

The Alan Turing Institute

RESEARCH ASSOCIATE – Digital Twins for the Economy

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 Alan Turing Institute is looking to build on existing research success at the intersection of machine learning data science and economics. The efficient use of data is the basis of risk management and decision making in the broader economy. Classical casual models for decision making has been built around simplified models and 'small-data' paradigm. This has enabled decision-makers to make decisions without a need for large-scale computation, but the conclusions which can be drawn from these models, and the accuracy and reliability of their predictions are limited. On the other hand, reinforcement learning provides a mathematical formalism for learning-based control, but at the cost of exploration or interventions that might be costly or impossible for high stake decision making. Therefore there is a need for developing tools for assessing risk and uncertainty for offline (when models are trained using historical data) and online (when models are being reevaluated and improved while decisions are being made) decision making.

The successful candidate should show considerable promise in research in at least one of the following areas: Reinforcement Learning, Bayesian Inference and Probabilistic Machine Learning, Uncertainty quantification and Data Assimilation Methods for online calibration of time-dependent models, Mathematical Modelling of collective behaviour of interacting systems, Computational Optimal Transport, Mean-field Game Theory or Stochastic Control.

The post offers the applicant an exciting opportunity to pursue world-class research and to develop her/his career. The ideal candidate will have a demonstrated ability to work in a highly collaborative manner and be enthusiastic about engaging widely across disciplinary boundaries and with industry, government and the third sector.

Particular areas of focus in the project:

- modelling of complex systems and their calibration using large scale but disparate data sources;
- building methods to enable robust decision making with uncertainty and online and offline learning;

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ROLE PURPOSE

This project will be run within the SPF-funded programme on AI for Science and Government, based at The Alan Turing Institute. This programme is focussed on research in data science, with accompanying translational activities to ensure impact in the fields applied science, engineering, urban analytics governance, as well as education and training components, in keeping with the vision, mission and charitable aims of the Turing Institute. This post is an appointment to the **Digital Twins for the Economy** group within the programme on AI for Science and Government at the Alan Turing Institute. You will join a team of researchers affiliated with the Alan Turing Institute working on projects involving the development of theory and methodology related to the modelling, calibration and control of complex models. The applicant will be expected to manage collaborations with other researchers within the ASG programme, as well as with relevant stakeholders from government bodies and industry.

Informal enquiries may be addressed to Ms Catherine Morrton (cmorton@turing.ac.uk). Please note that applications sent directly to this email address will not be accepted.

Main Responsibilities

- Conduct research at the top international level, in collaboration with others across the Turing, university partners, industry partners and the community beyond, towards outputs and outcomes that yield significant academic, societal or economic impact.
- Play a role in advancing the Turing's ASG Programme.

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PERSON SPECIFICATION

<p style="text-align: center;">Skills and Requirements</p> <p style="text-align: center;">Post holders will be expected to demonstrate the following</p>	<p style="text-align: center;">Essential (E)</p> <p style="text-align: center;">Desirable (D)</p>	<p style="text-align: center;">Tested at application(A)</p> <p style="text-align: center;">Tested at interview(I)</p>
Education		
Research Associate level: PhD in Mathematics, Statistics, Economics, Operations Research, Computer Science or closely related discipline.	E	A
Research Assistant level: Near completion of a PhD or equivalent level of professional qualification in Mathematics, Statistics, Economics, Operations Research, Computer Science or closely related discipline.	E	A
Knowledge and Experience		
A solid background in one or more of the following: Probability Theory, Stochastic Analysis and Control, Bayesian Inference and Probabilistic Machine Learning, mathematical Modelling of collective behaviour of interacting systems and rigorous agent based modelling.	E	A
Experience in design, development and implementation of research software libraries, ideally using one of the following: Python, R, Julia and their associated frameworks.	D	A&I
Track record of the ability to initiate, develop and deliver high quality research aligned with the research strategy indicated by the PI and any industrial stakeholders and to publish in peer reviewed journals and conferences	E	A&I
Hands-on experience with Machine Learning methods	E	A/I
Demonstrated enthusiasm and ability to rapidly assimilate new computational and mathematical ideas and techniques on the job, at a more than superficial level, and apply them successfully.	D	A/I
A PhD in a quantitative field, or publication record showing equivalent experience, with demonstrated sustained intellectual leadership in an area of relevance.	E	A
Track record of outstanding research and in delivering impact.	E	A
Ability to create and promote a collegial and collaborative approach to interdisciplinary research activities.	D	A/I
Excellent written and verbal communication skills, including experience in publishing research papers, code libraries or technical reports and giving presentations or classes on technical subjects.	E	A/I
Communication		
<ul style="list-style-type: none"> • The ability to initiate, plan, organise, implement and deliver programmes of work to tight deadlines. • Good effective communication (oral and written) skills, presentation and training skills. • Good interpersonal skills. 	E	I

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<ul style="list-style-type: none"> • A developing track record in producing high quality academic publications. • Ability to write research reports and papers in styles accessible to both academic and lay audiences. 	D	I
Teamwork and Motivation		
<ul style="list-style-type: none"> • The ability to work in a team and interact professionally within a team of researchers and PhD students. 	D	I
Teaching and Learning		
Teaching may be required as part of the role.	E	A/I
Other Requirements		
Commitment to meeting deadlines	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.

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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, covering letter and contact details for your referees. If you have questions about the role or would like to apply using a different format, please contact them on 0203 862 3340, or email recruitment@turing.ac.uk.

CLOSING DATE FOR APPLICATIONS: 13 December 2020 at 23:59.

TERMS AND CONDITIONS

This full-time post is offered on a 2 year fixed-term basis starting 1 January 2021. The annual salary is £35,000-£41,000 (depending on experience) plus excellent benefits, including flexible working and family friendly policies, <https://www.turing.ac.uk/work-turing/why-work-turing/employee-benefits>

Candidates who have not yet been officially awarded their PhD will be appointed as Research Assistant within the salary range £32,000-£34,000 per annum

This job description is written at a specific time and is subject to change as the demands of the Institute and the role develop. The role requires flexibility and adaptability and the post holder needs to be aware that they may be asked to perform tasks and be given responsibilities not detailed in this job description.

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 can also be made for any candidates with a disability.

Please note all offers of employment are subject to continuous eligibility 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.