



Department of Computer Science  
TrainFX

Job Ref: REQ231171

**Job title: Software and Data Science Engineer (KTP Associate)**

**Period:** 30 months

**Salary:** £35,000 - £40,000 per annum (Starting salary to be confirmed on offer of appointment), plus £5,000 training budget

**Application deadline:** 15<sup>th</sup> October 2023

**Key words:** software, data analytics, data science, big data, Computer Science, database, web, machine learning, data mining, SaaS, client-server programming.

**Project Title:** Railway Smart Passenger Information System (PIS)

This is a 30-month Knowledge Transfer Partnership (KTP) project between Loughborough University and TrainFX, funded by UKRI Innovate UK.

This is an exciting opportunity for a forward-thinking and ambitious Senior Frontend Developer to join a company that specialises in providing SaaS services to the Rail Industry. Working with some of the biggest Train Operators in the UK, you will be joining a company that finds ways to help make services to Rail passengers better, faster and more accessible for everyone.

### About the project

The project aims to integrate the real-time passenger loading information into TrainFX Smart-PIS (Passenger Information System), and improve the PIS through big-data analytics, reporting and forecasting of dynamic, real-time and connected passenger information.

The AI-empowered Smart-PIS will provide dynamic data acquisition and real-time, personalised information supporting travellers, railway operators and service providers. The system will improve current service efficiency, promote passenger satisfaction, and provide the potential for new services through affordable technologies. It is the first of this kind of innovative system in railway which enables bespoke customisation towards rail industry objectives.

The whole KTP project will be delivered through dual Associate workplans by **Two KTP Associates**. The Associates will work closely with and be supported by the company technical team and AI experts at the knowledge-base, Loughborough University, throughout the project. KTPs aim to help businesses improve their competitiveness and productivity through the better use of knowledge, technology and skills that reside within the UK Knowledge Base.

**KTP Associate Role:**

This job role focuses on integrating the real-time passenger counting information (from an AI-vision system) into TrainFX Smart-PIS and improving the PIS through big-data analytics, to provide a range of novel services. Based on the existing TrainFX PIS (a web-based client-server software platform), you will upgrade and maintain the back-office database and frontend interfaces, and implement/improve a range of smart functions, such as efficient route planning, passenger information management, and dynamic loading flow reporting etc. The developed Smart-PIS will enhance the capability of railway information system and achieve better services for passengers.

The KTP Associate will be based primarily at the company TrainFX premises in Derbyshire but will also spend some time at Loughborough University with the academic team. The Associate will be supervised by an academic team led by Prof. Baihua Li and Prof. Qinggang Meng, in AI and data science at the Department of Computer Science, Loughborough. The Associate will form an integral part of the TrainFX Research and Development team, working closely with the TrainFX 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 TrainFX**

TrainFX is a UK-based rail technology company specialising in bespoke, turn-key and fully integrated on-train solutions, incorporating seat sensors, CCTV, passenger counting, passenger information system, crew comms, call for assistance, etc. Based in the rail city of Derby, TrainFX are proud to supply and maintain Passenger Information Systems to train operators and ROSCO's right across the UK.

**Our Vision** - a better journey through innovation: we empower train operators to provide the best possible passenger experience, through smart, reliable and affordable technologies. To give operators the ability to analyse and monitor passenger and fleet activity, creating valuable insights which translate to dramatic improvements in service efficiency and passenger satisfaction.

The developed Smart-PIS will step-change existing TrainFX technology, creating fully integrated, bespoke operations management and passenger-facing mobile App services. State-of-the-art computer vision and machine learning technology will be applied to power novel, intelligent services. This project will help achieve TrainFX strategic aims through the development of novel SaaS technology, and further promote TrainFX profile with innovation.

---

**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.

Founded in 1974, the Department of Computer Science is one of the first university computing departments established in Great Britain. It is a part of the Loughborough University School of Science.

The department has an excellent research record in AI, machine learning, robotics, computer vision, deep learning, data science, HCI, IoT, digital technologies, and wireless sensor systems. with projects funded by UKRI EPSRC, Innovate UK, Newton, EU, NHS, KTP and a wide range of industry. In addition to our strong track record in fundamental research, a particular focus of our research is applied research to support industry and create significant economic and social impact. A recent £1m upgrade of high-end GPU computing facilities and £5.8M DigLabs now complement a £9m investment in our purpose-built research and teaching space.

In joining the highly ranked and fast-developing Department of Computer Science, the successful candidate will have access to a wide range of high-spec computing facilities, including HPC, high-spec deep learning machines, workstations and servers. They will also have full access to robotics and AI laboratories equipped with cutting-edge camera/vision systems, sensors, robots and software platforms. You will work with a strong research team in AI composed of over 30 staff, PDRAs and PhDs, and be supported through an excellent research and innovation environment.

-----

## **Job Description and Person Specification**

### **Job Grade: Other**

#### **Job Purpose**

The KTP Associate will:

- Work with stakeholders, including TrainFX senior leaders, technical multi-disciplinary scientists, commercial, sales, marketing teams, clients and academic experts, developing networks across the business and understanding of project needs, deliverables and highly regulated railway industry.
- Determine technical scope, objectives, specifications and opportunities for technology advancement.
- Explore state-of-the-art database management, big-data analytics, and SaaS technology.
- Develop and maintain features of the back-office application, including the database and frontend interfaces.
- Integrate passenger counting information into the Smart-PIS, and implement and improve new functions, e.g. passenger information management, dynamic loading information, smart route planning, etc.
- Assist the project team on AI-vision system for passenger counting tasks.
- Design, implementation, testing, deployment, documentation and maintenance.
- Solve for reliability, scale and flexibility, while implementing a visually rich and slick user experience.
- Document work regularly, ensuring knowledge and outcomes are transferred to other team members at TrainFX, 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**

- 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 commercialisation of the 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 commercial sensitivity of collaborating companies.
- Assist with the capture 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 TrainFX 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, where appropriate, Recruitment and Selection.

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

## 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	Web application development experience, building and maintaining large-scale highly visible web applications	1,2,3
	Experience in database design and development	1,2,3
	Solid foundation in data structures, algorithms and design patterns	1,2,3
	Experience in algorithm and software development	1,2,3
Skills	Solid skills in client-server programming, e.g. Ruby on Rails, SQL/PostgreSQL, JavaScript, Linux server and cloud-based services	1,2,3
	Hands-on skills on web technologies, e.g. HTML, CSS, HTTP, jQuery, JWT, REST	1,2,3
	Design, develop, code, test, debug and validate software systems	1,3
	Analyse and enhance efficiency, stability and scalability of system resources	1,3
	Integrate and validate new product designs	1,3
	Authoring of original work, technical reports and presentations	1,2,3
	Good project management and teamwork skills	1,3
	Strong real-world problem-solving skills	1,3
Qualifications	Minimum postgraduate (MSc) qualification or BSc/BEng in Computer Science or relevant disciplines with solid experience.	1,3

### Desirable Criteria

Area	Criteria	Stage
Knowledge	Knowledge of AI and big data technology	1,2, 3
	Knowledge of railway transport operations	1,3

Experience	Experience in applying predictive analytical techniques, machine learning, data mining	1,2, 3
	Experience working in R&D projects	1,3
Skills and abilities	Interface with hardware design and development	1,3
	Ability to take part in collaborative activities and work with technical staff in other subject domains in a commercial environment.	1,3
	Excellent written and oral communication skills	1,3
Qualifications	Licenced to drive in the UK	1,3

### Conditions of Service

The position is FULL TIME and FIXED TERM for 30 months. Salary will be between £35,000 - £40,000 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 year.

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/>.