Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Job Description

Reference ID:	TCDCS_RF02
Job Title:	AI Research Associate
School/Department:	ADAPT SFI Centre, School of Computer Science and Statistics
Principal Investigator:	Prof Vincent Wade
Duration:	1.5 years, starting Sept 2024 (can be flexible)
Salary	Gross Salary starts at Research Associate Scale. Annual increments apply on SFI Pay Scale.

The Wider Research Project

This AI Research is required to contribute to a new commercialisation project called Amethystcare led by Prof. Vincent Wade. The project is focused on the research and development of an Generative AI (LLM based) Conversational Agent capable of providing interactions and a level of companionship for older people living at home. The user interactions will include conversational engagement with older people regarding medicine adherence, loneliness and depression detection and cognitive decline & progress tracking. The AI researcher will develop neural architectures for multimodal (speech based) conversational agent. The will involve cutting edge technique in Generative AI. More specifically it will involve fine tuning selected foundational LLMs with exemplar input/output examples and prompt engineering to develop a configurable bank of prompts that can be personalised to the requirement of each individual user.

This work will be interdisciplinary in nature, requiring consideration of theories around conversation not only from a LLM agent technology perspective, but also incorporating knowledge from established theories in the fields of psychology, social theory and appropriate health science. The research will be part of a multidisciplinary team involving healthcare professional, full staff developer, business and research experts.

Context

The position will be based in the ADAPT SFI Research Centre, hosted in the School of Computer Science & Statistics, Trinity College Dublin. ADAPT is the world-leading SFI Research Centre for AI-Driven Digital Content Technology, and brings leading academics, researchers and industry partners together to deliver excellent science, engage the public, develop novel solutions for business across all sectors and enhance Ireland's international reputation. The ADAPT Centre is hosted and coordinated in the School of Computer Science and Statistics, TCD.

The School of Computer Science and Statistics is ranked #1 in Ireland (QS Rankings) and is a proud recipient of a Bronze Athena Swan award, attained in 2021. As part of the School's on-going actions in relation to equality, diversity and inclusion it welcomes all applications that meet the criteria below and particularly those from under-represented groups. The School offers a collegiate and supportive environment to all its staff and works to ensure that all its staff and students can perform at their best while putting in those steps that facilitate a healthy work/life balance

Main Responsibilities

Research

As part of the overall project, this AI Researcher will work on the following tasks:

- Development of Framework for fine tuning and enhancing (personalising) LLM based conversational agent. The selection techniques to provide the personalisation will be consider fine tuning existing foundational LLMs, RAG, Prompt Engineering as well as more recent approaches to LLM adaptation
- Development of a working prototypes to test out Gen AI conversational affordances based on use cases involving:
    - medicine adherence, loneliness and depression detection and cognitive decline & progress tracking
    - Casual conversation concerning topics of the day (news items)

- Report to Lead PI and Commercial Lead and collaborate closely with the multidisciplinary team.

Administrative

As a Research within a larger Research Group in ADAPT, the person will occasionally be required to engage in administrative tasks in support of the PI/Projects overall activity. This may include drafting sections of reports for funding bodies; organising a programme of suitably themed group meetings and seminars; contributing to research funding proposals; drafting of ethics applications; and other such tasks as they arise.

Person Requirements

The AI Research will require a range of knowledge, skills and attributes for successful performance in the role. The successful candidate is expected to:

- Have a thorough understanding of Generative AI techniques and technologies
- Experience of the development of deep learning architectures for conversational AI
- Familiarity with running of experiments e.g. on a high-performance compute farm
- Have excellent written and oral proficiency in English
- Have excellent communication and interpersonal skills
- Be willing to work as part of a multidisciplinary team and learn new cross-over skills as well as transfer skills to others
- Be highly organised in their work, with an ability to balance medium term and longer-term objectives in a project.
- Ability to represent the group at appropriate national and international conferences

Qualifications

Candidates appointed to this role must have completed at postgraduate degree in Computer Science, preferably with extensive experience of Generative AI or Large Language Model application development in,

Knowledge & Experience (Essential & Desirable)

Essential:

- Understanding of and demonstrated experience working with Generative AI
- Extensive knowledge and understanding of deep learning architectures and their use in speech recognition
- Proficiency and experience with a range of coding languages and environments, e.g. python, PyTorch, TensorFlow, GitHub etc
- Strong commitment to their own professional development
- Experience with the Linux environment (especially shell/bash scripts and user management)

Desirable

- Extensive knowledge and understanding of deep learning architectures
- Record of using or applying open-source publishing of code
- Exposure to standard tools for editing and labelling of conversations, (e.g. Adobe Suite, Elan, Anvil, Praat or others)

Benefits

- Competitive salary and equity
- High-end computer and peripherals
- Dedicated desk in shared office space, with generous social spaces
- A creative and enabling environment with impactful research
- Pension and social insurance (PRSI) included
- Trinity Day Nursery
- Travel Pass Scheme
- Bike to Work Scheme
- Employee Assistance Programme
- Sports Facilities
- 22 days of Annual Leave
- Paid Sick Leave
- Training & Development
- Staff Discounts locally

Application Procedure

Applicants should provide the following information when applying:

1. A motivation statement outlining their interest and suitability for the position.
2. A comprehensive curriculum vitae

3. The names and contact details (e-mail) of three referees.

Note:

Candidates who do not address the application requirements above will not be considered for interview.

Further Information

Informal enquiries about this post should be made to Conor McNally (conor.mcnally@tcd.ie).

Snapshot of the Faculty

The Faculty of Science, Technology, Engineering and Mathematics is located at the east end of the Trinity campus. It brings together eight schools that deliver discipline-specific research and training (**Biochemistry & Immunology, Chemistry, Computer Science and Statistics, Engineering, Genetics & Microbiology, Mathematics, Natural Sciences, Physics).** Each School produces graduates that are leaders, innovators and doers in STEM education and research, in Ireland and beyond.

As well as these eight schools, the Faculty is made up of three Trinity College Research Institutes, five National Research Centres and three Units. Together these represent approximately 30% of the staff in the College.

Researchers in the Faculty address challenges that are complex and multi-faceted. They do this by continuously asking the fundamental questions of how? and why? They seek out answers to current and future challenges in climate change, food and water security, sustainable urbanisation, personal privacy, healthy ageing and eradicating infectious diseases. They lead innovations at the frontiers of science and technology often in high-level multi-disciplinary teams based within the Schools, Research Institutes and Centres.

The three Trinity Research Institutes are:
- **CRANN -** The Centre for Research on Adaptive Nanostructures and Nanodevices
- **TBSI -** Trinity Biomedical Sciences Institute
- **TCIN -** Trinity College Institute of Neuroscience

The four National Research Centres are:
- **ADAPT -** The SFI Centre for digital content and media innovation
- **AMBER -** The SFI Centre for Advanced Materials and BioEngineering Research
- **CONNECT -** The SFI Centre for digital content and media innovation
- **ENABLE -** Connecting communities with smart urban environments through the Internet of Things

The three units that support our teaching and learning mission are:
- **Biology Teaching Centre -** responsible for the coordination of all Biology teaching to Junior and Senior Freshman students in Science, as well as providing service teaching to other groups within the College.
- **Comparative Medicine Unit -** aims to advance knowledge and improve the health and wellbeing of humans and animals by servicing, and providing, world-class facilities and infrastructures, to the Trinity research community.
- **Science Course Office -** responsible for facilitating the Junior and Senior Fresh undergraduate Science Programmes.

Trinity College Dublin, the University of Dublin

Trinity College Dublin, the University of Dublin is Ireland's leading university, one of the top ranked universities in Europe and a member of the League of European Research Universities. It is currently ranked 98th in the QS World University Rankings 2023. 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; Science, Technology, Engineering and Mathematics; and Health Sciences.

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. Our research charter outlines the principles that are central to our research vision: **www.tcd.ie/research/about/charter**

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 five 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 seven successive years and Europe's only representative in the world's top-50 universities (Pitchbook Universities Report 2021).

Trinity has been incorporating sustainability right across the university. Commitments to sustainability have been made in the Strategic Plan (2020 – 2025) and via Trinity's environmental sustainability practices under nine goals in areas that range from biodiversity to sustainable transport and green procurement.

For more on these sustainability commitments, please visit **www.tcd.ie/provost/sustainability/initiatives**

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 7 million printed items, 500,000 e-books and 150,000 e-journals.

With over 130,000 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 98th in the world (QS World University Rankings 2023). Trinity ranks in the top 50 in the world on 4 subjects and in the top 100 in 17 subjects (QS World University Rankings by Subject 2021).

Full details are available at:
www.tcd.ie/research/about/rankings