

# The Alan Turing Institute

## Research Associate

### AI methods in Mammography Intelligent Assessment

#### THE ALAN TURING INSTITUTE

There has never been a more significant time to work in data science and artificial intelligence (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 Turing Health and Medical Science Programme has long-term interests in research study design and evaluation methodology for AI-driven healthcare solutions. It is seeking contribute to the development of standards for how to evaluate AI in clinical studies within the NHS and internationally. Following a recent NHS AI Award to Kheiron Medical Technologies, a specific novel opportunity has arisen for a two-year research programme that will specifically focus on optimising such standards for the breast cancer screening domain as part of a new Kheiron-Turing collaboration.

Further information about the award:

Four phases of award are available to support AI solutions from initial feasibility to evaluation within NHS and social care settings. The award is a competitive process run by the [Accelerated Access Collaborative](#) (AAC) as part of the [NHS AI Lab](#), in partnership with NHSX and the [National Institute for Health Research \(NIHR\)](#). Phase 4 is intended to identify AI technologies that need more evidence to merit large-scale commissioning or deployment. The AAC will work with NHS sites to support their adoption of these technologies, and stress test and evaluate them within routine clinical or operational pathways to determine their efficacy and accuracy, and clinical and economic impact.

#### ROLE PURPOSE

We are seeking two Research Associates with experience in one or more of the following areas: clinical trials study design, diagnostic tools evaluation and artificial intelligence, to develop novel methodologies and studies to assess the safety and efficacy of Mammography Intelligent Assessment (Mia), a novel AI breast screening solution, developed by Kheiron Medical on over 3 million images from different mammography modalities and different ethnic backgrounds.

Mia has recently been tested in a large-scale clinical trial in the UK and Europe with 283,000 cases (unseen and unenriched sample size).

We are seeking to support the full-time employment/secondment (up to 1.0 FTE) of the Research Associate(s) to the Alan Turing Institute. We are also happy to consider employment/secondments of 0.5 FTE (18 hours) or above to allow for flexibility with candidates' existing commitments

The successful candidates will be managed by the Senior Research Advisor, AI Methods.

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As part of the AI award, Kheiron will be conducting a series of studies, including large-scale retrospective trials, reader studies, prospective trials, and post-market surveillance. This is amongst a series of recently commissioned large-scale studies of their AI deployed in a real-world national health system environment supported by the NHS. The project will also provide a framework to establish which combination of studies works best to evaluate the AI.

The role holder(s) will have the opportunity to undertake frontier research and produce publications in the novel design of evaluation studies for AI models in real-world health systems; as well as, be part of the frontier national work involving NHS, Alan Turing Institute, NICE, PHE, AAC and NHS X teams on how to safely and effectively integrate new, cutting edge AI technology, and establish the UK as a leading global exemplar for large scale deployment of AI solutions.

The research team will benefit from the support of a Turing Research Project Manager from within its strategic Health and Medical Sciences Programme.

## Example Research Questions

The project will address a number of emerging questions in the development of AI solutions for clinical application. These could include and not exclusively:

- Defining multiple and potentially competing endpoint criteria when assessing the performance of AI healthcare solutions,
- Addressing issues of missing not-at-random data or uncertainty in ground truth labels in the retrospective use of data for performance assessment,
- Developing novel methods suitable for population-level datasets or Bayesian alternatives to classical testing,
- Devising a process by which to demonstrate generalisability of AI solutions.

The postholder will receive supervision and mentorship from academic, clinical and industry to address these types of issues within the Kheiron-Turing collaboration.

## DUTIES AND AREAS OF RESPONSIBILITY

- Develop novel methodologies and studies to assess the safety and efficacy of Mammography Intelligent Assessment (Mia),
- Undertake frontier research in the novel design of evaluation studies for AI models in real-world health system
- To write or contribute to publications or disseminate research findings using other appropriate media
- Adhere to modern principles of reproducible and ethical data science in carrying out their responsibilities.
- To ensure compliance with secure handling of data and health and safety in all aspects of work.
- Drive collaboration with academic experts and broader research partners from across the Turing and the wider Turing / project community.
- Contribute to the broader research aims and challenges of the Health and Medical Sciences programme, and ensure positive feedback to the project partnership.
- Contribute to the life of the Institute and support its community

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## PERSON SPECIFICATION

<p style="text-align: center;"><b>Skills and Requirements</b></p> <p style="text-align: center;">Post holders will be expected to demonstrate the following</p>	<p style="text-align: center;"><b>Essential (E)</b></p> <p style="text-align: center;"><b>Desirable (D)</b></p>	<p style="text-align: center;"><b>Tested at application(a)</b></p> <p style="text-align: center;"><b>Tested at interview (i)</b></p>
<b>Education/Qualification</b>		
A PhD (or equivalent experience and/or qualifications) in a relevant area which will include Mathematics, Statistics, Computer Science, or related discipline	E	A/I
<b>Knowledge and Experience</b>		
Substantial experience in statistical modelling	E	A/I
Experience in performing data analysis on substantial real-world problems	E	A/I
Significant experience of using a modern statistical programming language (such as R and Python)	E	A/I
Ability to understand and apply the principles of reproducible data science in previous research	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
Demonstrate a level of scientific comprehension to allow in performing relevant literature reviews.	E	A/I
Ability to critically evaluate experimental results and derive evidence-driven conclusions.	E	A/I
Experience in the evaluation of predictive models in a clinical setting	D	A/I
Research experience in biostatistical or clinical research studies	D	A/I
Experience of regulatory processes involving software as medical devices	D	A/I
Ability to act as an ambassador for the development and implementation of new AI regulatory evaluation processes.	D	A/I
<b>Communication</b>		
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	A/I
Adapts the style of communication to the audience and ensures understanding.	E	A/I
Ability to communicate complex, specialist or conceptual information clearly and persuasively, presenting compelling arguments to influence and/or negotiate satisfactory outcomes.	E	A/I

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<b>Decision-Making Processes and Outcomes</b>		
Ability to lead own work Independently, and make independent decisions which are low risk and that mainly affect themselves or a small number of people and are guided by regulation and practice.	E	A/I
Work with others to make collaborative decisions that may be operational or strategic and impact immediate team or work area.	E	A/I
Recommend and advise on available options for decisions that affect operational processes, taking into account any risks.	E	A/I
<b>Initiative and Problem Solving</b>		
Uses judgement to analyse and solve problems, and take action to prevent recurrence of problems.	E	A/I
Consider possible solutions to identify those which offer wider benefits, and obtain evidence to support thinking.	E	A/I
<b>Service Delivery</b>		
Proactive approach to managing stakeholders and their requirements and identifying opportunities for collaboration	E	A/I
Adapts services and systems to meet stakeholders' needs and identifies ways of improving standards. Learns from issues and takes action to resolve them.	E	A/I
<b>Analysis and Research</b>		
Ability to plan and implement rigorous analysis plans.	E	A/I
Identify and use a range of standard sources to gather and analyse routine data and produce reports that can be interpreted by others.	E	A/I
Understand when additional data is required and identifies appropriate sources. Produces reports that identify key issues and findings.	E	A/I
<b>Liaison and Networking</b>		
Participates in networks within the organisation or externally to share knowledge and information in order develop practice or help others learn.	E	A/I
Networks with others with shared interests, collaborating on projects and strengthening future relations.	E	A/I
<b>Other Requirements</b>		
Working with confidential and sensitive data for research.	E	I
Flexible attitude towards work	E	I
Commitment to EDI principles and to the Organisation values	E	I

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.

# The Alan Turing Institute

## 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](mailto:recruitment@turing.ac.uk).

If you are currently employed by a University, please provide a statement of support from the applicable Head of Department to allow secondment to The Alan Turing Institute for this project (see Terms and

Conditions below). Statement can be submitted up to a week after closing date. This is an administrative requirement only and will not be part of assessment criteria.

**CLOSING DATE FOR APPLICATIONS: Monday 31<sup>st</sup> May 2021 (23:59 BST)**

### **TERMS AND CONDITIONS**

This full-time post is offered on a fixed-term basis for two years. The annual salary range is £37,000-£40,000 plus excellent benefits, including flexible working and family friendly policies, <https://www.turing.ac.uk/work-turing/why-work-turing/employee-benefits>

For research positions: Candidates who have not yet been officially awarded their PhD will be appointed as Research Assistant with the salary of £34,500 per annum

If you are employed by a University, you will be seconded to the Institute for the duration of the project, As a secondment, funding will cover salary and on-costs only plus VAT if applicable. Payments will then be made on a quarterly basis.

### **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](mailto:HR@turing.ac.uk).***