

The Alan Turing Institute

RESEARCH ASSOCIATE – DATA SCIENCE & AI FOR NETWORKED SYSTEMS

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 400 researchers and a talented business team.

THE ROLE

Project CHANCE (Coupled Human And Natural Critical Ecosystems). We are seeking to recruit a postdoctoral research associate to work in the area of data science (signal processing, compressed sensing) and machine learning (prediction, explainability) for networked engineering systems. The focus areas include, but are not limited to: water distribution, optical/wireless, transport, and civil networked assets. This post is based in the Data-Centric Engineering Programme at the Alan Turing Institute. You will join a team of researchers affiliated with the Alan Turing Institute supervised by Professor Weisi Guo (Cranfield, Cyberphysical Systems) and work with a wide range of co-supervisors/collaborators including Sir A. Wilson (UCL, Ada Lovelace), Prof. J. McCann (Imperial), Professor I. Guymer (Sheffield), Dr. R. Silva (UCL) & Prof. M. Musolesi (UCL). The CHANCE project is also complemented with Prof. Weisi Guo's EPSRC CoTRE project – building theoretical and data science foundations to national Digital Twins.

The research has been pioneering: (i) the development of generalised resilience measures for networked dynamical systems [1], (ii) signal processing methods to extract the minimum amount of data in networked dynamical systems [2], and (iii) exploitation of new data science approaches to be applied to infrastructure operators and National Infrastructure Commission (NIC). Our current work was shortlisted for the Bell Labs Prize 2019. The current publications and project webpage can be found at the end of the advert.

The 3-year CHANCE project is coming to the end of its second year and is looking for a confident and ambitious early-career researcher to join its fledging program. You will be expected to perform high quality research under the supervision of the principal investigator Prof. Weisi Guo. Specifically, you will produce breakthrough research in the areas of methods for graph signal processing and explainable artificial intelligence. You will contribute to publishing these results in top rated journals and at national and international conferences, as appropriate.

You will possess a PhD in Engineering, Computer Science, Statistics or related discipline. You should have a strong background in one or more of the following areas: Signal Processing, Machine Learning, Complex Networks, Bayesian Inference, large-scale simulation and computation methods. Access to Microsoft Azure for accelerated computation will be provided.

Informal enquiries may be addressed to Prof. Weisi Guo (wguo@turing.ac.uk). Please note that applications sent directly to this email address will not be accepted.

References

Project Website: <https://www.turing.ac.uk/research/research-projects/coupled-human-and-natural-critical-ecosystems-chance>

[1] "Resilience or Robustness: Identifying Topological Vulnerabilities in Rail Networks," A. Pagani, G. Mosquera, A. Alturki, S. Johnson, S. Jarvis, A. Wilson, W. Guo, L. Varga, Royal Society Open Science, vol.6(2), Feb 2019: <https://royalsocietypublishing.org/doi/10.1098/rsos.181301>

[2] "Optimal Sampling of Water Distribution Network Dynamics using Graph Fourier Transform," Z. Wei, A. Pagani, G. Fu, I. Guymer, W. Chen, J. McCann, W. Guo, IEEE Transactions on Network Science and Engineering, 2019: <https://ieeexplore.ieee.org/document/8839864>

TURING-LLOYDS PROGRAMME ON DATA-CENTRIC ENGINEERING

This project will be run as part of the programme for Data-Centric Engineering, based at The Alan Turing Institute. In partnership with the Lloyd's Register Foundation, the programme brings together world-leading academic institutions and major industrial partners from across the engineering sector. This programme is focused on research in data science, with accompanying translational activities to ensure impact in the field of engineering, as well as education and training components, in keeping with the vision, mission and charitable aims of both the Foundation and the Turing Institute.

DUTIES AND RESPONSIBILITIES

The research associate will work closely with the project investigators based at the Turing Institute with the aim:

- To establish a sound research base within the Alan Turing Institute in order to pursue individual and collaborative research of outstanding quality, consistent with making a full active research contribution in line with the research strategy outlined by the PIs.
- To write or contribute to publications or disseminate research findings using other appropriate media.
- To attend and present research findings and papers at academic and professional conferences, and to contribute to the external visibility of the Institute.
- To ensure compliance with secure handling of data and health and safety in all aspects of work.
- To participate in and develop internal and external partnerships, for example to identify sources of funding, generate income, obtain projects, or build relationships for future activities.

PERSON SPECIFICATION

The successful candidates will have:

ESSENTIAL

- PhD in Engineering, Computer Science, Statistics or related discipline Expertise in application, development and implementation of signal processing and machine learning techniques for engineering systems.

- Experience in design, development and implementation of research software libraries, ideally using C/C++ and Python and their associated frameworks.
- The ability to work in a team and interact professionally within a team of researchers and PhD students.
- 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.
- The ability to initiate, plan, organise, implement and deliver programmes of work to tight deadlines.
- A developing track record in producing high quality academic publications.
- Good effective communication (oral and written) skills, presentation and training skills.
- Good interpersonal skills.

DESIRABLE

- Experience in engaging with industry and non-academic partners.
- Ability to aid the PI in writing research proposals.
- Prior experience with simulating large-scale critical engineering systems.

TERMS AND CONDITIONS

This full-time post is offered on a fixed-term contract for a period of 13 months starting on Spring 2020 or as soon after that as possible. Happy to Talk Flexible Working.

The salary range offered for this role is £35,000 - £41,000 per annum. A competitive benefits package is also available (<https://www.turing.ac.uk/work-turing/why-work-turing/employee-benefits>).

APPLICATION PROCEDURE

If you are interested in this opportunity, please click the apply button below and submit your CV, with contact details for your referees and a covering letter.

If you have questions or would like to discuss the role further with a member of the Institute's HR Team, please contact them on 0203 862 3394 or 020 3862 3357, or email recruitment@turing.ac.uk. Applicants who would like to submit their application in a different format please email recruitment@turing.ac.uk.

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, gender reassignment, marital and civil partnership status, pregnancy, religion or belief or 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.