School of Science

Research Associate in *[Machine Learning and Data Science for Environmental Science]*

Job Ref: REQ231184

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

Department of Computer Science
Loughborough University
Locations: Loughborough University, Loughborough
Salary: £ 33,966 to £ 41,732 per annum.
Start ASAP, full-time, fixed-term contract for 13~15 months.

Loughborough University is one of the country's top 10 universities, consistently ranked by the Guardian Good University Guide and other assessment indexes, confirmed as having 5* world-class research in science and engineering. It has been awarded a record seven Queen's Anniversary Prizes (second only to Oxford) for its research and enterprise impact to society and industry.

Welcome to the School of Science at Loughborough University and take opportunities to undertake transformative research and technology development to improve agriculture and livestock ecosystem and achieve national Net Zero carbon ambition.

You will join the research group at Computer Science and work with a group of over 30 researchers including academics, PDRAs and PhDs. You will have access to world-class research facilities and fully instrumented laboratories, including cutting-edge HPC, deep-learning servers, high-spec computing platforms, the recent £5.8M DIGILab and over £9m investment in research and teaching facilities. In addition to having a strong track record of fundamental research, our research produced a wide range of economic and social impacts in agriculture, environment, and sports and manufacturing industry which have been widely reported by the media including BBC, NewScientist, Independent, Engineering & Technology.

Project Description

Brief overview of project title, details and context, who funded by, description of project team and where the Researcher will fit into the team

The world must urgently reduce its greenhouse gas (GHG) emissions to prevent dangerous climate change. The UK aims to achieve net zero greenhouse gas emissions by 2050. Agriculture and livestock farming have been recognised as important fields contributing to GHG emissions. Emissions from cattle and sheep farming and degraded peatlands together contribute over 11% of the UK's emissions.

The new £2.5 million research grant “Self-Learning Digital Twins for Sustainable Land” is funded by UK Research and Innovation (UKRI/EPSRC EP/Y00597X/1). It aims to develop innovative solutions, enhanced by machine learning and digital twin, to improve our knowledge and decision-making for smart and sustainable farming and GHG emission reduction from livestock and land use. The research will help us to gain insight into the complex agroecosystems, and improve livestock welfare, productivity, and land use associated together with GHG emission reduction.

The research team at Loughborough will be led by Prof. Li and Prof. Meng, working together with project partners, industry leaders and the farming community. The project brings together leading researchers from three research-intensive universities - Loughborough, Leicester and Bristol, with complementary expertise in machine learning, environmental research, digital twin, GHG measurement and modelling, as well as behavioural and social science. You will work with other Research Associate(s) and PhD(s) to explore a wide range of real-world farm data (e.g. livestock, feeding, pasture management, productivity), develop novel methods and machine-learning predictive models to infer and validate new hypotheses, and offer net zero scenarios for sustainable livestock management. This research will close a knowledge gap of how the UK can eliminate agriculture GHG emissions and the impacts of interventions in livestock farming management on net GHG emissions. The research outcomes will facilitate the digital transformation of environment-friendly agriculture and address numerous challenges for wider net zero carbon ambition.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

- To conduct a review on sustainable livestock farming and land use to reduce GHG emissions.
- To undertake methodology design, data collection, and processing
- To be responsible for data analysis and development of computational and machine learning-based models/algorithms/software for GHG emission prediction,
- To support and contribute to digital twin modelling.
- To undertake investigation, experiments and evaluation.
- To disseminate the research through publication, industry events and impact generation activities on net zero.

Job Duties

- To explore public datasets and resources regarding livestock farming (e.g. feeding, management, productivity) associated with GHG emissions.
- To work with project partners, investigate the integration of livestock farming data across scales from different data modalities, e.g. sensors, field and satellite data (including images).
- Explore the potential and demonstrate digital twins for livestock farming and agriculture net zero
- Explore the potential of ML/AI for the development of sustainable agriculture
- To work with industry and partners, collect and analyse real-world data.
- To propose technical solutions and develop algorithms/software for data processing, predictive models and evaluation.
- To carry out experiments and result analysis, and disseminate research outcomes through high impact publications.

- Be responsible for conducting the day-to-day running of the project.
- To formulate detailed plans for the project based on broad guidance from the project team.
- Write up progress reports and present outcomes to investigators, collaborators, and external stakeholders.
- To write high-quality research publications and attend and contribute to conferences.
- To assist the academic staff in the project team for funding bids
- To assist the academic staff in the project team with the supervision of undergraduate MSc and PhD project work and support each other with other researchers.
- Where appropriate, to deliver guest lectures and seminar talks to students and wider audiences.
- To engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project.
- To undertake other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.

Points To Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed.

Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

All staff should hold a duty and commitment to observing the University's Equality & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equality & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Respecting Diversity and, where appropriate, Recruitment and Selection.

Organisational Responsibility

Reports to PI- Prof. Baihua Li

Person Specification

Your application will be reviewed with respect to meeting the essential and desirable criteria listed below.
Your application will be reviewed against the essential and desirable criteria listed below. Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application. Stages of assessment are as follows:

1 – Application
2 – Test/Assessment Centre/Presentation
3 – Interview

Essential Criteria

Area	Criteria	Stage
Experience	Background in science and engineering (ideally Computer Science)	1
	Programming experience including machine learning and data science	1,2,3
	Experience processing and analysing large scientific datasets	1,2,3
Skills and abilities	*Research and algorithm development skills*	1,2,3
	Programming and software skills, e.g. Python, C++, TensorFlow	1,2,3
	Working knowledge of analytical, numerical, and statistical methods.	1,2,3
	Excellent written, oral communication, and organisational skills	1,2,3
	Ability to write project reports and make technical presentations to industrial and academic research groups	1,3
	Knowledge of relevant Health & Safety issues	2,3
Qualifications	PhD (or near completion)/MSc/BSc (e.g. computer science or related)	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	1,3

Desirable Criteria

Area	Criteria	Stage
Experience	Research experience in the application of ML/data science to agriculture	1,2,3
	Experience in machine learning, deep learning, data science, digital twin	1,2,3
	Experience in hardware interface, use of sensors for data collection	1,3
	Experience of teaching and/or supervision of students in relevant areas	1,2,3
Skills and abilities	Authoring original work and producing high-quality publications	1,3
Qualifications	PhD (or near completion)/MSc in Computer Science or relevant	1
Other	Able to travel Independently	3

Conditions of Service

The position is full-time, fixed-term for 13-15 months, start ASAP . Salary will be on Research Associate, £ 33,966 to £ 41,732 per annum, at a starting salary to be confirmed on offer of appointment.
The appointment will be subject to the University's Terms and Conditions of Employment for STAFF GRADE 6 details of which can be found here.

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which can be found here.

The University offers a wide range of employee benefits which can be found here.

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html

In addition, the University is supportive, wherever possible, of flexible working arrangements.
We also strive to create a culture that supports equality and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see http://www.lboro.ac.uk/services/hr/athena-swan/

Applications

The closing date for receipt of applications is 20th October 2023**.** Interviews will take place w/c 30th October 2023.

Please submit your CV, a cover letter with your application. Candidates with MSc/BSc degrees may also submit transcripts if it is convenient as supporting document.

Informal inquiries are welcome and should be directed to Prof. Baihua Li,
b.li@lboro.ac.uk