UNIVERSITY OF LEEDS

CANDIDATE BRIEF

Research Fellow in Agent-based Modelling for Future Transportation
School of Geography, Faculty of Environment



Salary: Grade 7 (£34,304 – £40,927 p.a.)

Reference: ENVGE1160

Fixed-term for 12 months

We will consider flexible working arrangements

Research Fellow in Agent-based Modelling for Future Transportation

Are you an ambitious researcher looking to develop agent-based models of future urban transportation systems? Are you interested in behavioural and social responses to new transportation innovations? Do you want to further your career in one of the UKs leading research-intensive Universities?

We are looking for a Research Fellow with expertise in agent-based modelling and/or transportation modelling to join our international project. The RAIM (Responsible Automation for Inclusive Mobility) project is undertaking qualitative and quantitative analysis of the diverse mobility needs of ageing populations in the UK and Canada, and apply a suite of computational methods to analyse, predict, and optimise an inclusive electric AV (EAV) Demand Responsive Transit (DRT) system design.

Through a multifaceted methodology, the project is seeking to make advances in our understanding and modelling the complex interactions of socio-economic status, gender, physical and health conditions, lifestyle, and attitudes on spatiotemporal demand for autonomous mobility in older populations. RAIM will furthermore make advances in optimising supply of autonomous vehicles to meet complex, heterogeneous demand, through novel application of Deep Reinforcement Learning and Graph Convolutional Networks. The project will engage closely with transport providers and charitable organisations, and determine the economic and policy case for (or against) public intervention, building estimates of the costs, impact, and broader benefits of EAV DRT schemes under current and future scenarios.

The RAIM project is a collaboration between the University of Leeds, University of Manitoba, and University College London, and led by Prof Ed Manley in the UK and Dr Babak Mehran in Canada. The project is funded by UKRI and Canadian funding councils under the ‘Canada-UK Artificial Intelligence (AI) Initiative: building competitive and resilient economies and societies through responsible AI’ project call. The project began in 2020 and will run until 2023. Our target sites for analysis are the West Midlands and Winnipeg, Manitoba, Canada. You will have opportunities to spend time working with colleagues on site in Canada.

In this role, you will work on the development of agent-based models of travel demand for proposed EAV DRT systems our UK and Canadian settings. Our estimates of



demand will build from qualitative and quantitative analyses, and integrate with models of transport supply, developed by other members of the project team. The agent-based model will incorporate a synthesised population, reflecting heterogeneity in perceptions and willingness to use EAV DRT, and an activity choice model, built from GPS collected survey data. In integrating across different components, the software platform that will be developed will sit at the heart of the project. As such, it is essential that you are able to work closely with colleagues across the project.

What does the role entail?

As a Research Fellow on this project, your main duties will include:

- Development of an agent-based model of demand-responsive autonomous transportation system in the UK and Canada;
- Use of diverse data sources and novel methodologies to produce estimates of older populations and their willingness to use EAV DRTs;
- Develop a model of travel demand for EAV DRT based on an activity-based modelling framework;
- Integrate different configurations of autonomous transportation supply, as developed by project partners at University of Manitoba;
- Execution of simulation scenarios relating to different implementations of the transportation system, including variations by cost, system configuration, accessibility, and so on;
- Contribute towards the development of an evaluation framework to assess the public benefit of different system configurations;
- Meeting with regularly and working closely with the partner research teams at UCL and University of Manitoba;
- Generating and pursuing independent and original research ideas in the appropriate subject area;
- Developing research objectives and proposals and contributing to setting the direction of the research project and team including preparing proposals for funding in collaboration with colleagues;





- Preparing papers for publication in leading international journals and disseminating research results through other recognised forms of output;
- 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.

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 a Research Fellow you will have:

- A PhD (or a PhD close to completion) in Computer Science, Geography, Mathematics, Transportation, Social Science, or relevant technical discipline, with a significant component of programming and/or data science;
- Experience of developing agent-based models within spatial contexts;
- Solid understanding of theories and models of human behaviour, decision-making, and activity choice within mobility or spatial contexts;
- Deep knowledge of a programming language appropriate for the development of agent-based models (preferably Java or Python);
- Experience of multidisciplinary working, and proven ability and interest in working across traditional disciplinary boundaries;
- Knowledge of modern software development processes to support multisite / multiuser code contributions and open science;
- A proven track record of peer-reviewed publications in high impact factor journals;
- Excellent written and verbal communication skills including presentation skills;
- A proven ability to work well both individually and in a team;



- A strong commitment to your own continuous professional development.

You may also have:

- Expertise in transportation modelling and activity-based modelling;
- Experience of developing large-scale agent-based transportation models.
- A strong understanding of the mobility needs of older populations;

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:

Professor Ed Manley
Tel: +44 (0)113 343 3356
Email: E.J.Manley@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.

A diverse workforce
The Faculty of Environment has received a prestigious Athena SWAN silver award from Advance HE, the national body that promotes equality in the higher education sector. This award represents the combined efforts of all schools in the Faculty and





shows the positive actions we have taken to ensure that our policies, processes and ethos all promote an equal and inclusive environment for work and study.

Working at Leeds
Find out more about the benefits of working at the University and what it is like to live and work 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.

Criminal record information

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.

