



UNIVERSITY OF LEEDS

CANDIDATE BRIEF

Research Fellow in Machine Learning for Human Behaviour Analysis,
Faculty of Environment



Salary: Grade 7 (£37,099 – £44,263 p.a. depending on experience)

Reporting to: Stephane Hess

Reference: ENVTR1191

Fixed term for 36 months to complete specific time limited work

Location: University of Leeds (with scope for hybrid working)

We are open to discussing flexible working arrangements

Overview of the Role

Do you have research expertise in Machine Learning with a specific focus on analysing human decisions and behaviour? Are you interested in conducting methodological research to develop new approaches? Would you like to implement novel methodologies to advance the state-of-the-art in behavioural modelling and make a real-world impact?

Understanding the mechanisms and the drivers behind people's choices has been the focal point of a range of academic disciplines and a key component in policy making, for example aiming to shift behaviours for a more sustainable future.

While models grounded in economic science and psychology are key tools in this area, competing approaches are emerging in the field of machine learning. While these methods offer potentially very good prediction performance, there are concerns about behavioural realism, and only limited knowledge spillovers into choice modelling and mathematical psychology, despite the shared core goal of understanding individual decision making.

The synergy of distinct disciplines that all focus on behavioural models and the development of new state-of-the-art modelling frameworks holds the promise of providing new Data-Driven Behavioural Models (DDBMs) combining the strengths and addressing the distinct limitations of each area. The development of DDBMs will come at a time when big data sources constantly challenge traditional modelling approaches. Additionally, the growth in human-machine interactions, such as with the advent of autonomous vehicles, will require the development of AI consistent with human behaviour to guarantee public safety and wider adoption in the market.

The Choice Modelling Centre at the Institute for Transport Studies seeks to hire an early career researcher to take part in the ERC-funded project "SYNERGY". The project's aim is to combine key techniques from Machine Learning, Choice Modelling and Mathematical Psychology, and help to develop new approaches.

The role will involve working at the cutting edge of Machine Learning for analysing human decisions/behaviour, but with a keen focus on helping to build bridges across areas, helping to develop modelling frameworks that will actively shape future policy making. The successful candidate will need to demonstrate sufficient theoretical and technical knowledge in machine learning, and possess an open mind to new ideas



and approaches. Knowledge of a programming language, with an emphasis on R and/or Python, is also strongly advised.

As a member of the team, you will be based at the [Institute for Transport Studies \(ITS\)](#) where you will work with Professor Stephane Hess and other researchers in the Choice Modelling Centre (CMC), drawing also on expertise in its global network. You will become part of a highly productive team, have the opportunity to work with other groups in the University of Leeds and take part in international conferences for the purpose of disseminating the findings of the research. You are expected to contribute to methodological research on bridging choice modelling, mathematical psychology and machine learning in the context of transport, health and environment. As this is a multi-faceted research project, you will be able to contribute to individual components of the work as well as helping to shape the direction of the research according to your own interests and background. You will be expected to take academic ownership of large parts of the programme and make a lasting contribution to the field.

Main duties and responsibilities

- Working with Professor Stephane Hess and other researchers in the Choice Modelling Centre for the successful execution of the research project SYNERGY;
- Generating and pursuing original research ideas in bridging choice modelling, mathematical psychology and machine learning;
- Developing and leading your own methodological contributions to the project;
- Developing research objectives and proposals and contributing to setting the direction of the research project and team;
- Providing a supporting role in a large-scale primary data collection to support the attainment of the research objectives;
- Working with novel secondary data provided by non-academic partners and primary data collected as part of the project;
- Willingness to travel within the UK and internationally for training and dissemination events;
- Evaluating methods and techniques used and results obtained by other researchers and relating such evaluations appropriately to your own work;
- 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;
- Supporting the management of the project (e.g. helping in organising workshops, seminars etc.);
- Maintaining own continuing professional development and acting as a mentor to less experienced colleagues as appropriate;
- Contributing to the training of postgraduate students, 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.

Qualifications and skills

Essential

- A PhD or near completion - i.e. the initial thesis needs to have been handed in at the point of application in Machine Learning with a focus on analysing human behaviour/decisions or a closely allied discipline;
- A strong track record of developing and refining mathematical models and applying them to modelling different types of human decisions;
- An emerging track record of making methodological contributions, refining rather than just applying the toolkit;
- An interest in bridging gaps between choice modelling, mathematical psychology and machine learning;
- Experience in specifying advanced models and applying them to real world decision contexts;
- Evidence of cross-disciplinary experience, applying models across different fields;
- Computer programming skills in the specific context of model estimation;
- A track record of peer-reviewed publications in international journals;
- Good time management and planning skills, with the ability to meet tight deadlines, manage competing demands and work effectively under pressure without close support;
- 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.



Desirable

- Experience of pursuing external funding to support research;
- Experience of conducting interdisciplinary work;
- Experience of working with large data and novel data sources;
- Experience with working in a collaborative project involving remote partners;
- Ideas for ways in which the project could stimulate engagement with policy makers and/or the public.

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

[Stephane Hess](#), Professor of Choice Modelling, Director of the Choice Modelling Centre

Tel: +44 (0)113 343 6611

Email: s.hess@leeds.ac.uk

Additional information

Please note: If you are not a British or Irish citizen, from 1 January 2021 you will require permission to work in the UK. This will normally be in the form of a visa but, if you are an EEA/Swiss citizen and resident in the UK before 31 December 2020, this may be your passport or status under the EU Settlement Scheme.

Find out more about the [Institute for Transport Studies](#) and the [Choice Modelling Centre](#).

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

Find out more about our [Research and associated facilities](#).

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

Working at Leeds

We are a campus based community and regular interaction with campus is an expectation of all roles in line with academic and service needs and the requirements of the role. We are also open to discussing flexible working arrangements. To find



out more about the benefits of working at the University and what it is like to live and work in the Leeds area visit our [Working at Leeds](#) information page.

Our University

As an international research-intensive university, we welcome students and staff from all walks of life and from across the world. We foster an inclusive environment where all can flourish and prosper, and we are proud of our strong commitment to student education. Within the Faculty of Environment we are dedicated to diversifying our community and we welcome the unique contributions that individuals can bring, and particularly encourage applications from, but not limited to Black, Asian and ethnically diverse people; people who identify as LGBT+; and people with disabilities. Candidates will always be selected based on merit and ability.

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.

Information for disabled candidates

Information for disabled candidates, impairments or health conditions, including requesting alternative formats, can be found on our [Accessibility](#) information page or by getting in touch with us at hr@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.

