

The Alan Turing Institute

Senior– Data Analyst & Modeller

THE ALAN TURING INSTITUTE

There has never been a more significant time to work in data science and AI. There is recognition of the importance of these technologies to our economic and social future: the so-called fourth industrial revolution. The technical challenge of keeping our data secure and private has grown in its urgency and importance. At the same time, voices from academia, industry, and government are coming together to debate how these technologies should be governed and managed.

The Alan Turing Institute, as the UK's national institute for data science and artificial intelligence, plays an important part in driving forward advances in these technologies in order to change the world for the better.

The Institute is named in honour of Alan Turing, whose pioneering work in theoretical and applied mathematics, engineering and computing is considered to have laid the foundations for modern-day data science and artificial intelligence. The Institute's goals are to undertake world-class research, apply its research to real-world problems, driving economic impact and societal good, lead the training of a new generation of scientists, and shape the public conversation around data and algorithms.

After launching in 2015 with government funding from EPSRC and five founding universities, the Institute has grown an extensive network of university partners from across the UK and launched a number of major partnerships with industry, public and third sector. Today it is home to more than 500 researchers, a rapidly growing team of in-house research software engineers and data scientists and a business team.

BACKGROUND

The Alan Turing Institute has been awarded a grant by Alzheimer's Research UK (ARUK) to lead the Analytics Hub for the EDoN initiative.

Early Detection of Neurodegenerative diseases (EDoN) is the largest initiative in the world that will collect, share and analyse clinical and digital health data to detect diseases like Alzheimer's. Ultimately, this approach would be used by doctors to give an earlier and much more accurate diagnosis of dementia diseases.

The Alan Turing Institute is leading on the EDoN Analytics Hub which is tasked with designing and performing the analyses that will allow EDoN to make sense of the data collected in the project. The Analytics Hub is composed of data scientists and is responsible for developing, validating, and refining machine learning 'fingerprint' models that can detect the diseases that cause dementia at their earliest stage.

The [Health and Medical Sciences](#) programme at the Turing delivers research into the theory and methods of AI, statistics, and data analytics underpinning medical and health applications that will enable scientists to do better science, without compromising respect for privacy and patient trust. The Analytics Hub is led by PI, Professor Richard Everson and is recruiting a Senior Data Analyst & Modeller to support the data analytics and modelling.

ROLE PURPOSE

The Senior Data Analyst & Modeller will work closely with PI Professor Richard Everson to deliver the data analytics and modelling aspects of the Analytics Hub. The post-holder will be responsible for coordinating and performing the data science analyses of retrospective and prospective data collected by the EDoN project and held in the Turing Secure Research Environment.

This role represents an outstanding opportunity to influence the direction of data intensive research to improve millions of people's lives. You will develop novel methods to, for example, reduce misclassification of individuals due to co-morbidities, accurately predict particular disease subtypes, detect and model cognitive decline, combine multi-modal datasets. Initial work will be on retrospective data, but we will rapidly move to novel forms of data collected on low-burden digital platforms, such as smart phones and wearable technologies. You will produce breakthrough research in machine learning and data science for the early detection of neurodegenerative disease, publishing in top-rated journals and conferences.

As a leader in your field and area of expertise you will collaborate with and coordinate the work of other post-doctoral researchers the Analytics Hub and will design and coordinate analytics work with the Digital and Clinical Hubs. Your

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colleagues in the Analytics Hub include data wranglers mentored by Dr Ann-Marie Mallon at MRC Harwell and a reproducibility lead mentored by Dr Kirstie Whitaker at The Alan Turing Institute. The EDoN Clinical Hub is led by Professor Zuzana Walker at University College London and the EDoN Digital Hub is led by Dr Chris Hinds at the Big Data Institute at the University of Oxford. Professor Zoe Kourtzi at the University of Cambridge is the Scientific Director of EDoN and the Chair of the EDoN Steering Group. More information about members of the EDoN collaboration can be found at <https://edon-initiative.org/organisation>. We expect that success in the role will also require close collaboration with other communities such as the Brain Imaging Data Structure (BIDS), UK Dementia Research Institute, and Deep Dementia Phenotyping Network, among others.

There is significant scope for the postholder to develop new skills and grow in the role. We do not expect the applicants to have extensive experience across all aspects of AI methods, biological models of cognitive decline, and the analysis of brain imaging and digital markers. We do however expect the postholder to be prepared to learn at pace. For example, you may have a track record in brain imaging but can demonstrate knowledge of statistical modelling techniques that translate to digital markers, or – conversely – expertise in the computational modelling of dementia with evidence of translatable skills to the predictive modelling of brain, cognitive and digital markers. We are excited to work with applicants who bring a fresh perspective on a paradigm shifting and ambitious research goal.

This programme of work sits under the Health and Medical Sciences Programme at the Alan Turing Institute and as such the Health Programme delivery team will enable extensive opportunities for you to collaborate with and learn from experts from across all programmes at The Alan Turing Institute. Professor Richard Everson will be your line manager, and informal enquiries can be directed to healthprogramme@turing.ac.uk

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DUTIES AND AREAS OF RESPONSIBILITY

- Design and implement cutting edge statistical analysis methods to detect dementia-causing diseases and cognitive decline. Demonstrate internally across the EDoN consortia and the broader health data science communities, how data science and AI methods can provide predictive modelling to help clinicians in the detection of dementia.
- Compare the power of cognitive, neuroimaging and digital markers in retrospective and prospective cohorts to accurately detect dementia.
- Determine the integrity of digital markers and estimating the scale of data collection that will be necessary for the EDoN project's overarching vision of detecting diseases like Alzheimer's years before the symptoms of dementia start.
- Analyse initial prospective data from the Predictors of COgnitive DEcline in attenders of memory clinic (CODEC) study based at the Essex Neurocognitive Clinic along with other pilot data to determine the integrity of digital markers and estimating the scale of data collection that will be necessary.
- In collaboration with the EDoN Reproducibility Lead, deliver robust and transparent algorithms and models that can be reproducibly deployed at scale for future analysis work.
- In collaboration with the EDoN data wranglers design a pathway for importing and analysing data from CODEC and other cohorts as it begins to become available
- Catalyse connections and collaboration between EDoN team members across a distributed team. This could come in the form of synchronous regular meetings or it could occur asynchronously, for example through active engagement on distributed channels such as Slack and private GitHub repositories.
- Communicate technical topics to colleagues and external partners by preparing and presenting reports, blog posts, organising and delivering presentations, and taking an active role in meetings and discussions. Communications may be synchronous or asynchronous, remote or in-person, and must be prepared at the appropriate granularity of detail for the audience.
- Publish – as lead or co-author – peer-reviewed research articles and, if interested, perspective, opinion and commentary articles
- Contribute to the research aims and challenges of the EDoN Initiative, The Alan Turing Institute's Health and Medical Sciences Programme, and those of The Alan Turing Institute more broadly. This may be through active participation at in-person and online workshops or in conversation with experts across these overlapping communities.
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PERSON SPECIFICATION

Skills and Requirements Post holders will be expected to demonstrate the following	Essential (E) Desirable (D)	Tested at application(A) Tested at interview (I)
Education/Qualification		
A PhD (or equivalent experience and/or qualifications) in a relevant area, which will include Statistics, Mathematics, Engineering, Computer Science, or related discipline.	E	A
Knowledge and Experience		
Strong background in one or more of the following areas: Bayesian inference, ensemble models, multivariate time-series analysis, medical image analysis.	E	AI
Experience managing, structuring and analysing research data.	E	AI
An understanding of the importance of good practices for producing reliable software and reproducible analyses (e.g., version control, issue tracking, automated testing, package management, literate analysis tools such as Jupyter and Rmarkdown).	E	AI
Interest and/or knowledge of neurodegenerative and cognitive datasets	D	AI
Developing for high-performance computing hardware (CUDA, MPI, OpenMP)	D	AI
Experience contributing to, maintaining and/or leading open source research software projects	D	AI
Experience in making or evaluating the case for new projects (e.g., authoring or evaluating research proposals or business cases)	D	AI
Experience of managing, prioritising and resourcing a project portfolio, leading it to a successful conclusion	D	AI
Communication		
Excellent written and verbal communication skills, including experience in the visual representation of quantitative data, documentation of software packages or data resources, the authoring of research papers or technical reports, and giving presentations or classes on technical subjects.	E	AI
Ability to adapt the style of communication to the audience and ensures understanding	E	AI
Ability to communicate complex, specialist or conceptual information clearly and persuasively, presenting compelling arguments to influence and/or negotiate satisfactory outcomes.	E	AI
Analysis and Research		
Identify and use a range of standard sources to gather and analyse routine data and produce reports that can be interpreted by others.	E	AI
Planning and Organising		
Ability to plan a programme of work for themselves and a small team of others.	E	AI
Manages time and resources effectively; routinely monitoring and reviewing progress to ensure effective working of self and others.	E	AI
Ensures work is completed to expected standards, timeframes in line with team objectives.	E	AI

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Liaison and Networking		
Participates in networks within the organisation or externally to share knowledge and information in order develop practice or help others learn.	E	AI
Collaborates with others to meet deadlines and joint objectives by ensuring dissemination of information in the right format to the right people at the right time. Builds relationships and contacts to facilitate future exchange of information.	E	AI
Participates in networks within the organisation or externally to share knowledge and information in order develop practice or help others learn.	E	AI
Pro- actively seeks opportunities for collaboration and strengthen future working relationships.	E	AI
Service Delivery		
Has accurate and up to date knowledge of project deliverables. Promptly deals with a range of stakeholders.	E	AI
Adapts services and systems to meet stakeholders needs and identifies ways of improving standards.	E	AI
Learns from complaints and takes action to resolve them. Collates feedback and views from stakeholders and keeps up to date with market trends to inform service development and make changes. Actively promotes services.	E	AI
Decision Making		
Work with others to make collaborative decisions that may be operational or strategic and impact immediate team or work area.	E	AI
Recommend and advise on available options for decisions that affect operational processes, taking into account any risks.	E	AI
Initiative and Problem Solving		
Uses judgement to analyse and solve problems and take action to prevent recurrence of problems.	E	AI
Consider possible solutions to identify those which offer wider benefits and obtain evidence to support thinking.	E	AI
Team Development		
If the funding was confirmed and the project extended, the project team might require additional resources which will reporting to the role holder. Ability to undertake coaching/mentoring activities, providing advice, guidance and feedback to help team members work more effectively.	D	
Other Requirements		
Ability to work with confidential and sensitive data for research	E	A
Commitment to EDI principles and to the Organisation values	E	I

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Please note that job descriptions cannot be exhaustive, and the post-holder may be required to undertake other duties, which are broadly in line with the above key responsibilities. This job description is written at a specific time and is subject to changes as the demands of the Institute and the role develop.

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OUR VALUES

The Alan Turing Institute is committed to equality diversity and inclusion and to eliminating discrimination. All employees are expected to embrace, follow and promote our [EDI Principles](#) and [Rules of the Game](#)



Respect – We treat everyone with respect, dignity and kindness and acknowledge the experiences, skills and contributions of others.

Trust - We communicate openly and honestly to support an environment where we have trust in each other.

Transparency – We seek to ensure that everyone understands the how and the why of our decisions and actions. We take on board to feedback when those decisions are challenged.

Inclusivity – We are committed to continuously learning how to be more inclusive by listening to those facing barriers.

Leadership – We recognise creating an inclusive, diverse and equitable institute requires leadership from all. We stand up and speak out when change is needed.

Integrity – We recognise that how we work is as important as our outputs and seek to exemplify best practice in all our decisions.

APPLICATION PROCEDURE

If you are interested in this opportunity, please click the apply button below. You will need to register on the applicant portal and complete the application form including your CV and covering letter. If you have questions about the role or would like to apply using a different format, please contact them on 020 3862 3575, or email recruitment@turing.ac.uk.

TERMS AND CONDITIONS

This full-time post is offered on a fixed-term basis for twelve months, with the possibility to extend. The annual salary is £48,000 plus excellent benefits, including flexible working and family friendly policies, <https://www.turing.ac.uk/work-turing/why-work-turing/employee-benefits>

EQUALITY, DIVERSITY AND INCLUSION

The Alan Turing Institute is committed to creating an environment where diversity is valued, and everyone is treated fairly. In accordance with the Equality Act, we welcome applications from anyone who meets the specific criteria of the post regardless of age, disability, ethnicity, gender reassignment, marital or civil partnership status, pregnancy and maternity, religion or belief, sex and sexual orientation.

Reasonable adjustments to the interview process will be made for any candidates with a disability.

Please note all offers of employment are subject to obtaining and retaining the right to work in the UK and satisfactory pre-employment security screening which includes a DBS Check.

Full details on the pre-employment screening process can be requested from HR@turing.ac.uk.