The Alan Turing Institute

Research Associate / Senior Research Associate, Turing-Roche Partnership (Multimodal Data Integration)

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 purpose is to make great leaps in data science and AI research to change the world for the better. Its goals are to advance world-class research and apply it to national and global challenges, build skills for the future by contributing to training people across sectors and career stages, and drive an informed public conversation by providing balanced and evidence-based views on data science and AI.

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 Health and Medical Sciences Programme at 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.

Hoffman La-Roche (Roche) has been committed to improving lives since it was founded in 1896 in Basel, Switzerland. Today, Roche creates innovative medicines and diagnostic tests that help millions of patients globally and was one of the first companies to bring targeted treatments to patients.

In 2021 the Alan Turing Institute and Roche initiated a world-leading industry and academic partnership in advanced analytics strategic focused on enabling the transformative benefits of personalized healthcare to become a reality for patients around the world.

The Turing-Roche Strategic Partnership covers multiple activities, with the "North Star" of developing new data science methods to investigate large, complex, clinical and healthcare datasets to better understand how and why patients respond differently to treatment, and how treatment can be improved. Understanding such "treatment heterogeneity" is a problem at the forefront of modern medicine and is an essential first step toward the ambitious goal of developing a personalized healthcare.

ROLE PURPOSE

The Turing-Roche partnership is now recruiting two Research Associates / Senior Research Associates to investigate the development of methodologies and approaches for learning from multimodal data for clinical applications, to answer high impact clinical questions in alignment with the Turing-Roche "North Star", however we also welcome interested candidates with a strong AI/ML or computational/statistical analysis background who may not have specifically applied their work to clinical or healthcare problems previously

Complex clinical decisions, such as diagnosis, prognostication and treatment selection are rarely made from consideration of a single data modality and typically involve numerous data sources, such as clinical histories, basic physiological

measurements (heart rate, blood pressure, BMI, etc.), blood test results, images obtained from x-rays, MRI scans etc. and tissue sample examinations. Increasingly, complex high-dimensional data, such as genomic information, is also being used. However, when making a clinical decision, doctors typically collect data in a precise order, aiming to obtain the answer to their question with minimal harm to the patient, and at lowest cost to the hospital.

When required, integrating all this information into clinical decisions requires teams of specialists (general medics, surgeons, radiologists, pathologists etc.,) who regularly meet in multi-disciplinary meetings with other healthcare professionals to discuss patient cases and arrive at personalised decisions. This process can be highly expensive both financially and in terms of specialist time.

AI has the potential to streamline this clinical decision-making process, by providing rapid assessment of diverse data modalities. However, while conventional clinical AI has had significant success on unimodal data, our understanding of learning from multimodal data is still at an early stage. The aim of this project is to develop clinically aware AI tools that can integrate and learn from complex multi-modal clinical and healthcare data sets and support clinicians in making complex clinical decisions.

The successful candidate will work closely with an expert team of academic and industrial data scientists and clinicians and will have freedom to develop their own programme of work in this area, under supervision. Topics of particular interest include: (1) developing an information theoretic framework to integrate multimodal data, by addressing questions such as: to what extent does knowledge of one data modality, confer clinically useable information about another? (2) developing machine learning tools to predict one data source from another, addressing questions such as: to what extent can we predict one modality from another (e.g., to predict invasive tests from non-invasive tests)? (3) developing a theoretically rigorous theory for data fusion, addressing questions such as: when is it better to integrate data before learning, and when is it better to train models separately and integrate the results after learning?

Whilst we are interested in developing methodology and approaches of the integration of all modalities of data, we anticipate our initial focus will be on the integration of imaging and genomics data, so experience of working with one of other of these data types will be advantageous.

The successful candidate will also contribute to developing and shaping the direction of research in the Turing-Roche partnership, including working with Turing and Roche scientists on other established research projects. The successful candidate will form part of the Turing's Health and Medical Sciences programme team. They will work closely with colleagues at the Turing and advanced analytics leaders and scientists at Roche and will have the opportunity for regular interactions with the partnerships' advisory group of senior academic experts.

As well as working closely with colleagues at the Roche site at Welwyn within the UK, they will be supported to travel internationally to collaborate with Roche colleagues at other sites (particularly, San Francisco and Basel). The successful candidate will be expected to spend some time working at one or more of the Roche sites to develop relationships and an increased understanding of the pharmaceutical industry.

This is a stand-out opportunity to join a prestigious, national research institute and shape its agenda at an important and exciting time in its development. Working within the partnership will give the successful candidate visibility of many facets of the pharmaceutical industry and support to develop a network of contacts in both academia and industry. As well as being exposed to a variety of analytical methodologies and applications within the partnership they will also have the freedom to develop their own area of aligned research under the mentorship from senior leaders in both academia and industry.

CORE DUTIES AND AREAS OF RESPONSIBILITY

- To assist with the development and delivery of an ambitious programme of research in the area of multimodal data integration, aligned with the aims and objectives of the partnership.
- To undertake high-quality independent research, which will support the partnership in its goal of understanding patient heterogeneity.
- Write or contribute to publications or disseminate research findings using other appropriate media.
- To communicate research outputs to diverse stakeholders, through conferences, events, meetings, and press opportunities as appropriate.
- To work closely with the Turing and Roche communications teams to disseminate and publicise key findings, communicating complex ideas through a variety of mediums.
- To travel as necessary to present work and meet with external collaborators.
- Cultivate strong relationships with internal stakeholders,
- Drive collaboration with academic experts and broader research partners from across the Turing, Roche and the wider Turing / project community.
- Adhere to and promote principles of reproducible and ethical data science

If appointed at a Senior Research Associate level, the post holder will have additional responsibilities, such as:

- Overseeing the work of Research Associates and providing guidance as required
- Defining research directions in collaboration with Project Investigators (PIs)
- Taking the lead on writing up findings as they emerge, producing and developing reports, and developing publications in peer reviewed journals, in collaboration with the research team
- Leading on the preparation of proposals and applications to external bodies, e.g., for funding and contractual purposes.
- Supporting externally funded projects, identifying and working with senior colleagues to develop research ideas and contribute to funding proposals
- Contributing to the supervision of postgraduate students, including PhD students and mentor junior colleagues

Other Duties

- Teaching may be required as part of collaboration work

Please note that job descriptions cannot be exhaustive, and the postholder 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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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 either a computational focus like Statistics, Mathematics, Computer Science, Information Engineering, etc. or a biomedical modelling focus like Bioinformatics, Computational Biology, Biomedical Engineering, etc. or similar inter-disciplinary subjects.	E	A/I
Research Assistant level: <u>must</u> be near completion of PhD in a relevant area which will include either a computational focus like Statistics, Mathematics, Computer Science, Information Engineering, etc. or a biomedical modelling focus like Bioinformatics, Computational Biology, Biomedical Engineering, etc. or similar inter-disciplinary subjects.	E	A/I
Knowledge and Experience		
Substantial experience in statistical modelling and/or data analytics on significant real-world problems, including experience in learning from data from multiple sources and types.	E	A/I
Substantial experience of using modern statistical programming languages (such as R and Python)	E	A/I
Ability to understand and apply the principles of reproducible data science	E	A/I
Experience in working with modern artificial intelligence technologies	E	A/I
Experience of developing and documenting analysis workflows for scientific research projects	E	A/I
Ability to perform relevant literature reviews	E	A/I
Ability to critically evaluate experimental results and derive evidence-driven conclusions	E	A/I
Experience of publishing their research through peer-reviewed scientific articles	E	A/I
Experience and knowledge of either genomics and/or imaging data	D	A/I
For the Senior Research Associate position: Experience in scoping and investigating independent research questions within a given overarching theme	E	A/I

For the Senior Research Associate position: Substantial postdoctoral experience in their field of expertise with commensurate output	E	A/I
Communication		
Excellent written and verbal communication skills including the ability to present complex or technical information, and to communicate effectively with analysts and other stakeholders outside the research community	E	A/I
Ability to adapt the style of communication to the audience and ensures understanding	E	A/I
Liaison and Networking		
Ability to collaborate successfully with colleagues in a multidisciplinary environment within the organisation or externally to share knowledge and information in order develop practice or help others learn	E	A/I
Ability to represent the partnership at practitioner events and high-level meetings	E	A/I
Ability to establish academic collaborations nationally and internationally	E	A/I
Project Management and Project Delivery		
Ability to keep accurate and up to date knowledge of services available in own and related areas of work	E	I
Ability to work across the partnership to contribute and assist in diverse research activities	E	A/I
Ability to develop and lead collaborative research and innovation	E	A/I
Decision Making		
Ability to work with others to make collaborative decisions	E	A/I
For the Senior Research Associate position: Ability to advise on available options for decisions that affect operational processes, taking into account any risks	E	A/I
Initiative and Problem Solving		
Ability to use own judgement to analyse and solve problems	E	A/I
Ability to consider possible solutions and identify with evidence those which offer widest benefits.	E	A/I
Ability to lead one's own work, including planning and execution, and to prioritise work to meet deadlines	E	A/I
Analysis and Research		
Ability to organise working time, take the initiative, and carry out research independently under the guidance of the PIs	E	A/I
For Senior Research Associate position: Take the lead on research direction in collaboration with the PIs	E	A/I

Team Development (Senior Research Associate)		
Previous experience overseeing and supervising more junior colleagues' work	D	A/I
Teaching and Learning		
Teaching may be required as part of the role	E	A/I
Other Requirements		
Commitment to EDI principles and to the Organisation values	E	I

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 Our Values.

Our values

Trust
We create an environment where we have trust and can be trusted

Inclusivity
We expect our Turing community to contribute to a culture that is inclusive and free of barriers

Respect
We all have different roles, priorities and challenges but our shared purpose is the same

Leadership
Leadership is everyone's business; Turing leaders set the right tone and lead by example

Transparency
Everyone should understand the how and the why of our decisions and actions

Integrity
We are all ambassadors for the Turing's mission of changing the world for the better

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 us on 020 3862 3536 or email recruitment@turing.ac.uk.

CLOSING DATE FOR APPLICATIONS: Sunday 29th October at 23:59

TERMS AND CONDITIONS

These full-time posts are offered on a fixed term basis for 2 years.

If appointed as Research Associate, the annual salary range would be £42,893 to £48,510 depending on experience.

If appointed as Senior Research Associate the annual salary range would be £53,576 to £55,125 depending on experience.

Candidates who have not yet been officially awarded their PhD will be appointed as Research Assistant at a salary of £40,148 per annum.

In addition to the annual salary we offer excellent benefits, including flexible working and family friendly policies, https://www.turing.ac.uk/work-turing/why-work-turing/employee-benefitshttps://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.

We are committed to building a diverse community and would like our leadership team to reflect this. We therefore welcome applications from the broadest spectrum of backgrounds.

We are committed to making sure our recruitment process is accessible and inclusive. This includes making reasonable adjustments for candidates who have a disability or long-term condition. Please contact us at adjustments@turing.ac.uk to find out how we can assist you.

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***.***