

AI and Digital Systems Engineer (KTP Associate)

School / Department:	School of Architecture, Built Environment, Engineering and Computing	Grade:	£38,000 - £42,000
New appointees to Birmingham City University will ordinarily be appointed at the entry point of the appropriate grade			
Responsible to:	Academic Lead	Responsible for:	N/A

Job Purpose

This position forms part of the Knowledge Transfer Partnership (KTP) programme co-funded by Innovate UK and HB Tunnelling Limited. The AI and Digital Systems Engineer (KTP Associate) will work on a 28-month collaborative innovation project to develop an AI and IoT-enabled Digital Twin for Tunnelling (DT4T) platform for HB Tunnelling Limited, to be used for load-bearing applications

The Project

The project is focused on the development of a Digital Twin for Tunnelling (DT4T) platform, an integrated AI and IoT-enabled system designed to transform how HB Tunnelling Limited manages the full lifecycle of tunnelling projects, from initial tender through to construction monitoring and long-term asset maintenance.

The platform combines three core capabilities: AI-driven tender intelligence that automates the screening and analysis of incoming project enquiries; automated Bills of Quantities (BoQ) generation that draws on historical project data and engineering specifications to accelerate estimating workflows; and real-time IoT monitoring using wireless sensor networks to track ground conditions, structural behaviour, and environmental impacts across active tunnel sites.

Main Activities and Responsibilities

The successful candidate will lead the design, development, and deployment of the Digital Twin for Tunnelling (DT4T) platform, an integrated AI and IoT-enabled system that will transform HB Tunnelling Limited's approach to tender management, estimating, and construction monitoring. The position is for 28 months. The expected start date is as soon as is practical.

The Associate will work on:

- Developing AI-driven tender intelligence capabilities, including automated document ingestion, project screening, and opportunity scoring using large language model (LLM) tools
- Building automated Bills of Quantities (BoQ) generation workflows that integrate tender specifications with historical project cost data and engineering calculations (including flotation checks and rebar density)
- Designing and implementing IoT data pipelines to ingest, process, and visualise real-time sensor data from wireless monitoring nodes deployed at tunnel sites
- Creating a unified digital twin platform interface that consolidates tender, estimating, and monitoring functions into a single operational environment
- Integrating the platform with HB Tunnelling's existing data sources, workflows, and commercial systems

- Conducting user testing and iterative refinement with engineering and commercial teams to ensure practical adoption
- Producing technical documentation, training materials, and knowledge transfer outputs to embed the platform sustainably within the business
- Supporting the Local Management Committee with progress reporting at key project milestones

The role requires the successful candidate to:

- Work embedded within HB Tunnelling Limited's operational environment, collaborating daily with engineers, estimators, and project managers
- Translate complex technical capabilities into practical tools that non-technical staff can adopt with confidence
- Manage their own workload and project timeline with a high degree of independence, under the academic supervision of Birmingham City University
- Engage with the full software development lifecycle, from requirements gathering and system design through to testing, deployment, and iteration
- Apply and adapt commercial AI tools (such as GenieAI and PDF-based LLMs) to domain-specific tunnelling and construction workflows
- Maintain rigorous documentation standards to support ongoing knowledge transfer and future platform development
- Communicate effectively across academic and industry stakeholders, including attendance at supervisory meetings and LMC governance sessions
- Adhere to relevant industry standards and regulations, including those governing tunnelling safety and construction data management

Person Specification

Essential Criteria	Application Form / Support Statement / Interview
1. A minimum 2:1 or first-class undergraduate qualification in Computer Science, Software Engineering, Information Technology, Civil Engineering, or a closely related discipline	Application Form / Support Statement / Interview
2. Proficiency in Python for data processing, automation, and API integration	Application Form / Support Statement / Interview
3. Demonstrable experience working with AI and machine learning tools, including large language models (LLMs) for document analysis or natural language processing	Application Form / Support Statement / Interview
4. Experience with cloud platforms (Azure, AWS, or equivalent) for application hosting and data storage	Application Form / Support Statement / Interview
5. Strong understanding of database design, data modelling, and structured/unstructured data management	Application Form / Support Statement / Interview

6. Experience developing and integrating RESTful APIs and web-based platforms	Application Form / Support Statement / Interview
7. Ability to work independently, manage competing priorities, and deliver to project milestones with limited day-to-day supervision	Application Form / Support Statement / Interview
8. Strong written and verbal communication skills, with the ability to present technical concepts clearly to non-technical audiences	Application Form / Support Statement / Interview
Desirable Criteria	
1. Master's degree or PhD (awarded or near completion) in Artificial Intelligence, Data Science, Construction Informatics, Digital Built Environment, or a closely related discipline will be an advantage	Application Form / Support Statement / Interview
2. Familiarity with IoT data protocols and time-series data handling (e.g., MQTT, LoRaWAN, or similar sensor network technologies)	Application Form / Support Statement / Interview
3. Exposure to digital twin concepts, Building Information Modelling (BIM), or asset lifecycle management	Application Form / Support Statement / Interview
4. Knowledge of or interest in the construction, civil engineering, or infrastructure sector	Application Form / Support Statement / Interview
5. Experience with data visualisation tools and dashboard development (e.g., Power BI, Grafana, or similar)	Application Form / Support Statement / Interview
6. Experience in an industry-facing or applied research environment, such as a placement, KTP, or collaborative project	Application Form / Support Statement / Interview
7. Familiarity with relevant construction industry standards and terminology (e.g., Bills of Quantities, tender processes, ground monitoring)	Application Form / Support Statement / Interview
Personal Skills	
1. Enthusiastic, self-motivated and able to take a proactive role in delivering the proposal's work plan successfully.	Application Form / Support Statement / Interview
2. Practical interpersonal skills to establish good working relationships with colleagues, stakeholders, and industrial partners.	Application Form / Support Statement / Interview
3. Excellent communication skills to express ideas adequately and articulate complicated matters between the academics and the company project team members either orally or in writing	Application Form / Support Statement / Interview

4. Excellent analytical, problem-solving, and computational skills, along with being adept at applying knowledge to commercial projects, driving value and making an impact where possible.	Application Form / Support Statement / Interview
5. Strong leadership and project management skills.	Application Form / Support Statement / Interview

- Application Form – assessed against the application form. Normally used to evaluate factual evidence e.g. award of a qualification. Will be assessed as part of the shortlisting process.
- Cover Letter & CV - applicants are asked to provide a statement to demonstrate how they meet the criteria, and may reference their CV. The response will be assessed as part of the shortlisting process.
- Interview – assessed during the interview process by either competency-based interview questions, tests, work-related exercise, presentation and discussion, or teaching session etc.