



**UNIVERSITY OF LEEDS**

## **CANDIDATE BRIEF**

**Research Fellow in Calibration and Data Assimilation for Agent-Based Models, School of Geography, Faculty of Environment**



**Salary: Grade 7 (£32,548 – £38,833 p.a.)**

**Reference: ENVGE1072**

**Closing date: 21 March 2018**

**Fixed term for 4.5 years (External Funding)**

**Open to job share or flexible working considerations**



## Research Fellow in Calibration and Data Assimilation for Agent-Based Models, School of Geography, Faculty of Environment

Are you an ambitious researcher looking for your next challenge? Do you have a background in spatial simulation, statistics, and data analytics? Do you want to further your career in one of the UK's leading research intensive Universities?

You will work on a new project, funded by the European Research Council, called [Data Assimilation for Agent-Based Models: Applications to Civil Emergencies](#) (DUST). The ultimate aim of the project is to develop a comprehensive simulation that can be used to model the current state of an urban area and provide valuable information to policy makers with regards to how to manage events that disrupt the 'normal' behaviour of cities. Agent-based modelling is an ideal methodology for this type of simulation but one that suffers from a serious drawback: **models are not able to incorporate up-to-date data to reduce uncertainty**. There is a wealth of new data being generated in 'smart' cities that could inform a model of urban dynamics (e.g. from social media contributions, mobile telephone use, public transport records, vehicle traffic counters, etc.) but we lack the tools to incorporate these streams of data into agent-based models. Instead models are typically initialised with historical data and therefore their estimates of the current state of a system diverge rapidly from reality.

The research team is lead by [Dr Nicolas Malleson](#) and will be located within the Leeds Institute for Data Analytics (LIDA), which has been established with more than £20 million of funding from the University and four major research councils. The city of Leeds is already recognised as a hub for big data analytics in business, health care and academic research. LIDA's goals are to move the University even further to the forefront by combining projects in consumer data research, medical bioinformatics, digital humanities and monitoring environmental change to provide a truly multi-disciplinary approach to this exciting and challenging field.

You should have a PhD (or be very close to obtaining a PhD) in Geography, Computer Science, Mathematics/Statistics, Physics – or a related discipline with a significant component of programming and/or data science – and be able to demonstrate a combination of enthusiasm and expertise in computational modelling and data analysis. Evidence of relevant statistical and/or mathematical expertise that could be



applied to the challenge of data assimilation is essential. Direct experience in developing and using agent-based models would be ideal but is not compulsory.

**Further information on the project and The Leeds Institute for Data Analytics (LIDA) can be found on the Additional Information sheet.**

## What does the role entail?

As Research Fellow, your main duties will include:

- Work with the project investigator and colleagues at Leeds and with the partners to develop statistical methods that can be used to allow streams of data that emerge from 'smart' cities to be incorporated into an agent-based simulation of a city running in real time;
- Develop data assimilation methods that can be used to incorporate streams of data into an agent-based model to reduce uncertainty;
- Prepare research papers and other material for publication;
- Disseminate findings from the research project by preparing and delivering research presentations at conferences or other forums;
- Contribute to the development of research funding applications;
- Plan and manage your own research activity in collaboration with the project investigator;
- Use creativity to analyse and interpret research data and draw conclusions on the outcomes;
- Working both independently and also as part of a larger team of researchers, engaging in knowledge-transfer activities where appropriate and feasible;
- Maintaining your own continuing professional development and acting as a mentor to less experienced colleagues as appropriate;
- Contributing to the training of both undergraduate and postgraduate students, where appropriate, including assisting with the supervision of projects in areas relevant to the project.

These duties provide a framework for the role and should not be regarded as a definitive list. Other reasonable duties may be required consistent with the grade of the post.



## What will you bring to the role?

As Research Fellow you will have:

- Hold a PhD (or be very close to obtaining a PhD) in Geography, Computer Science, Mathematics/Statistics, Physics – or a related discipline with a significant component of programming and/or data science;
- A demonstrable ability to develop novel solutions to mathematical and/or statistical problems;
- An awareness of model calibration or related data science techniques, and an enthusiasm to apply them in the context of modelling cities;
- An understanding of individual-level models, such as agent-based models, (direct experience of working with such methods is not essential);
- Experience in developing new software for modelling and/or data analysis;
- Confidence in the use of a high level, object oriented programming language;
- An ability to write high-quality research papers and documents with an emerging track record in the publication of scholarly articles in peer-reviewed journals;
- Excellent communication skills including evidence of having presented work at a high academic level and an ability to explain complicated technical work to colleagues in diverse fields;
- A proven ability to work effectively with others in a multidisciplinary team environment;
- Proven ability to manage competing demands effectively, responsibly and without close support;
- A strong commitment to your own continuous professional development.

You may also have:

- Direct experience in building agent-based models;
- Direct experience with data assimilation and/or related techniques;
- Expertise in the use of mathematical/statistical packages such as Matlab or R.

## How to apply

You can apply for this role online; more guidance can be found on our [How to Apply](#) information page. Applications should be submitted by 23.59 (UK time) on the advertised closing date.





## Contact information

To explore the post further or for any queries you may have, please contact:

**Dr Nick Malleson, Associate Professor**

Tel: +44 (0)113 343 5248

Email: [n.s.malleson@leeds.ac.uk](mailto:n.s.malleson@leeds.ac.uk)

## Additional information

Find out more about the [Faculty of Environment](#) and [School of Geography](#).

Find out more about [Athena Swan](#) in the Faculty.

### Working at Leeds

You can find out more about our generous benefits package and more about what it is like to work at the University and live in the Leeds area on our [Working at Leeds](#) information page.

### Candidates with disabilities

Information for candidates with disabilities, impairments or health conditions, including requesting alternative formats, can be found on our [Accessibility](#) information page or by getting in touch with us at [disclosure@leeds.ac.uk](mailto:disclosure@leeds.ac.uk).

## Criminal record information

### Rehabilitation of Offenders Act 1974

A criminal record check is not required for this position, however, all applicants will be required to declare if they have any 'unspent' criminal offences, including those pending.

Any offer of appointment will be, in accordance with our Criminal Records policy. You can find out more about required checks and declarations in our [Criminal Records](#) information.

