The Alan Turing Institute

SENIOR RESEARCH ASSOCIATE, HEALTH GRAND CHALLENGE – MACHINE LEARNING FOR HEALTHCARE AND MEDICINE

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

Currently, Turing is undergoing a restructuring, moving towards a challenge-led model with three Grand Challenges (Health, Environment & Sustainability, Defence & National Security), underpinned by cross-cutting Fundamental Research. This new Turing 2.0 model focuses on world-class science and innovation and aims to generate high-quality research and translate it into real-world impact and deployment.

The Health Grand Challenge aims to become a transformative agent for the NHS and global healthcare through advanced AI solutions. Our vision is to harness the untapped innovation potential within the UK, driving significant healthcare impact and positioning the UK as a global leader in AI and healthcare integration. The Grand Challenge is structured into three themes: Knowledge, Action, and Impact (KAI), each focusing on critical areas where AI can revolutionise healthcare. These themes have the following initial incarnations:

1. Knowledge: Transforming how we harness and combine data-driven methods from millions of operational NHS patient records with exabytes of national biobank resources to create a unique multi-modal multi-domain foundation model with support from national AI compute resources to create a globally unique generative AI. We are seeking here people interested in working on next-generation foundation models, multi-modality multi-domain generative AI and fusion.

2. Action: Transforming how AI can intervene in healthcare to lighten the decision and action burden on clinician. This focuses on using operational data from patient state and clinician's actions to use methods from offline reinforcement learning, casual learning, system identification, data-centric biomedical engineering and digital twins. The approach is currently already being deployed in critical care and mental health AI systems, and we seek to deepen and broaden these to other domains of medicine.

3. Impact: Focussing on developing the underpinning AI technology platforms that enables us to combine vast distributed data sources in a privacy-preserving manner, shape AI and human interaction and cooperation.

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We are seeking highly skilled Senior Research Associates with backgrounds in machine learning, AI, statistics, control engineering, natural language processing, and medical image understanding to join us in this pioneering endeavour. Specific research will be based in one of the three initial themes and may involve activity in the following topics:

- Large Health Models beyond large language models that comprise multi-modal and multi-domain models
- Next generation sequential data modelling beyond transformers
- Uncertainty Quantification
- Domain Adaptation & Transfer Learning
- Model Calibration
- AI for data curation
- Behaviour Analytics
- Mobile & Wearable Health Systems
- Explainable and Interpretable AI
- Safe & Trusted AI including methods for model assurance and validation
- Causal Inference & Learning from Biomedical Data
- Human-AI cooperation & interaction
- Data-centric Biomedical Engineering
- Data-derived Digital twins
- Offline Reinforcement Learning
- Multi-modal, multi-domain foundation models
- Privacy Preserving Machine Learning

ROLE PURPOSE

The primary purpose of this role is to contribute to the Grand Challenge in Health by advancing Knowledge, Action, and Impact. As Senior Research Associates, you will leverage your expertise to develop innovative AI models and solutions that address complex healthcare problems. You will work collaboratively with a multidisciplinary team to drive forward the Institute's vision of transforming healthcare through AI, ensuring that research outcomes have practical, real-world applications and impact.

DUTIES AND AREAS OF RESPONSIBILITY

- Provide technical project management and leadership for research projects, ensuring successful outcomes
- Liaise with clients and colleagues to understand and prioritise project goals, and balance client value with research outputs
- Define the research direction in collaboration with Principal Investigators (PIs).
- Be a point of contact, supporting PIs in engaging with stakeholders regarding projects and deputising in meetings where necessary.
- Take 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.
- Lead on the preparation of proposals and applications to external bodies, e.g., for funding and contractual purposes.
- Present, disseminate and explain our work at meetings/events and contribute to both the internal and external visibility of the Institute.
- Take responsibility for driving collaboration with academic experts and broader research partners from across the Turing, and the wider Turing / project community.
- Supervise the work of junior members of the team and provide guidance as required
- Line manage direct reports if required
- Contribute to the life of the Institute and support a diverse and inclusive community through embracing the Turing values.
- Adhere to and promote principles of reproducible and ethical data science and ensure secure handling of data and health and safety in all aspects of work.

Specific to the project/programme/role:

- **Research and Development**
    - Play a leading role in undertaking high-quality independent research, actively contributing, and steering to the broader research aims of the Health Grand Challenge
    - Undertake high-quality cutting-edge research in AI, machine learning, statistics, control engineering, natural language processing, and medical image understanding
    - Develop and implement novel algorithms and models that align with Knowledge, Action, and Impact
    - Collaborate with other researchers to integrate multimodal and multi-domain data into comprehensive AI solutions
- **Collaboration and Communication:**
    - Work closely with healthcare professionals, data scientists, and engineers to translate research findings into practical healthcare applications.
    - Present research outcomes at national and international conferences and publish in high-impact journals.
    - Engage with stakeholders across the NHS and global healthcare sectors to ensure alignment and impact of research activities.
- **Mentorship and Supervision:**
    - Provide guidance and mentorship to PhD students and junior researchers.
    - Supervise research projects and contribute to the academic development of team members.

OTHER DUTIES

- Travel may be necessary to meet the requirements of the role.
- 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 Computer Science, AI, Machine Learning, Statistics or similar inter-disciplinary subjects.	E	A
Knowledge and Experience		
Proven research experience in machine learning and AI	E	A/I
Expertise in natural language processing and medical image understanding	E	A/I
Knowledge of reinforcement learning and causal statistics	E	A/I
Evidence of high-quality publication(s) in a relevant field (published or in-press) commensurate with your career stage	E	A
Substantial research experience in their field of expertise with commensurate output	E	A/I
Evidence of high-quality publication(s) in a relevant field commensurate with your career stage	E	A
Experience in interdisciplinary research and collaboration	D	I
Experience with privacy-preserving machine learning	D	I
Familiarity with large-scale biomedical or patient databases	D	I
Experience in scoping and investigating independent research questions within a given overarching theme	D	I
Experience in line management	D	A/I
Previous experience overseeing and supervising more junior colleagues' work	D	A/I
Communication		
Excellent written and verbal communication skills including the ability to present complex or technical information, and to communicate effectively with diverse audiences	E	A/I
Ability to adapt the style of communication to the audience and ensure understanding whilst negotiating and influencing where needed	E	A/I
Analysis and Research		
Ability to carry out research independently and take the lead on writing up findings as they emerge	E	A/I
Project Management & Project Delivery		
Ability to initiate, plan and prioritise research projects and ensure effective use of research resources	E	I

Proactive approach to managing stakeholders and their requirements and identifying opportunities for collaboration	D	I
Wiling to seek opportunities to make improvements and be proactive in identifying sources of funding/income	D	I
Teamwork and Motivation		
Ability to work effectively both as part of a team and in cross collaboration with other teams as required by the role	E	I
Decision- Making Processes and Outcomes		
Ability to advise on available options for decisions that affect operational processes, considering any risks	E	I
Other Requirements		
Commitment to EDI principles and to the Organisation values (outlined below)	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.

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. The covering letter should address:

- Why you are applying for this position
- How you qualify for this position (see criteria under "Person Specification")
- Publication list (if not covered in CV)

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 15 September 2024 at 23:59 (LONDON, UK BST)

Interviews are expected to take place from week commencing 30 September 2024.

TERMS AND CONDITIONS

This post is offered on a full time, fixed-term basis for 3 years. The annual salary is £55,184 - £63,971 plus excellent benefits, including flexible working and family friendly policies, https://www.turing.ac.uk/work-turing/why-work-turing/employee-benefits.

The Turing operates a hybrid model. We would like the successful candidate to be in our office (London) 3 days per week.

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***.***