ESRC / The Alan Turing Institute Joint Fellowship Scheme 2019 Call specification

Version: March 2019

Summary

The Economic and Social Research Council (ESRC) and The Alan Turing Institute[1] are pleased to announce a third round of the Joint Fellowship Scheme. This third joint call will focus on the following two themes:

- Public policy and government innovation
- Urban analytics.

This exciting opportunity is aimed at driving forward the development and application of cutting-edge data science to study major societal challenges. The ambitions of the Turing align very closely with those of the ESRC which has a long-held strategic objective to strengthen quantitative and data science skills across the UK social science research base. The advent of big data and the need to look at new ways to analyse such data has added further impetus to build new research capacity in this area. The partnership with the Turing is seen as an integral and innovative part of this broader strategy.

Each award recipient will have the status of a Turing Fellow for the duration of the award period, with benefits including: access to work space at the Institute, Azure cloud credits, support from the research facilitation and partnerships team in developing the project, eligibility to apply for additional funding through the Turing internal schemes, and opportunities for collaboration with other Turing Fellows from across a network of 13 universities.

We are anticipating supporting up to **two** Fellows, dependent on the quality of the proposals. The maximum amount available for each Fellowship is **£500,000 at 100% full economic cost (fEC)** of which ESRC will pay 80%. Funding will be available for a **maximum of 36 months**.

Proposals are welcome from mid-career[2] and senior social scientists from an eligible UK Research and Innovation (UKRI) research organisation (RO)[3]. A **minimum of 20% time commitment** over the period of the grant will be required from the Fellow. To support the Fellow a Post-Doctoral Researcher can be requested. The Post-Doctoral Researcher can be based at their host RO or at the Turing.

Proposals need to be submitted to the ESRC **no later than 16:00 on 6 June 2019.**

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[1] The Alan Turing Institute is the national institute for data science and artificial intelligence, headquartered at the British Library, London.
[2] Mid-career academics should have a minimum of four years' academic research experience following the submission of their PhD
[3] UKRI Eligibility can be found on the UKRI website.

After peer review, successful applicants will be invited for **interviews which will take place on 19 September 2019.**

Funding decisions will be available from early October 2019 and the Fellowships are expected to **start no later than the end of January 2020.** The usual three month lee-way on ESRC grants will not apply to successful proposals except in exceptional circumstances.

Call themes

The Turing is committed to interdisciplinary research. It aims to include a wide range of scholars with an interest in data-intensive research who will work together to tackle scientific challenges.

In 2018 the Turing published eight research challenges identifying key areas in which data science and AI can have a game-changing impact for science, society, and the economy. These challenges reflect the broader areas of applied science the Turing works with and are underpinned by a set of core capabilities. See full details on the Turing website.

This joint call will focus on two of the Turing research programmes where data-intensive digital technologies could bring advances in delivery and innovation. The Fellow and the Post-Doctoral Researcher will have the opportunity to work with the academics involved in a range of projects and collaborations within each programme, as below:

Public policy and government innovation

Data science and artificial intelligence could have a transformative effect on the ways in which government makes policy and designs services: for example: designing personalised public services that are tailored to each person's needs and situation; and identifying policy priorities by modeling complex systems and scenarios. The Turing's Public Policy Programme is working with policy-makers across government to explore how data science and AI might solve long-running policy problems and to develop ethical foundations for the use of digital technologies in policy-making. The programme has the following four challenges:

- **Use data science and artificial intelligence to inform policy-making**
- **Improve the provision of public services**
- **Build ethical foundations for the use of data science and AI in policy-making**
- **Contribute to policy that governs the use of data science and AI**

The ESRC Fellow and Post-Doctoral Researcher will work within the overall framework of the Public Policy Programme, which will provide opportunities to collaborate with the programme's core team of researchers and join a group of over 60 Turing academics that are pursuing more than 20 research projects at the intersection of data science and policy. The ESRC Fellow and Post-Doctoral Researcher will also have the opportunity to contribute to the programme's wide range of collaborations across government departments and agencies.

The programme has identified three research priority areas that have attracted the interest of policy-makers, but these are indicative only, and applications will be welcomed from researchers working in any area relevant to using data science and AI to address policy challenges:

Simulation and Agent Computing

For policy problems that require casual inference, tools such as agent computing allow policy makers to establish causation and generate counterfactuals by simulating entire economies and societies. Over the past few years, powerful computers and massive data sets have enabled agent computing researchers to progress from simple, toy models, to being able to replicate the dynamics of the US private sector by

modelling the behaviour of 120 million agents. Recent advances in agent computing make these models increasingly relevant for policy-making, as they make it possible for government to experiment with different policy options, coming across unintended consequences before committing to a certain policy measure.

Example questions from policy-makers that agent computing can address:

- Policy makers and trade deal negotiators struggle to understand the effects that different trade arrangements might have on specific sectors or regions. Can we build a scenario tool that allows policy makers to quickly understand who will be affected by a particular course of action?
- Can we build a policy simulator that can be used to predict how the fishing fleet will adapt to new fishing regulations?
- Can we model the effects that local policy might have on the country as a whole? For example, if a local authority increases its efforts to collect council tax, what impact would this have on the national budget?

Machine learning for predictive capacity

The ability of today's machine learning algorithms to detect patterns and association in large-scale data is increasing the possibility of probability-based prediction, both at aggregate levels – forecasting the demand for healthcare or education in a specific locality, for example, or at an individual level – predicting, for example, whether an individual child will drop out of school or be taken into care.

Example questions from policy-makers that machine learning for predictive capacity can address:
- Can we identify high-potential pupils, as well as the ones that are struggling, to target interventions?
- Can we predict the next food crisis and identify system failure points?
- Can we generate individual-level predictions of lifetime income?

Ethics

Government must establish the ethical foundations that make data science and artificial intelligence usable in policy-making, prioritising these issues as an integral part of the development of data science and AI. Indeed, the two methodologies identified above introduce new and distinct ethical challenges. For example, agent computing's increasing ability to build models with a one-to-one mapping of economies and societies raises questions about whether government should build or use models that allow it to study a specific individual or a specific company's behaviour in response to policy changes. The use of machine learning for predictive capacity raises a wide range of additional questions from whether policy makers should use machine-generated predictions to make decisions about individuals to what one should do, for example, with a statistical probability of 60% that a pupil will drop out of formal education. These issues make it imperative that ethicists work alongside data scientists when adapting these technologies to policy-making. Example questions from policy makers that ethics can address:

- Is it ethical to collect social media data or health data for immigration purposes?
- What are the ethical implications of using predictive policing technologies?
- Is it ethical to forecast which children will end up in care? Who has the right to access that forecast? How is one to interpret and use that prediction?

These areas are preliminary rather than exhaustive. For example, the programme has already identified three further research areas for development; behavioural insights from data at scale; new methodologies for data linking; and modelling volatility, risk and uncertainty - and will welcome applications in these and other areas of data science and AI for public policy.

Urban Analytics

Cities and urban environments are global drivers of economic growth, wealth creation, social interaction and well-being. They also present huge inequalities in health, affluence, education and lifestyle with persistent challenges for management, administration and policy.

Those instruments that help us to study, plan and manage cities are being transformed through increased access to data that describe our social and economic interactions alongside their contexts. Such data are generated through an increasingly diverse range of sources from transactional data such as loyalty cards, health records or smart energy meters, through to mobile telephone transactions and street sensors.

Within this context, the Urban Analytics programme at the Turing is building capacity for the application of innovative data science and artificial intelligence frameworks to problems relating to mobility, consumption and choice, lifestyles, behaviour, and with repercussions for health, sustainability, economic development and social welfare. Projects that exploit the synergy between Urban Analytics and related themes at the Turing such as Health, Defence, Finance and Data-Centric Engineering, and the Public Policy Programme are also strongly encouraged.

Potential areas of research might include:

- Research concerned with identifying changing patterns over space and time, for example in behaviour, expenditure, mobility or attitudes, including associations with rapid changes in technology or social, economic and political organisation
- The development or application of novel techniques in data science and artificial intelligence (eg machine learning, reinforcement learning, data assimilation) that are required to extract insights from new and emerging data sets within an appropriate social science context
- Applications of urban analytics that seek to exploit the unique features of new data sets, such as the ability to forecast in real-time, or build interventions around living laboratories of social behaviour;
- Extending our existing understanding of inequality, deprivation and spatial or social justice through the deployment of emerging technologies in data science and AI to new forms of data

Urban Analytics represents a new data-intensive science of cities, and will enhance planning and policy-making for municipalities, governments and commercial organisations. The Alan Turing Institute has a strong infrastructure for partner engagement, with a development strategy that includes aspirations of working collaboratively with stakeholder organisations with shared interests in embedding transformational and world-leading research into real-world contexts. Whilst this aspect is not essential, we would welcome projects with the potential to support engagement with business and government through alignment with new or existing partners.

Please note: that these areas are indicative rather than exhaustive, and applications will be welcomed from researchers working in any application of data science and AI to challenges in urban analytics.

Main purpose and expectations of the Fellowship:

The Fellowships are aimed at social scientists with interests in data analytics and associated fields who wish to draw on the resources and expertise of the Turing Institute. To develop their knowledge of this area and explore the implications of potential applications within either of the two programmes.

The main purpose of the Fellowship is:
- To develop an interdisciplinary research programme and conduct outstanding, creative and innovative research incorporating data science and the relevant social science, to develop internationally-significant outcomes through high-impact publications

- To collaborate with others across the Turing and the broader data science, artificial intelligence, and social science community, towards outputs and outcomes that yield significant academic, societal or economic impact
- To play a role in advancing the strategic objectives of the Turing and the ESRC
- To achieve research excellence as appropriate to the applicant's discipline
- To help build new interdisciplinary research capacity in data science and relevant social science through training of the proposed Post-Doctoral Researcher
- To help broaden and deepen the interdisciplinary research base of the Turing through building a critical mass of social scientists at the Turing.

We want the successful candidate to use the Fellowship to:

- Generate and pursue original research ideas, design and conduct a successful programme of investigation and develop innovative, world-class research
- Publish research in high-quality peer-reviewed national and international journals; present research findings at national and international meetings, conferences, seminars and workshops
- Take part in knowledge exchange and/or translation activities as appropriate; eg collaborative working with the Turing's partners, or with government departments/policy-makers, and on public engagement, policy events, etc.
- Advance their own professional development, with support from the Turing and the host partner university
- Build additional interdisciplinary capacity in data science and social science through their support for the training and development of the Post-Doctoral Researcher.

To fulfil these duties the Fellows are encouraged to spend some time at the Turing headquarters in the British Library, London and build this into their proposal. This can involve both the Fellow and the Post-Doctoral Researcher participating in activities, sponsor events, etc. This is seen as critical to developing links and potential further collaborations, promoting multi-disciplinary thinking at the Turing. The Fellow should support the professional development of the Post-Doc Researcher. Please refer to the Concordat for Research Careers for further information.

Reporting requirements
In addition to the standard ESRC reporting requirements[4], a minimum degree of reporting to the Turing by the Fellow is expected on an annual basis. The Fellow will prepare and submit an annual summary of the progress made towards fulfilling the objectives of the Fellowship. The Fellow will meet with an appropriate representative from the Turing to review progress. A report on the conduct and outcome of the research must also be submitted by the Fellow within three months of the end of the award period.

ESRC funding
We view these Fellows as a way of building data science skills across the social science base within the UK, and recognise that many ROs are already creating their own capabilities in this area. We therefore see this as an opportunity for the ESRC and the Turing to partner with those ROs.

The grant for the Fellowship will be issued and managed by the ESRC in accordance with our normal Research Funding Guide and procedures as stated on the website. Proposals should be costed on a full economic cost (fEC) basis.

Please note: the following exception to the standard research funding guidelines:

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[4] ESRC Reporting outcome information using ResearchFish:
https://esrc.ukri.org/funding/guidance-for-grant-holders/reporting/

Travel and subsistence
ESRC will allow travel and subsistence costs to be claimed for both the Fellow and the Post-Doctoral Researcher to commute between their host RO and the Turing. However, this will be dependent on the location of the host RO and whether the Post-Doctoral Researcher will be based at the Turing (please refer to the FAQs for further information).
Costs for travel and subsistence to attend conferences or events can be claimed through the Fellowship. However, these must be integral to the Fellowship and not associated with any costs that may be covered by the Turing (see 'Turing internal funding schemes' below).

Turing Research Engineering Team
Applicants may work with Research Engineers at their host institutes or elsewhere.
One option available is the Turing's team of in-house Research Software Engineers and Research Data Scientists, known collectively as the Research Engineering Team.

The Research Engineering team contributes skills in research software engineering and data science in support of other programmes, as well as to its own projects. This model of working ensures that the tools they develop are useful and applicable to a wider range of areas. The team supports professional delivery of impactful research across the Turing's programmes, as well as its own research interests.
You can choose to cost in the time of this group in your application. The rate for the Turing's Research Engineering Team is £67,605.66 per one FTE, per annum. This cost must be entered into the grant under 'Other Directly Incurred' costs.

All requests for Research Engineering Group time should be discussed in advance with Martin O'Reilly, Principal Research Software Engineer (moreilly@turing.ac.uk).

Turing facilities and internal funding schemes
In addition to costs submitted to ESRC through the proposal, the Fellow will also be able to apply, on a competitive basis, to the Turing's internal funding schemes that may be available at the time, up to a total of £17,500. These costs should be applied for separately and not costed within the proposal.

Applying through the Turing internal schemes will provide the successful Fellow with the same opportunities available to other Turing Fellows. Applications for internal funding schemes are measured for their impact against the Institute's expressed research priorities.

Facilities for both the Fellow and Post-Doctoral Researcher can be provided by the Turing at their headquarters in the British Library, London and include meeting rooms, desk space and support from the events team to host workshops.

Through time spend at the Turing, Fellows and Post-Doctoral Researchers will also benefit from networking opportunities across the Turing's university partner network including potential industry partners, collaborators and government bodies, national and international research collaborations facilitated through the programmes and supporting teams, opportunities to shape the future landscape in their area of research through advocacy, influencing policy and leadership; Time to be spent at the Turing should be outlined within the application.

Security screening
Working at the Turing will allow access to the systems and information of both the Institute and its partners. Misuse could carry significant risks in terms of breach of relevant data protection obligations and reputational damage. As the national institute for data science and AI, we take very seriously the appropriate protection of data and information, and the intent of the security checks is to undertake all reasonable steps to protect ours and our partners' data and information. Everyone engaged with the Turing, including Fellows and Post-Doctoral Researchers and operations staff will undergo the same security checks before working here. The checks will be carried out via a third party organisation called

Agenda Security Screening and will include the following components: identity confirmation, five year employment history, sanctions and Politically Exposed Person (PEP), deep web internet mining (Open Source Intelligence; OSINT), UK criminal check and Basic Disclosure Scotland (DBS). Any award will be conditional upon the Fellow and Post-Doctoral Researcher agreeing to undergo and passing these checks to the satisfaction of the Turing.

Please note, the screening process will include an option for candidates to self-disclose any previous criminal convictions, and possession of a criminal record will not necessarily preclude applicants from being awarded a Fellowship placement with the Institute.

How to apply
Proposals are welcome from mid-career and senior career academics.

Applicants must provide demonstrable evidence of their existing skills in the use of quantitative techniques and clearly describe how they envisage these will be developed by working at the Turing. The expectation is that the applicant will be able to show how their research programme will show impact through advancing scientific knowledge and direct application to real-world challenges.

The principal investigator should be from a RO eligible for ESRC funding.

Please note: Depending on which theme you are applying under, please include the prefix 'Urban' or 'Public Policy'.

All proposals **must** be made on the [Je-S Proposal Form](#), which is available at:

Je-S is the electronic submission system which is used by all Research Councils to provide a common electronic system that supports research administration. More detailed information can be found on the [Je-S guidance](#). **In particular, applicants should note the registration requirements for making a Je-S submission**. Please also refer to the Je-S Guidance for this scheme in conjunction with this Call Specification.

Only those proposals submitted through the Je-S system will be accepted for processing. The proposal submitted through Je-S will be taken to be the final version, and will be the version used for external peer assessment.

What we will do with your information
In accordance with General Data Protection Regulation (GDPR) the personal information that you provide within the proposal will specifically be used for the purpose of administering this call. The information will be viewed by ESRC and the Turing staff and selection panel members, and your information will not be used for any other purpose without your specific consent.

For further information on how your information is used, how we maintain the security of your information, and your rights to access information we hold on you, please contact the Joint Information Services Unit (jisu@epsrc.ac.uk).

Commissioning timetable

- Open date for proposals – 5 March 2019
- Closing date for proposals – 16:00 on 6 June 2019
- Interviews and panel meeting – 19 September 2019
- Fellowship Start Date – no later than the end of January 2020

Contacts

If you have any questions or would like further information about the scheme, contact:

- Claire Dyball
  Email: esrcturing@esrc.ukri.org
  Telephone: 01793 413003

Enquiries relating to technical aspects of the Je-S form should be addressed to:

- Je-S helpdesk
  Email: jeshelp@je-s.ukri.org
  Telephone: 01793 444164