The Alan Turing Institute

Data Scientist, EME

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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 300 researchers, a rapidly growing team of in-house research software engineers and data scientists and a business team.

BACKGROUND

The Defence & Security programme at the Turing is looking to expand a newly formed team of data scientists working on real-world problems in the radio frequency domain aligned with defending and securing the UK. As a team, we bring together cutting-edge research and motivating mission challenges, using our data science, software engineering and stakeholder management skills to create next generation capabilities for our partners. This is a senior technical research post to work in the defence and security programme at the Alan Turing Institute in London. 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 Private Investigators (PIs), and other researchers in the Defence Artificial Intelligence Research (DARe) centre who are working in domains as diverse as: future sensing, space systems, human-machine teaming, synthetic environments, and edge AI.

The ideal candidate is inquisitive, enjoys solving complex, challenging problems, and thinks creatively to find non-obvious solutions. We are a cross-disciplinary team and encourage applications from both generalists and specialists including those who self-identify as software engineers, computer scientists, machine learning practitioners, physicists, mathematicians, statisticians or more widely as data scientists or data engineers.

The team practices an agile, experiment-driven approach and values a positive, supportive and collaborative environment in which 'radical candor' and 'lifelong learning' are encouraged. We embrace failure as a learning opportunity and necessary precursor to success. We are empowered to take ownership of our work and operate with a high level of autonomy in our roles, to deliver measurable impact to our partners.

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ROLE PURPOSE

This technical role sits within the Electromagnetic Environment (EME) team (part of DARe) which is aiming to become a world-class group focused on delivering the science needed to improve our understanding, management, and exploitation of the electromagnetic environment through the application of AI technologies. This involves both the application of existing AI algorithms and techniques as well as fundamentally advancing the state of the art of AI.

Data Scientists perform investigations based on tasking from D&S partners to derisk new technologies and create proof-of-concept work to inform future research. Investigations often involve understanding whether a new algorithm is suitable for a particular problem, how academic technology performs when applied in real- world situations, and what the potential drawbacks of adopting a new technology are.

EME projects usually last 1-2 years, are exploratory, have a high risk of failure, and generally output Proof of Concept code and technical write-ups. Work is done in collaboration with other EME members. Senior Data Scientists are expected to provide support and consultancy to more junior team members, as well as providing technical leadership on their team projects. The technical scope of the role includes:

- The application of modern AI techniques to the RF domain e.g. GNNs, transformers, autoencoders, reinforcement learning.
- Developing novel multi-modal AI approaches to the fusion of data from multiple sensors
- Developing new techniques for the detection, recognition, identification, localisation, and exploitation (DRILE) of radio frequency signals.
- Understanding of electronic protection measures (EPM), electronic support measures (ESM) and electronic attack (EA).
- Understanding of RF transmitter and receiver concepts, modelling, and wave propagation, including waveforms, channel effects, multipath, transmitter idiosyncrasies e.g. amplifier effects, oscillator offset and drift on signals, and network topologies.
- Performing technical electromagnetic assessments and trials.
- Contribution to and involvement in the team running of the Turing's AI for RF special interest group.

DUTIES AND AREAS OF RESPONSIBILITY

- Engage with scientists from the EME's Defence and Security partners to learn their aims and requirements and understand and identify problems they face.
- Apply state-of-the-art Machine Learning, Data Science, and radio frequency techniques emerging from the Institute, broader academia and industry to problems faced by EME partners, both as part of unclassified EME projects and on partner systems.
- Perform rigorous investigations into new algorithms and applications, providing consultancy to inform our Partners' decisions and developing high-quality proof-ofconcept outputs which can be deployed in real-world situations.
- Design and carry out rigorous experimentation and development with some guidance from Principal staff, both alone and in small teams, and guiding collaborations to success.
- Present, disseminate and explain our work via presentations, reports and workshops.
- Liaise with clients and colleagues to understand and prioritise project goals, balancing client value with research outputs.
- Comply with the secure handling of data and health and safety with all aspects of their work.

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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.

Successful candidates will be subject to a Dstl research workers form check at the offer stage.

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		
Experience in a field with significant use of physics, engineering, advanced statistical or numerical methods, data science or computer programming evidenced by: • a PhD degree; or • equivalent professional experience.	E	A/I
Must be eligible to hold a UK SC clearance and secure SC clearance within 6 months of the commencement of their employment, or in such longer period as the Institute may in its absolute discretion consider reasonable to obtain such clearance.	E	A
Knowledge and Experience		
Practical experience applying Machine Learning to real world problems ***or*** strong theoretical knowledge and academic experience with Machine Learning and adjacent topics or demonstrated experience developing algorithms for transmitting, processing and analysing radio frequency signals	E	A/I
Demonstrable recent experience developing novel algorithms for transmitting, processing and analysing radio frequency signals or AI for physics/maths/engineering/communications and networks/radar problem sets	E	A/I
Fluency in one or more modern programming languages used in research in data science and artificial intelligence. We primarily work in Python, but demonstrable use of other programming languages for research, together with a facility for learning new languages, will be considered. Experience with Machine Learning frameworks such as PyTorch is beneficial.	E	A/I
An understanding of the importance of good practices for producing reliable software and reproducible analyses, such as version control, issue tracking, automated testing, package management and literate analysis tools such as Jupyter and Rmarkdown.	E	A/I
Experience working with customers to identify, understand and refine problems, scoping data science work to solve them.	E	A/I
Experience working on a research project with a focus on AI or Radar or Communications and Networks.	E	A/I
Direct experience developing and deploying technologies in support of Defence and National Security organisations.	D	A/I
Experience conducting and publishing research to the standard required by top-tier reviewed journals (e.g. arecent RF publication in a peer-reviewed journal).	E	A/I

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Communication		
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	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
Teamwork and Motivation		
Ability to lead one's own work independently, including planning and execution.	E	I
Service Delivery		
Ability to work effectively as part of a remote team, when necessary, with collaborators and stakeholders.	E	I
Adapts services and systems to meet stakeholders needs and identifies ways of improving standards.	E	I
Decision Making		
Able to contribute to discussions and make decisions as part of team.	E	I
Analysis and Research		
Experience of structuring, analysing and visualising research data and the results of computational experiments.	E	A/I
Demonstrated enthusiasm and ability to rapidly assimilate new computational and algorithmic ideas and techniques on the job, at a more than superficial level, and apply them successfully.	E	A/I
Other Requirements		
Commitment to EDI principles and to the Organisation values.	E	I
The ability to obtain a UK Security Clearance (SC) as a minimum once in post	E	A

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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: FRIDAY 17 JULY AT 23:59 (LONDON, UK BST)
We reserve the right to close this vacancy early or to interview suitable candidates before the closing date if enough applications are received.

TERMS AND CONDITIONS

This full-time post is offered on a permanent contract. The annual salary is £45,505 - £51,241 plus excellent benefits, including flexible working and family-friendly policies, https://www.turing.ac.uk/work-turing/why-work-turing/employee-benefits.

Must be eligible to hold a UK SC clearance and secure SC clearance within 6 months of the commencement of their employment, or in such longer period as the Institute may in its absolute discretion consider reasonable to obtain such clearance.

Successful applicants will be subject to a Dstl research workers check at offer stage.

EQUALITY, DIVERSITY, AND INCLUSION

The Alan Turing Institute is committed to creating an environment where diversity is valued and everyone is treated fairly. We value diversity of background, experience, and perspective, and are proud to be an inclusive employer. We warmly encourage applications from all backgrounds, particularly from groups currently under-represented in our sector. If you feel passionate about this role but don't meet every single requirement, please apply — we recognise that great candidates may bring strengths beyond the criteria listed.

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.

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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 Our Values.