Research Associate in Economic Networks & Transactions

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 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 several 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 Finance and Economics programme brings together leading experts in data science, machine learning, finance and the social sciences, from both academia and industry to tackle the most challenging questions by producing world-leading research with significant impact. The Institute has recently partnered with the Office for National Statistics (ONS) with the aim of developing cutting-edge machine learning and data science tools and working on unique national statistics data sets to gain new insights into the broader economy.

Our aim is to build close research links between our two organisations, and to yield research output that will bring tangible benefits in the short-to-medium-term. It is our shared goal that these initial two-year projects will serve as a starting point for a longer-term, multi-faceted relationship. We share the ambitious and exciting goal of advancing economic data science and mapping the economy in real-time for the benefit of the UK's economy, society and population. To do this we will access novel, real-time, large scale datasets that bring about exciting research opportunities.

ROLE PURPOSE

The successful candidates will join the **Economic Networks and Transaction Data** project. This project will build on new, large scale datasets on firm-to-firm transactions held by the ONS. The successful candidate will have the opportunity to be at the heart of the development of new economic statistics, develop economic models of production networks that can leverage large scale datasets, and develop methods for efficiently reducing the dimensionality and complexity of network-generated data.

The research will combine traditional methods in economics and economic statistics with new methods from machine learning and network analysis, with the aim of understanding supply chain

disruptions, business cycles and industry co-movement, and the evolution of production networks at high and medium frequency.

The successful candidate will join a vibrant team of researchers and will have opportunities to engage with projects / experts. The candidate will work closely with a team of data scientists at the ONS, another Turing postdoc, Vasco Carvalho (Cambridge) and François Lafond (Oxford). The candidate will have opportunities to engage with other partners in the larger programme, including Sam Cohen, Gesine Reinert, Doyne Farmer, Terry Lyons & Mihai Cucuringu (Oxford), Aureo de Paula & Lars Nesheim (UCL), and Lukasz Szpruch (Edinburgh).

This position is open to pre-doctoral and post-doctoral candidates.

DUTIES AND AREAS OF RESPONSIBILITY

- Apply state-of-the-art and novel machine learning and network analysis techniques emerging from the Institute and elsewhere to the business-inspired research challenges of the Turing partnerships:
    - o Develop methods for utilising transaction level data in a national statistics context.
    - o Contribute to the development of input-output network models, including estimation of these models from disparate data sources.
    - o Develop data-science tools and pipelines to provide economic indicators at various levels of geographic and temporal aggregation, to an industrial standard.
    - o Develop metrics for evaluating the utility, similarity, and privacy of synthetic data sets across multiple use cases.
    - o Enable data sharing between organisations and different departments within an organisation.
- Scope, pilot and deliver high quality research activity in partnership with partner stakeholders, and under the Direction of the Principal Investigator and Programme Director:
    - o Understand which data are, or might be, available; and collect and manage this data, in collaboration with the ONS.
    - o Drive the development of mathematical and statistical techniques for the inference of large, sparsely observed networks.
    - o Document processes for effective and efficient reuse across multiple domains.
- Drive collaboration with academic experts and broader research partners from across the Turing and the wider Turing community
- Publish and disseminate high-quality research papers and publications detailing research output and project case-studies.
- Become part of the broader partnership team and be expected to engage on a regular basis with the partner.

Other duties:

The successful candidate may be expected to:

- Present, disseminate and explain our work at internal and external events hosted by Turing and/or the partner.
- Contribute to the life of the Institute and support its community.

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.

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		
Research Associate level: PhD in Economics, Statistics, Mathematics, Operations Research, Computer Science or closely related discipline.	E	A
Research Assistant level: Degree or professional qualification in Economics, Statistics, Mathematics, Operations Research, Computer Science or closely related discipline.	E	A
Knowledge and Experience		
A solid background in one or more of the following: Macroeconomics, National and Financial Accounting, Network Science, Machine Learning, Mathematical modelling of collective behaviour of interacting systems.	E	A
A demonstrable interest in quantitative economic modelling. Experience with the economic analysis of large, firm-centric or payment-system datasets would be highly advantageous.	E	I
Experience in design, development and implementation of research software libraries, ideally using one of the following: Python, R, Julia and their associated frameworks.	E	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	D	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
Track record of outstanding research and in delivering impact appropriate to career stage.	E	A
Ability to create and promote a collegial and collaborative approach to interdisciplinary research activities.	D	A&I
Communication		
The ability to initiate, plan, organise, implement and deliver programmes of work to tight deadlines.	E	I

Good effective communication (oral and written) skills, presentation and training skills, including the ability to explain technical concepts to technical and non-technical audiences.	E	I
Ability to write research reports and papers in styles accessible to both academic and lay audiences.	D	A/I
Teamwork and Motivation		
The ability to work in a team and interact professionally within a team of researchers and PhD students from a variety of professional backgrounds.	D	I
Analysis and Research		
Ability to organise working time, take the initiative, and carry out research independently, under the guidance of the PI	E	I
Ability to use own judgement to analyse and solve problems	E	I
Liasion and Networking		
Participates in networks within the organisation or externally to share knowledge and information in order develop practice or help others learn	E	A/I
Decision Making Processes and Outcomes		
Independently makes 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
Other Requirements		
Commitment to meeting deadlines	E	I
Commitment to EDI principles and to the Organisation values	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.

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 3546, or email recruitment@turing.ac.uk.

TERMS AND CONDITIONS

This full-time post is offered on a 2-year fixed-term basis. The annual salary is £38,000-£46,200 (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. The start date is as soon as possible, by agreement.

Candidates who have not yet been officially awarded their PhD will be appointed as Research Assistant at a salary of £36,236 per annum

ONS security clearance

Successful candidates must pass a disclosure and barring security check carried out by the ONS.

Successful candidates must meet the security requirements before they can be appointed.

The level of security needed is security check.

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 teal to reflect this. We therefore welcome applications from the broadest spectrum of backgrounds.

Reasonable adjustments to the interview process will 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***.***