

# The Alan Turing Institute

## Lead Research Data Scientist – Edge AI

### 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 Defence and Security programme at the Turing is looking to build a newly funded research group the AI Research Centre for Defence (ARC-D) working on real world problems in AI. As a team, we aim to advance the state-of-the-art and publish cutting edge research in AI and data science. This role is focused on leading development in edge AI technologies designed for real time low size, weight, and power (SWaP) scenarios. This is a permanent lead technical research post to work in the Defence and Security programme at the Alan Turing Institute. Day to day we collaborate with technical and subject matter experts from our partner organisations as well as academics, software engineers, and data scientists from across the Turing's research community. Your role will be to work both independently and collaboratively with the PIs and other researchers in the programme working in domains as diverse as: future sensing, space systems, the metaverse, human-machine teaming, electromagnetic activities, and communications and networks.

The Defence and Security programme at the Alan Turing Institute delivers an ambitious programme of data science and artificial intelligence research that will impact real world scenarios. We provide a rewarding, fast-paced and innovative environment with the opportunity to get close to the application, and work embedded with defence and security partners with a wide range of expertise.

### ROLE PURPOSE

The Lead Research Data Scientist position involves technical leadership of projects or service delivery of a small team in areas that support significant research programmes in the institute. The role takes responsibility for shaping the strategic direction of the project or service, delivering project outputs, and managing relationships with external stakeholders. They also work closely with the Research Programmes and play a significant role in the development and scoping of novel projects for the team that supports the research mission of the institute.

The role will sit within the new Artificial Intelligence Research Centre for Defence (ARC-D) which is aiming to become a world-class group focussed on delivering the research needed to advance UK capabilities in AI and Data Science in the defence and security domain. This involves both the application of existing AI algorithms and techniques as well as fundamentally advancing the state of the art of AI.

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The technical scope of the role involves:

- The application of modern AI techniques at the edge e.g. CNNs, transformers, autoencoders, GNNs, reinforcement learning
- Efficient implementation of complex AI algorithms for automated real time onboard collection, analysis and exploitation of data on low size, weight and power (SWAP) platforms e.g. pruning and quantisation of networks, handling sparsity, and missing data
- Embedded hardware and software for multi-purpose, multi-sensor autonomous systems
- Novel approaches to increasing the transfer and through-put of data and reducing latency e.g. in-network computing
- Distributed computing approaches to optimise resource allocation and computation for increased efficiency and improved resiliency.
- Novel approaches to 3D classifiers and reconstruction
- Perform technical edge AI assessments and trials.
- Managing of data scientists/research associates working on edge AI projects
- Ensure compliance with the secure handling of data and health and safety with all aspects of their work.

**If not already held, successful candidates will need to be willing to undertake the SC/DV process once in-post. Eligibility criteria and further information on the process can be found on the [UK Government security vetting website](#).**

## DUTIES AND AREAS OF RESPONSIBILITY

- Provide technical leadership and project management on multi-person projects (2 to 4 people), guiding the project directions synergistically with other related efforts and align with the strategic research goals of the institute. Able to liaise with the PI and oversee the contribution to a larger project, delegate work packages and other tasks to team members, and take responsibility for their completion over the lifetime of the project.
- Are the primary person responsible for delivery of a service area of strategic importance to the Institute. The team member is expected to shape the effort to align with the strategic goals of the institute, coordinate team activities, manage delivery of several independent areas, solicit feedback, and tweak services in response to the changing operational needs of the Institute.
- Provide leadership for the team involvement in external projects within one or more domain challenge areas:
  - Work closely with the Programme Director to ensure projects align with the strategic research directions of the programme and draw upon the skills and experience of team members.
  - Mentors a Senior member of staff in this process, delegating work as is appropriate.
  - When necessary, author or contribute to research proposals to support these efforts.
- Line manage a team including their performance and supporting their career development aspirations.
- Present, disseminate and explain research outputs to external stakeholders and research collaborators via presentations, reports and well-documented software packages.
- Contribute to the life of the Institute and support its community:
  - Participates in broader Turing networks related to project work.
  - Support development of new internal projects and ways of working in conjunction with colleagues and other service delivery units in the Institute.
  - Deliver teaching and training to colleagues and students, including within the team in our regular skills sessions.
  - Support research colleagues to make the most of the Institute's secure high performance computing environments for advanced research.
- Develop, implement, and adapt state-of-the-art and novel data science, and artificial intelligence techniques emerging from the Institute and elsewhere to problems faced by the Turing's partners.

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- Understand the problems of the Turing's partners and develop appropriate approaches to solving these problems.
- Perform experiments and develop capabilities, which might include: building and deploying machine learning models; applying data science, statistical and algorithmic techniques to data, designing and implementing data collection trials
- Ensure compliance with the secure handling of data and health and safety with all aspects of their 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                                                                                                                                                                                                                                                                                                                                                                | Essential (E)<br>Desirable (D) | Tested at application (A)<br>Tested at interview (I) |
| Post holders will be expected to demonstrate the following:                                                                                                                                                                                                                                                                                                                            |                                |                                                      |
| <b>Education/Qualification</b>                                                                                                                                                                                                                                                                                                                                                         |                                |                                                      |
| A PhD (or equivalent experience and/or qualifications) in a relevant area, which will include Computer Science, Data science, Physics, Engineering, Mathematics or related discipline.                                                                                                                                                                                                 | E                              | A                                                    |
| Undergraduate-level degree or higher in computer science, engineering, data science, mathematics, statistics or related-discipline                                                                                                                                                                                                                                                     | E                              | A                                                    |
| <b>Knowledge and Experience</b>                                                                                                                                                                                                                                                                                                                                                        |                                |                                                      |
| Strong mathematics/physics, computing or engineering background, and preferably a strong AI background                                                                                                                                                                                                                                                                                 | E                              | A, I                                                 |
| Strong background in one or more of the following areas: autonomous systems, embedded hardware and software, edge computing, machine learning, reinforcement learning, adversarial AI, FPGAs, sensor systems, UAV technologies, neural network accelerators, neuromorphic computing                                                                                                    | E                              | A, I                                                 |
| Experience developing software in a scientific computing context, ideally in Python, including the use of established libraries such as NumPy, Tensorflow, Keras, PyTorch, scikit-learn, pandas, numpy, scipy, matplotlib, and RL specific frameworks such as Ray/RLlib, Stable Baselines. Experience in development suites, systems and versioning products (e.g., Git, IDEs, Linux). | E                              | A, I                                                 |
| Development of algorithms that enable adaptability to changing conditions in open world problems                                                                                                                                                                                                                                                                                       | E                              | A, I                                                 |
| Interest in and or knowledge of multi sensor datasets                                                                                                                                                                                                                                                                                                                                  | E                              | A, I                                                 |
| Developing for high performance hardware (CUDA, MPI, OpenMP)                                                                                                                                                                                                                                                                                                                           | D                              | A, I                                                 |
| Experience with public cloud platforms and related technologies                                                                                                                                                                                                                                                                                                                        | D                              | A, I                                                 |
| Experience leading a research project with a focus on edge AI, robotics, autonomous systems, or UAVs                                                                                                                                                                                                                                                                                   | E                              | A, I                                                 |
| Experience leading a project to a successful conclusion.                                                                                                                                                                                                                                                                                                                               | E                              | A, I                                                 |
| Experience conducting and publishing research to the standard required by top-tier peer reviewed journals                                                                                                                                                                                                                                                                              | E                              | A, I                                                 |
| 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)                                                                                                                                                  | E                              | A, I                                                 |
| <b>Communication</b>                                                                                                                                                                                                                                                                                                                                                                   |                                |                                                      |
| Excellent written and verbal communication skills, including experience in the authoring of research papers or technical reports, and giving presentations or classes on technical subjects                                                                                                                                                                                            | E                              | A, I                                                 |
| Ability to negotiate and influence others                                                                                                                                                                                                                                                                                                                                              | E                              | I                                                    |
| <b>Project Delivery</b>                                                                                                                                                                                                                                                                                                                                                                |                                |                                                      |
| Ability to shape the direction of projects, deliver project outputs and manage relationships with key external stakeholders                                                                                                                                                                                                                                                            | E                              | I                                                    |
| Ability to provide technical leadership of projects that support significant research programmes in the institute.                                                                                                                                                                                                                                                                     | E                              | I                                                    |

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| <b>Decision Making</b>                                                                                                                                   |   |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|---|------|
| Independently make decisions which are low risk and that mainly affect themselves or a small number of people and are guided by regulation and practice. | E | I    |
| <b>Initiative and Problem Solving</b>                                                                                                                    |   |      |
| Ability to lead one's own work independently, including planning and execution                                                                           | E | I    |
| Ability to use own judgement to analyse and solve problems                                                                                               | E | I    |
| <b>Analysis and Research</b>                                                                                                                             |   |      |
| Experience managing, structuring, and analysing research data.                                                                                           | E | A, I |
| Ability to lead research within formal or informal teams and work collaboratively within a team of researchers.                                          | E | I    |
| Ability to adopt appropriate data analysis methods for the purpose, and produce simple reports to present the findings                                   | E | I    |
| <b>Team Development</b>                                                                                                                                  |   |      |
| Ability to support and demonstrate routine procedures to new team members                                                                                | E | I    |
| <b>Other Requirements</b>                                                                                                                                |   |      |
| Commitment to EDI principles and to the Organisation values                                                                                              | E | I    |
| A willingness to undergo the SC/DV process once in post if not already held.                                                                             | E | I    |

# 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 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 3533 or 0203 862 3516, or email [recruitment@turing.ac.uk](mailto:recruitment@turing.ac.uk).

**CLOSING DATE FOR APPLICATIONS: Sunday 7 May 2023 at 23:59**

## TERMS AND CONDITIONS

This full-time post is offered on a permanent basis. The annual salary is £62,666 - £67,200 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.

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