

Post Title: PhD Studentship in Machine Learning and Neurolinguistics

Location: Trinity College Dublin

Anticipated Start Date: September 2021

Stipend: €18,500 per annum (non taxed) plus university fees

Closing Date: 10 August 2021

Apply: <https://forms.gle/tLxZeGvXvKrx21iQ7>

Why ADAPT?

- **Contribute** to the ADAPT research agenda that pioneers and combines research in AI driven technologies: Natural Language Processing, Video/Text/Image/Speech processing, digital engagement & HCI, semantic modeling, personalisation, privacy & data governance.
- **Work** with our interdisciplinary team of leading experts from the complementary fields of, Social Sciences, Communications, Commerce/Fintech, Ethics, Law, Health, Environment and Sustainability.
- **Leverage our success.** ADAPT's researchers have signed 43 collaborative research projects, 52 licence agreements and oversee 16 active commercialisation funds and 52 commercialisation awards. ADAPT has won 40 competitive EU research projects and obtained €18.5 million in non-exchequer non-commercial funding. Additionally, six spinout companies have been formed. ADAPT's researchers have produced over 1,500 journal and conference publications and nearly 100 PhD students have been trained.

As an ADAPT funded PhD researcher you will have access to a network of 85 global experts and over 250 staff as well as a wide multi-disciplinary ecosystem across 8 leading Irish universities. We can influence and inform your work, share our networks and collaborate with you to increase your impact, and accelerate your career opportunities. Specifically we offer:

1. Opportunity to build your profile at international conferences and global events.
2. A solid career pathway through formalised training & development, expert one-on-one supervision and exposure to top specialists.
3. A Fully funded, 4 year PhD postgraduate studentship which includes a stipend of (€18,500 per annum - non taxed), along with equipment, annual travel funding
4. Funding for annual student fees

Context

The ability to process large datasets has allowed for the rapid advance of speech and natural language processing technologies. Despite a series of recent breakthroughs and success in performing specialised tasks, the field of AI has yet to produce algorithms that can truly understand language as humans do. One solution is to study the most sophisticated "device" that we know of: The human brain.

The present project aims to better understand how our brains transform speech sounds into

meaning by studying the brain encoding of speech with machine learning methodologies. The results of this project are expected to have a strong impact across disciplines. The findings on speech processing will contribute to the area of neurolinguistics advancing our understanding of speech processing in health, development, and disease, potentially leading to novel tools for early diagnosis of language-related deficits. Indeed, the novel computer science methodologies for neural data analysis developed during this project will impact the field of cognitive science at large. Finally, the findings may also translate into innovative AI solutions for speech and language communication.

Upon completion of the work, the successful candidate will be an expert in neural data science, speech and language processing, and neurolinguistics. As such, they will be in the position to use AI methodologies to answer cognitive science questions and, vice versa, to use knowledge from neurolinguistics to advance AI solutions. They will be competitive candidates for both academic and industry research positions as well as for high-profile data science roles. Their new expertise in analysing challenging neural data will put them in a position to work in areas involving data with similar complexity, as well as to work in areas such as neural-engineering.

The student will be supervised by Prof Giovanni Di Liberto (TCD; lab website: diliberg.net). The successful candidate will also have the opportunity to interact with experts from different relevant disciplines across the ADAPT institutions and the Trinity Centre Institute of Neuroscience.

Minimum qualifications:

- *First class honours undergraduate degree in Computer Science, Electronic/Computer Engineering or similar discipline*
- *Skills: programming, signal processing and/or machine learning*

Preferred qualifications:

- *MSc in Computer Science, Electronic/Computer Engineering, Cognitive Science or similar discipline*
- *Skills: neural data recording and analysis, speech processing, NLP, linguistics*

Application Process

Each application should only consist of

1. Detailed curriculum vitae, including – if applicable – relevant publications;
2. Transcripts of degrees,
3. The name and email contacts of two academic referees,
4. A cover letter/letter of introduction (max 800 words). In the letter, applicants should include the following details:
 - a. An explanation of your interest in the research to be conducted and why you believe they are suitable for the position. Please mention if you have particular relevant research questions that you would like to pursue.
 - b. Details of your final year undergraduate project (if applicable)
 - c. Details of your MSc project (if applicable)
 - d. Details of any relevant modules previously taken, at undergraduate and/or Master level.
 - e. Details of any relevant work experience (if applicable).

Diversity

ADAPT is committed to achieving better diversity and gender representation at all levels of the organisation, across leadership, academic, operations, research staff and studentship levels. ADAPT is committed to the continued development of employment policies, procedures and practices that promote gender equality. On that basis we encourage and welcome talented people from all backgrounds to join ADAPT.

About the ADAPT Centre

ADAPT is the world-leading SFI research centre for AI Driven Digital Content Technology hosted by Trinity College Dublin. ADAPT's partner institutions include Dublin City University, University College Dublin, Technological University Dublin, Maynooth University, Munster Technological University, Athlone Institute of Technology, and the National University of Ireland Galway. ADAPT's research vision is to pioneer new forms of proactive, scalable, and integrated AI-driven Digital Content Technology that empower individuals and society to engage in digital experiences with control, inclusion, and accountability with the long term goal of a balanced digital society by 2030. ADAPT is pioneering new Human Centric AI techniques and technologies including personalisation, natural language processing, data analytics, intelligent machine translation, human-computer interaction, as well as setting the standards for data governance, privacy and ethics for digital content.

Our Research Vision

Governments and civil society are starting to recognise the need for urgent and concerted action to address the societal impact of the accelerating pace of digital content technologies and the AI techniques that underpin them. ADAPT provides an ambitious, ground-breaking, integrated research programme that assembles three interlocking Strands that together are capable of addressing this challenge. Each of these complementary and reinforcing research Strands takes one of the different perspectives on the provision of personalised, immersive, multimodal digital engagement, i.e. the individual's experience and control of the engagement, the algorithms underlying digital content processing, and the balanced governance by enterprise and societal stakeholders.

Digitally Enhanced Engagement Strand

From the individual perspective, research within this Strand will deliver proactive agency techniques that sense, understand and proactively serve the needs of individual users to deliver relevant, contextualised and immersive multimodal experiences which also offer them meaningful control over the machine agency delivering those experiences.

Digital Content Transformation Strand

From the algorithmic perspective, new machine learning techniques will both enable more users to engage meaningfully with the increasing volumes of content globally in a more measurably effective manner, while ensuring the widest linguistic and cultural inclusion. It will enhance effective, robust integrated machine learning algorithms needed to provide multimodal content experiences with new levels of accuracy, multilingualism and explainability.

Transparent Digital Governance Strand

From the enterprise and societal perspective, new structured knowledge frameworks and associated practices for AI data governance will be required to balance the needs and values of individuals, organisations and society when it comes to rich digital experiences. This requires the advancement of research in the areas of data ethics, data quality, data protection, data value, data integration, and multi-stakeholder governance models.