dr Hennelly's network of collaborators who are among the leading scholars working on state of the art technologies in biology, imaging, spectroscopy, and mathematics.

The student will be involved in developing high speed algorithm that can identify patterns in the information that is collected from cells as they are probed with a laser, flowing through a channel at high rates. These algorithms will include the use of deep learning to clean the data and to classify the cells for downstream microfluidics sorting. All laser optics, and microfluidics, will be managed by two postdoctoral researchers who will both work with the student on the development of their algorithms. It is likely a high-speed streamlined implementation of the algorithms will be developed, in which Andor's GPU express library will be used to stream the recorded spectra directly to a high-performance Graphical Processing Unit (GPU) card without needing to be passed to the CPU memory.

### **Duties and Responsibilities**

1. Undertake postgraduate research in the area of agreed research project.
2. Work closely with the academic supervisor to ensure that the progress of the individual project is in line with the objectives of Dr Hennelly's research programme.
3. Work effectively within a multidisciplinary environment that includes, physicists, engineers, biologists and mathematicians.
4. Attend and participate in all training events and supervisory meetings.
5. Prepare progress reports.
6. Present and publish research outputs to both academic and non-academic audiences.
7. Attend and participate in academic and non-academic conferences, events and seminars.
8. Contribute to teaching/training of undergraduate and postgraduate project students working with Dr. Hennelly's group.

As the description of the duties and responsibilities cannot be exhaustive, it is worth mentioning that the student may be required to undertake other duties that are broadly in line with the objectives of their research projects.

### **Qualifications, Expected Skills and Competencies**

1. Applicants must hold at least a first or upper second-class honours Bachelor's or Master's degree in Engineering, Computer Science, or a related discipline.
2. Strong mathematical, analytical and programming skills.
3. An aptitude for experimental work with GPUs and machine learning.
4. Any experience in PCA/LDA or similar multivariate statistical classification tools would be beneficial but not essential.
5. Highly proficient English language skills.
6. Excellent written and verbal communication, including presentation skills.
7. Excellent organisational skills, attention to detail and the ability to meet deadlines.
8. Ability to think logically, create solutions and make informed decisions.
9. Willingness to work collaboratively in a research environment.
10. A strong commitment to their own continuous professional development.

## **Application Process / Additional Information**

Applications must be sent by e-mail to Dr Bryan Hennelly ([bryan.hennelly@mu.ie](mailto:bryan.hennelly@mu.ie)). Early applications are strongly encouraged.

Applications should include:

1. A cover letter explaining the applicant's motivation and interest in the project topic. Any relevant background and/or experience needs to be mentioned.
2. A Curriculum Vitae that includes the applicant's educational qualifications and any scientific publications and achievements.
3. Academic transcripts.
4. Two academic references.

Informal enquiries concerning the advertised position, accompanied with the CV and a motivation letter, can be made to Dr Bryan Hennelly ([bryan.hennelly@mu.ie](mailto:bryan.hennelly@mu.ie)).

Applications will close at 5pm (GMT) March 31<sup>st</sup> **2022**. The received applications will be analysed after the application deadline, and the shortlisted candidates will be invited to a Skype interview.