Department of Computer Science
School of Science

Research Associates in Artificial Intelligence (NIHR-funded Research Project: DECODE) Until 30 September 2024

Data-driven, Machine learning-aided Stratification and Management of Multiple Long-term Conditions in Adults with Intellectual Disabilities - **DECODE**

REQ220682

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

School/Department summary

The Research Associate will be based in the internationally renowned Department of Computer Science at Loughborough University, UK. Founded in 1974, the Department of Computer Science is one of the most well-established university computing departments in the UK with a long track record of developing skilled and highly employable graduates, as well as a reputation for cutting edge research and industry engagement. Based in the recently multi-million pound refurbished Haslegrave Building, the Department is one of the largest within the School of Science. Loughborough University is one of the country's top 10 universities, consistently ranked by the Guardian Good University guide and other assessment indexes, confirmed as having world-class research facilities in sports, engineering and sciences and has been awarded a record seven Queen's Anniversary prizes for impact to society and UK industry.

Project Description

DECODE is a 30-month research project funded by the NIHR Artificial Intelligence for Multiple Long-Term Conditions (AIM) Programme. This project is led by Loughborough University (PI: Dr Gyuchan Thomas Jun, Reader in Socio-technical System Design) jointly with Leicestershire Partnership NHS Trust (joint PI: Dr Satheesh Gangadharan, Consultant Psychiatrist). Overall, the project team consists of fifteen co-investigators with expertise in the field of intellectual disabilities, neuropsychiatry, epidemiology, health data science, machine learning, data visualisation, human factors, qualitative research and ethics from eight institutions.

The co-investigators include Dr Georgina Cosma (AI and data science) and Dr Panos Balatsoukas (UX design) at Loughborough University, Dr Francesco Zaccardi (epidemiology), Dr Michelle O'Reilly (qualitative research) and Prof Kamlesh Khunti (primary care) at the University of Leicester, Ashley Akbari (data science) and Prof Simon Ellwood-Thompson (health informatics) at Swansea University, Dr Vasa Curcin (AI) at King's College London, Prof Rohit Shankar (neuropsychiatry) at the University of Plymouth, Dr Reza Kiani (intellectual disabilities) at Leicestershire Partnership NHS Trust, Dr Neil Sinclair (ethics) at the University of Nottingham, Dr Chris Knifton (nursing) at De Montfort University, and Gillian Huddleston (PPI lead).

The DECODE project aims to improve the health and wellbeing of people with intellectual disabilities (also known as learning disabilities) by developing actionable insights to support a model of effective care coordination using machine learning aided analysis of multiple long-term conditions in people with intellectual disabilities.

The *Research Associates in AI* will join a team of researchers with clinical expertise who will assist them in the interpretation and validity of the results from a clinical perspective. The Research Associate will join DECODE's team as well as Dr Cosma's team of 5 PhD students and 2 other researchers working in AI under the supervision of Dr Cosma.

The Research Associates will be supervised by Dr Cosma who has expertise in AI and health data science.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

FTE: 1 FTE

Term: Until 30 September 2024

Job Purpose

The two Research Associates will work on delivering Work Package Artificial Intelligence Applications: Identification of MLTC clusters, trajectories and risk factors.

Given that there are two posts, we encourage applicants with strong programming skills in AI algorithm development, and those who have experience in software development to apply. The tasks will be assigned based on skillsets.

Tasks include:

- Statistically analyse the pre-processed SAIL and CPRD datasets.
- Develop machine and deep learning algorithms that can identify temporal clusters of multiple long-term conditions that exist in people with intellectual disabilities.
- Develop deep learning algorithms that can generate trajectories of the most dominant clusters and their interactions with risk factors and outcomes.
- Develop algorithms for making personalised patient trajectory predictions.
- Empirically explore and implement feature selection methods that can identify combinations of risk factors for predicting key events in trajectories.
- Develop strategies and methods for algorithmic and data bias management and mitigation.
- Empirically evaluate the algorithms using the SAIL and CPRD datasets.
- Implement a web-based tool with a front-end that will enable end-user access and testing of the algorithms.
- Implement methods for analysing the data found in LTC clusters and trajectories.
- Contribute to the development of algorithms needed for data preparation and visualisation and embed these in the final version of the tool.
- Create publications and presentations that are of high quality and contribute to dissemination activities (such as publications in top conferences and journals).
- Support in identifying and involving relevant stakeholders that will benefit from the project results.
- Engage in training programmes in the University, which are consistent with your needs and aspirations and those of the project team.
- Undertake other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.
- Follow principles of AI ethics when developing the proposed algorithms.
- Contribute to required project documentation and develop documentation for data preparation and model design decisions.
- Liaise with the healthcare team to discuss the clinical validity of the AI outputs and integrate their feedback into the algorithms.

Points To Note

The purpose of this job description is to indicate the general level of duties and responsibilities of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed.

Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

All staff should hold a duty and commitment to observing the University's Equality & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equality & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Respecting Diversity and, where appropriate, Recruitment and Selection.

Organisational Responsibility

Reports to: Dr Georgina Cosma (g.cosma@lboro.ac.uk)

Person Specification

Your application will be reviewed with respect to meeting the essential and desirable criteria listed below. Your application will be reviewed against the essential and desirable criteria listed below. Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application. Stages of assessment are as follows:

1 – Application
2 – Presentation
3 – Interview

Essential Criteria

Area	Criteria	Stage
Experience	Background in computer science, artificial intelligence/machine learning.	1
	The conducting of original research that can be, or has been published in leading international venues	1,2
	Practical experience in solving Deep Learning tasks	1,3
	Practical experience in optimising code and developing web applications	1,3
Skills and abilities	Excellent written and oral communication skills	1,3
	Highly motivated with the ability to meet deadlines appropriate to the progress of the project	3
	Excellent interpersonal and organisational skills	3
	Good communication skills to engage effectively with various audiences, both orally and in writing, using a range of media	2,3
Training	Willingness to undertake appropriate further training and to adopt new procedures as and when required	1,3
Qualifications	First degree in Computer Science and/or an MSc in a Computer Science topic or in Artificial Intelligence (Merit or Distinction)	1
Other	Commitment to observing the University's Equal Opportunities policy at all times	1,3

Desirable Criteria

Area	Criteria	Stage
Experience	Research experience in deep learning models for temporal clustering, predictive modelling tasks. Front-end development using Django.	1,3
Skills and abilities	Authoring original work in the highest quality refereed academic journals and conferences	1,3
Qualifications	To have a PhD in Computer Science or to be near completion	1

Conditions of Service

The position is FULL TIME and FIXED TERM until 30 September 2024. Salary will be on Specialist and Supporting Academic Grade 6 (£31,406 – £40,927 per annum), at a starting salary to be confirmed on offer of appointment.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Academic and Related staff/Operational and Administrative staff, details of which can be found here.

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which are available at http://www.lboro.ac.uk/services/hr/a-z/family-leave-policy-and-procedure---page.html.

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html

In addition, the University is supportive, wherever possible, of flexible working arrangements.
We also strive to create a culture that supports equality and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see http://www.lboro.ac.uk/services/hr/athena-swan/

Informal Enquiries

Informal enquiries should be made to Dr Georgina Cosma g.cosma@lboro.ac.uk