Post Specification

Post Title:	Two PhD Studentships in Deep Neural Networks for Medical Imaging
Post Status:	Fixed-term Contract or Specific Purpose Contract – Full-time or Part-time.
Research Group / Department / School:	Cusack Lab, Trinity College Institute of Neuroscience, Trinity College Dublin, the University of Dublin
Location:	Trinity College Dublin, the University of Dublin College Green, Dublin 2, Ireland
Reports to:	Prof. Rhodri Cusack
Terms & Conditions:	Annual Stipend of €22,000, EU Fees and conference travel for four years
Hours of Work:	Full-time
Closing Date:	Shortlisting will begin on 22 April 2024 and will continue until a suitable candidate is found

NOTE: Applicants must have been resident in an EU member state for 3 out of the last 5 years to be eligible for EU fees

Post Summary

Brain development in infants and its disruption by preterm birth or perinatal injury, can be measured with functional MRI (fMRI). Unfortunately, infants move in the scanner and half the images are discarded, precluding clinical application. In recent years, deep neural networks (DNNs) have led to breakthroughs in artificial intelligence and are finding growing application in biomedical imaging. DNNs have considerable potential to correct head motion in fMRI, as they can learn complex mappings, and exploit knowledge of brain structure. The PhD Candidates will develop DNNs to motion correct fMRI data.

Standard Duties and Responsibilities of the Post

- training deep neural networks to motion correct corrupted neuroimaging data
- evaluating performance of training regimes and network architectures with respect to a baseline of current motion correction methods
- develop novel motion correction algorithms that will be of value to the infant neuroimaging community and neuroimaging more broadly
- writing and submitting manuscripts to present the developed algorithms
- presenting your work at national and international seminars and meetings
- contributing to the growth of the methodological and intellectual expertise of the team

Funding Information

This position is fully funded by the SFI Award 22/FFP-A/11050

Person Specification

Qualifications

- a strong undergraduate degree or Masters in physics, engineering, neuroscience, computer science, or a relevant field (e.g., First or Upper Second for Irish or UK applicants; GPA 3.3+ for US applicants)
- For non-native English speakers, IELTS 6.5 or higher (or equivalent, see admissions)

Knowledge & Experience

- Candidates must have experience in at least one of the two following areas and must be willing to develop skills in the other:
  - design and optimisation of deep neural networks
  - neuroimaging with fMRI
- Candidates must have a strong level of expertise in programming in python or another language

Skills & Competencies

- strong critical thinking and good judgement
- excellent organisation and time management
- the ability to find, read, critique and synthesize complex bodies of literature

- the ability to generate strong scientific hypotheses and to design experiments to test them
- the ability to work thoroughly through tasks until they are completed, even if they turn out to be more difficult than you first expect
- the ability to write clearly and concisely
- enthusiasm and aptitude to acquire expertise in diverse areas of the project
- enthusiasm and aptitude to share expertise with other team members
- enthusiasm for communication with a broader audience
- a desire to develop your transversal and cross-sectoral skills

Application Procedure

Applicants should submit the following documentation to admin@cusacklab.org with the subject line "DNN for MRI PHD 2024":

- a cover letter addressing why this project interests you and what you will bring to it
- a full curriculum vitae
- the names and email addresses of two referees
- your undergraduate grades/transcripts (unofficial fine at this stage)
- a sample of academic writing (such as a papers, preprints or university assignment)
- a link to any relevant code repositories demonstrating your aptitude for this project (if applicable)
- links to any other supporting media, preprints, articles in the media, or blogs

Excellent candidates from outside of the EU will also be considered.

Selection will begin in April 2024.

If you have any query please contact:

Tamrin Holloway

admin@cusacklab.org

Further Information for Applicants

Lab website	www.cusacklab.org
Trinity College Institute of Neuroscience	www.tcd.ie/neuroscience
URL Link to Area	www.tcd.ie
URL Link to Human Resources	https://www.tcd.ie/hr/

Trinity College Dublin, the University of Dublin

Trinity is Ireland's leading university and is ranked 81 in the world (QS World University Rankings 2024). Founded in 1592, the University is steeped in history with a reputation for excellence in education, research and innovation.

Located on an iconic campus in the heart of Dublin's city centre, Trinity has 18,000 undergraduate and postgraduate students across our three faculties – Arts, Humanities, and Social Sciences; Engineering, Mathematics and Science; and Health Sciences.

Trinity is ranked as the 16th most international university in the world (Times Higher Education Rankings 2020) and has students and staff from over 120 countries.

The pursuit of excellence through research and scholarship is at the heart of a Trinity education, and our researchers have an outstanding publication record and strong record of grant success. Trinity has developed 19 broad-based multidisciplinary research themes that cut across disciplines and facilitate world-leading research and collaboration within the University and with colleagues around the world. Trinity is also home to 5 leading flagship research institutes:
- Trinity Biomedical Sciences Institute (TBSI)
- Trinity College Institute of Neuroscience (TCIN)
- Trinity Translational Medical Institute (TTMI)
- Trinity Long Room Hub Arts and Humanities Research Institute (TLRH)
- Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN)

Trinity is the top-ranked European university for producing entrepreneurs for the past five successive years and Europe's only representative in the world's top-50 universities (Pitchbook Universities Report).

Trinity is home to the famous Old Library and to the historic Book of Kells as well as other internationally significant holdings in manuscripts, maps and early printed material. The Trinity Library is a legal deposit library, granting the University the right to claim a copy of

every book published in Ireland and the UK. At present, the Library's holdings span approximately 6.5 million printed items, 400,000 e-books and 150,000 e-journals.

With over 120,000 alumni, Trinity's tradition of independent intellectual inquiry has produced some of the world's finest, most original minds including the writers Oscar Wilde and Samuel Beckett (Nobel laureates), the mathematician William Rowan Hamilton and the physicist Ernest Walton (Nobel laureate), the political thinker Edmund Burke, and the former President of Ireland Mary Robinson. This tradition finds expression today in a campus culture of scholarship, innovation, creativity, entrepreneurship and dedication to societal reform.

Rankings

Trinity is the top ranked university in Ireland and ranked 81 in the world (QS World University Rankings 2024). Trinity ranks in the top 50 in the world in 3 subjects and in the top 100 in 21 subjects (QS World University Rankings by Subject 2019). Full details are available at: www.tcd.ie/research/about/rankings.

The Selection Process in Trinity

The Selection Committee (Interview Panel) may include members of the Academic and Administrative community together with External Assessor(s) who are expert in the area. Applications will be acknowledged by email. If you do not receive confirmation of receipt within 1 day of submitting your application online, please contact the named Recruitment Partner on the job specification immediately and prior to the closing date/time.

Given the degree of co-ordination and planning to have a Selection Committee available on the specified date, the University regrets that it may not be in a position to offer alternate selection dates. Where candidates are unavailable, reserves may be drawn from a shortlist. Outcomes of interviews are notified in writing to candidates and are issued no later than 5 working days following the selection day.

In some instances the Selection Committee may avail of telephone or video conferencing. The University's selection methods may consist of any or all of the following: Interviews, Presentations, Psychometric Testing, References and Situational Exercises.

It is the policy of the University to conduct pre-employment medical screening/full pre-employment medicals. Information supplied by candidates in their application (Cover Letter and CV) will be used to shortlist for interview.

Applications from non-EEA citizens are welcomed. However, eligibility is determined by the Department of Business, Enterprise and Innovation and further information on the Highly Skills Eligible Occupations List is set out in Schedule 3 of the Regulations https://dbei.gov.ie/en/What-We-Do/Workplace-and-Skills/Employment-Permits/Employment-Permit-Eligibility/Highly-Skilled-Eligible-Occupations-List/ and the Ineligible Categories of Employment are set out in Schedule 4 of the Regulations https://dbei.gov.ie/en/What-We-Do/Workplace-and-Skills/Employment-Permits/Employment-Permit-Eligibility/Ineligible-Categories-of-Employment/ . Non-EEA candidates should note that the onus is on them to secure a visa to travel to Ireland prior to interview. Non-EEA candidates should also be aware that even if successful at interview, an appointment to the post is contingent on the securing of an employment permit.