

Aeronautical and Automotive Engineering
Uniper UK Limited

Job Ref: REQ240282

Job title: Machine Learning Engineer for predictive maintenance (KTP Associate)

Period: 24 months

Salary: £35,000 - £42,000 per annum (Starting salary according to candidate's qualification and experience, to be confirmed on offer of appointment), plus £4,000 training budget

Application deadline: 21st April 2024

Key words: predictive maintenance, gas turbines, electricity generator monitoring, energy, digital twin, AI, artificial intelligence, machine learning.

Project Title: To develop predictive maintenance technologies for gas turbine electricity generator monitoring, facilitating continuity in supply and energy grid stability.

About the project

This is a 24-month Knowledge Transfer Partnership (KTP) project between Loughborough University and Uniper UK Limited, funded by UKRI Innovate UK.

This project focuses on developing automated, proactive maintenance technologies that identify, predict and override equipment sensor failures within gas turbine generators. The technology will utilise new skills in statistical learning, deep learning and generative-AI that will monitor the system parameters and identify data patterns to prevent inappropriate sensor trips and enable proactive maintenance preventing generator outage and ensuring constancy in supply and grid stability.

KTP Associate Role:

The KTP Associate will be based primarily at the company's premises, Uniper UK Technology Centre, Ratcliffe-On-Soar, Nottingham, and will also spend some time at Uniper Grain Power Station, Kent, as well as Loughborough University with the academic team. The Associate will be supervised by an academic team, led by Dr Eve Zhang and Dr Miguel Martinez Garcia, who are experts in predictive maintenance and machine intelligence.

The Associate will form an integral part of Uniper's Gas Turbine fleet team, working closely with the company supervisory team and company partners. As a KTP Associate, the successful applicant will have access to a wide range of commercial, R&D and management training programmes, as well as technical training resources and facilities at Loughborough University.

Introduction to Uniper UK Limited

Uniper operate seven power stations in the UK utilising a variety of energy generation sources. Electricity, produced through gas turbine-mediated generation, is supplied to the wholesale market complementing renewable power generation. Gas powered generation is vital to energy grid supply security during low renewable power generating conditions such as low wind/overcast. With a broad portfolio of assets supporting the energy sector Uniper have stakes in the Europe to UK 235-kilometer gas pipeline, UK regasification and gas storage facilities.

Uniper's strategy reflects the Government focus on UK energy supply security and decarbonisation with their market position in focus through tailor-made customer solutions.

Loughborough University/Department Summary

Loughborough University is ranked in the Top-10 in the most recent Complete University Guide Guardian League Table and the Times Good University Guide. Its position is confirmed through its outstanding research & innovation in science and engineering, and its world-class research facilities. It has been awarded a record of seven Queen's Anniversary prizes for its research impact to society and UK industry.

Today, Loughborough University is one of the UK's leading centres of excellence for teaching and research in STEM – with a proven track record in supplying industry with high-calibre, highly motivated graduates, and a vibrant international research culture. Our mission is to deliver world-leading excellence in our research, covering a full spectrum of engineering, technology and science activities, essential to the fast paced Aeronautical and Automotive industry sectors.

Loughborough's Department of Aeronautical and Automotive Engineering has a well-established reputation built on a long and successful history. The active research culture utilises the latest thinking in the field, tackling challenging project work relevant to transportation, manufacturing and energy technologies. The department boasts purpose-built facilities including laboratories, workshops, wind-tunnels, a flight simulator and a technical display area.

Loughborough's Aeronautical and Automotive Engineering enjoys a close relationship and productive research collaborations with world leaders in the transport and energy industries. The Risk and Reliability Research Group has focussed on developing methods and modelling capabilities to improve inherent component reliability, maximise system operational reliability and availability, and understand and mitigate risks to make systems safer and more resilient.

Job Description and Person Specification

Job Grade: Other

Job Purpose

The KTP Associate will:

- Work with stakeholders, including Uniper's senior leaders, technical multi-disciplinary scientists, site engineers, local control engineers, and academic experts, developing networks across the business and understanding of project needs, deliverables across the energy industry.
- Determine technical scope, objectives, specifications, and opportunities for technology advancement.
- Conduct experiments, testing, and evaluation for the developed system for trials and measure its impact.
- Document work regularly, ensuring knowledge and outcomes are transferred to other team members, embedding, recording, creating a repository throughout the project.
- Write reports and presentations, sharing these as project updates at supervision meetings, LMCs, advisory panel meetings, and other necessary forms of engagement and dissemination.

Job Duties

- Develop and innovate machine learning algorithms that predict anomalous behaviour from sensor data.
- Carry out the KTP project tasks and deliver the outcomes as outlined in the project workplan.
- Manage the project and disseminate key deliverables/findings to the project team and key stakeholders, to facilitate progress of the digital product.
- Undertake KTP management training, as well as personal development training and courses as deemed necessary.
- Prepare research papers for publication in journals/conferences, in line with the expected scholarly activities of the University Research Staff, and in accordance with the sensitivity of collaborating companies.
- Assist with the capture and generation of intellectual property.
- Travel to company business partners within the UK and possibly overseas, when necessary.
- To undertake such 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.

Previous KTP Associates or employees of Uniper UK Limited are not eligible to apply for this KTP.

Applicants must have completed their last qualification (degree, masters, PhD), no more than five years before the closing date.

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 Welcome to Loughborough in-person courses.

We actively encourage applicants from women, disabled and Black, Asian and Minority Ethnic candidates, who can bring their experiences and voices to the partnership.

Organisational Responsibility

Reports to the KTP Lead Academic: Dr Eve Zhang (Y.Zhang@lboro.ac.uk).

Person Specification

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 – Presentation
- 3 – Interview

Essential Criteria

Area	Criteria	Stage
Experience	Specific experience of developing algorithms in relevant Engineering subjects	1,2,3
	Experience of conducting research that can lead to high quality conference or journal publications	1,2,3
Skills	Demonstration of excellent technical ability	1,2,3
	Computer and programming skills in Python, C++, R or equivalent	1,3
	Excellent inter-personal and communication skills - both written and oral	1,3
	Excellent team-working skills, engaged and proactive	1,3
	Capability to work autonomously and generate results	1,3
	Excellent research paper or technical report writing skills	1,3
	Highly motivated with the ability to set and meet deadlines appropriate to the progress of the project	1,3
	Strong real-world problem-solving skills	1,3
Training	Willingness to undertake appropriate further training and to adopt new procedures as and when required	1,3
Qualifications	Master's degree in engineering, computer science or other relevant subjects	1,3

Desirable Criteria

Area	Criteria	Stage
Knowledge	Expert knowledge in AI, deep learning and digital twin methodologies	1,2,3
	Knowledge of gas turbine and sensor technologies	1,2,3
	Knowledge of control technologies	1,2,3

Experience	Experience of working in research and development projects	1,2,3
	Experience of conducting industry-led research that has been published in high quality conferences or journals	1,2,3
	Experience of project management	1,3
Skills and abilities	Track record in originating and developing new ideas	1,3
	Ability to take part in collaborative activities and work with technical staff in other subject domains in an industrial environment	1,3
Qualifications	PhD (or near completion) in engineering, computer science or other relevant subjects	1,3
	Licenced to drive in the UK	1,3

Conditions of Service

The position is FULL TIME and FIXED TERM for 24 months, until 19 August 2026. Salary will be between £35,000 - £42,000 per annum at a starting salary to be confirmed on offer of appointment. The successful applicant will also receive a £2,000 per annum training budget each.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Academic and Related staff/Operational and Administrative staff, details of which can be found [here](#).

We 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/>.