

The Alan Turing Institute

POSTDOCTORAL RESEARCH ASSOCIATE – AGENT-COMPUTING MODELS TO STUDY SOCIO-ECONOMIC SHOCKS AND POLICY INTERVENTIONS (x2)

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

[SHOCKS AND RESILIENCE RESEARCH PROJECT](#)

Measuring policy impact in the Covid-19 crisis and building resilience against future shocks.

The Covid-19 crisis has highlighted how vulnerable societies and governments are to shocks. This vulnerability is exacerbated by the propensity to design policy for narrow siloes relating to singular policy areas and government departments, without adequate consideration of the interdependencies between them and the interconnected nature of local and global societies. The pandemic has brought into focus that resilience in one policy area (e.g. health) can come at the cost of resilience in another (e.g. the economy). The overall aim of this large-scale, 2-year research project is to develop a better understanding of resilience in interconnected health, social, and economic systems and to use this understanding to identify robust policy measures.

The project brings together multidisciplinary expertise from across the Turing community, including in health, public policy, economics, and urban analytics. We are hiring nine postdoctoral research associates for this project, who will work collaboratively to develop a rigorous understanding of societal responses to shocks and a clear strategy for how to engender policy resilience. To achieve our aims, we will require reliable, consistent, real-time, fine-grained data sources, as well as integrative, highly-granular models that bring together policy areas and cross disciplinary boundaries.

We recommend reading [the project's website](#). This project is supported entirely by public funds, through Wave 1 of the UK Research and Innovation Strategic Priorities Fund, under EPSRC Grant EP/T001569/1.

ROLE PURPOSE

We are looking to hire two outstanding researchers in the overlapping fields of Complexity Economics and Computational Social Sciences with significant expertise in agent-computing modelling to join a

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multidisciplinary team of data scientists and expert modellers as part of an exciting project on shocks and resilience. The aim of these roles is to develop data-rich and theoretically grounded models on the economic and societal impacts of the Covid-19 pandemic as well as other types of shocks. The first PDRA will concentrate on labour market dynamics, with an emphasis on pandemic scenarios. They will work closely with an expert in epidemiological modelling. The second PDRA will investigate broader classes of shocks and their impact in various socioeconomic dimensions, for example, in financial markets, across supply chains, on the housing market, on educational outcomes, or on income inequality. Both post-holders will have experience in sourcing different types of large-scale datasets (this may include non-structured ones), pre-processing, analysing, and in coupling them with highly disaggregated computational models through adequate parameter estimation methods. Both PDRAs will also engage with government stakeholders, so having some experience regarding the viability and limitations of policy interventions is ideal. They will report to the Deputy Director of the Turing's Public Policy Programme and will work closely with the other members of the project's team.

DUTIES AND AREAS OF RESPONSIBILITY

The core responsibilities are as follows:

- To develop highly-resolved agent-computing models of the socio-economic impacts of the Covid-19 pandemic and other types of shocks. Such models should take full advantage of different types of large-scale data and should facilitate the experimentation of different types of policy interventions.
- Identify and curate data sources that can be used to calibrate/estimate and validate the models.
- Design and implement realistic policy intervention experiments, and translate the results into intuitive lessons for policymakers.
- Work with the eight other postdoctoral research associates across the shocks and resilience project to inform their models, and distil principles of resilience from the research of the project as a whole.
- Collaborate with the senior academics overseeing this research project, as well as the eight other postdoctoral research associates, in pursuing the research agenda described above.
- Develop work plans to ensure timely delivery of objectives and assist with quarterly grant reports.
- Build and maintain relationships with policy-makers and socio-economic modelling groups as part of the research project's external engagement strategy.
- Prepare research outputs that are tailored to a diverse audience, ranging from policy-makers to academic researchers, civil society, and the general public; present papers and research outputs at external conferences and events.
- Work in close coordination with the Turing's Health and Public Policy Programmes to maximise the project's influence on ongoing policy debates.

If appointed at a Senior Postdoctoral Research Associate level, the post-holder will have additional responsibilities, such as:

- To oversee the work of other Postdoctoral Research Associates who are conducting research in related areas.
- To define the research direction in collaboration with the PIs of the Shocks and Resilience project.
- To take the lead on writing up findings as they emerge, producing reports, and developing publications in peer reviewed journals, in collaboration with the research team.

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PERSON SPECIFICATION

| Skills and Requirements The post holder will be expected to demonstrate the following: | Essential (E) Desirable (D) | Tested at application (A) Tested at interview (I) |
|---|--|--|
| Education | | |
| Postdoctoral Research Associate level: holds a PhD or has equivalent level of professional experience in any quantitative discipline related to economic systems, complexity science, or computational social sciences. We will consider candidates for an appointment at a Senior Postdoctoral Research Associate level if they have significant postdoctoral research experience (3+ years). | E | A |
| Knowledge and Experience | | |
| A solid track record conducting innovative quantitative/computational research in the study of socioeconomic systems and their dynamics. This would entail a deep understanding of the behavioural principles that drive economic behaviour, and the ability to combine them with ideas about complex adaptive systems such as micro-to-macro dynamics (emergent properties), propagation through and formation of complex networks, adaptiveness, co-evolution, criticality, and non-equilibrium dynamics. | E | A I |
| Experienced in working with large-scale datasets from various sources and formats. | E | A I |
| Outstanding computational skills to analyse large-scale data and to produce efficient and well-documented agent-computing models. | E | A I |
| Expertise in different calibration/estimation methods for agent-computing models. This should demonstrate critical thinking about choosing or developing empirical strategies that exploit the characteristics of the data and the model/problem at hand. | E | A I |
| A record of scientific publication, which may include journal articles, book chapters, and scientific advisory reports/white papers, that is suitable to career stage and appointment level | E | A |
| Experience in verifying and debugging model code, and in using collaborative tools such as GitHub, GitLab and Docker. | D | A I |
| Experience with machine learning methods that could be suitable for model estimation/calibration, or for the design of computational experiments that require sampling high-dimensional parameter spaces. | D | A I |
| Knowledge/understanding of the UK government and policy-making landscape | D | I |
| Communication | | |
| Excellent writing skills and proven ability to communicate complex, specialist or conceptual information/research findings clearly and persuasively to diverse audiences | E | A I |
| Teamwork and Motivation | | |
| Ability to work with others, especially postdocs, research assistants, and PhD students. | E | A I |
| Liaison and Networking | | |
| A proven ability to collaborate successfully in a multidisciplinary environment and to manage delivery of projects | E | A I |
| Experience in interacting with policy-makers and translating data-driven findings into meaningful insights and policy-focused reports | D | A I |
| Planning and Organising | | |
| Ability to organise and prioritise own work with minimal supervision | E | A I |
| Analysis and Research | | |
| Ability to identify, develop and apply new concepts, techniques and methods | E | A I |
| Planning and Organising | | |
| Commitment to Equality Diversity and Inclusion 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. 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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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 [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.



TERMS AND CONDITIONS

These two full-time posts are offered on a fixed-term basis until 31 March 2023. The annual salary is £36,000 to £42,000 (dependent on skills and experience) plus excellent benefits, including flexible working and family friendly policies, <https://www.turing.ac.uk/work-turing/why-work-turing/employee-benefits>.

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Candidates who are appointed at a Senior Postdoctoral Research Associate level will have a salary within the range of £46,000 to £48,000.

Candidates who have not yet been officially awarded their PhD will be appointed as Research Assistant within a salary range of £34,000 to £35,000 per annum.

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 that outlines how you meet the job specifications; a list of publications as well as a sample piece of writing (a journal article, conference proceeding, book chapter, or equivalent); and contact details for two referees. If you have questions about the role or would like to apply using a different format, please contact us on 020 3862 3575 or email recruitment@turing.ac.uk.

CLOSING DATE FOR APPLICATIONS: 31 March 2021

EQUALITY, DIVERSITY AND INCLUSION

The Alan Turing Institute is committed to creating an environment where diversity is valued, and everyone is treated fairly. 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.