

UNIVERSITY OF LIVERPOOL

AI & Cyber-Physical Systems Engineer

Grade and salary: Grade 7, £40,704 - £46,970 per annum
Working hours: Full-time 35 hours per week
Tenure: Fixed term available until 31 March 2028
Location: Digital Innovation Facility, Liverpool campus (hybrid, 60%+ on campus)
Faculty: Health and Life Sciences, Civic Health Innovation Labs

Recruiting department contact: Email: dawn.stewart-ryan@liverpool.ac.uk
Job ref: 118074

The Role

Role overview and University context:

The Liverpool City Region's Innovation Zone (IZ) Programme is a £160 million government investment designed to accelerate the growth of the health and life sciences sector, upskilling residents and creating jobs for our region. As an integral part of that Programme, the University of Liverpool is establishing the Civic HealthTech Innovation Zone (CHI-Zone) to spearhead the use of data, including AI, and technology to transform health and social care. CHI-Zone harnesses the University's knowledge and expertise to support local entrepreneurs, SMEs and large corporates to research, develop and commercialise cutting-edge products and services for the health and care sector.

The University's Civic Health Innovation Labs (CHIL) is working with the Virtual Engineering Centre (VEC) to deliver a number of CHI-Zone initiatives. The VEC and the Digital Innovation Facility (DIF) make up the Institute for Digital Engineering and Autonomous Systems (IDEAS), which co-locates world-class academic research and industrial application in autonomous systems, robotics, data analytics and artificial intelligence, with a mission to accelerate business growth through digital technology.

This funded post sits within the CHIL team responsible for the programme. You will be based day-to-day at the DIF on the University of Liverpool campus alongside VEC colleagues, and will also work with CHIL staff at the Liverpool Science Park and the VEC facility at Sci-Tech Daresbury as required. Working under the supervision of colleagues in the CHI-Zone team and the VEC, you will design, inform, develop and test solutions to pressing problems posed by commissioners and providers of health and care services, taking primary responsibility for developing pipelines that integrate technologies across autonomous systems, cyber-physical systems, robotics, IoT, and distributed and connected devices.

You will report to the VEC's Head of Digital Solutions Engineering and work closely with CHIL's Innovation Manager. You will join a multidisciplinary team whose focus areas include data science and analytics; AI and autonomous systems; immersive systems (VR, AR and mixed reality); robotics, IoT and connectivity; digital twins and digital threads; design optimisation, manufacture and assembly; digital heritage; blockchain and Web3; high-fidelity and distributed simulation; and sensors, diagnostics and biomedical devices.

Although the University operates a hybrid working system, we expect the postholder to work more than 60% of their time on campus.

Find out more: LCR Life Sciences Innovation Zone, Virtual Engineering Centre, Civic Health Innovation Labs and Health Data Science.

Key responsibilities:

The responsibilities below are indicative rather than prescriptive. You will be expected to show flexibility and adaptability in meeting the developing needs of the VEC client base, and to undertake other duties as required, commensurate with the position.

- Collaborate effectively with Social Care Testbed members, including less digitally mature organisations, as well as CHIL's technical professionals and academics.
- Design and develop digital twins using skills and experience in IoT, connected and distributed systems.
- Develop digital and cyber-physical solutions that enable autonomous decision-making based on real-time data, using techniques such as computer vision, reinforcement learning and sensor fusion.
- Design and implement systems involving both hardware and software (e.g. robotics, smart grids, industrial automation, sensors and IoT devices), including control systems, embedded systems and data acquisition from sensors and actuators.
- Design AI-driven algorithms for tasks such as object recognition, motion planning and state estimation, and implement path planning, navigation, obstacle avoidance and environment mapping for autonomous systems.
- Ensure real-time operation, reliability, safety and feedback loops between software and the physical environment, troubleshooting and resolving application and infrastructure issues.
- Develop processes and pipelines for integrating digital technologies and tools across diverse sources, systems and platforms, supporting the import and export of data, insights and processing components between Trusted Research Environments (TREs).
- Work with the Design Manager to facilitate the co-design, development and testing of experimental software/hardware underpinned by the Testbed's data infrastructure.
- Work with researchers to ensure appropriate consent, information governance and de-identification processes are followed, and with data scientists and domain experts to ensure data accessibility, accuracy and utility for machine learning and predictive modelling.
- Liaise with programme partners and participate in meetings and networks, building relationships, encouraging a wide range of stakeholders to collaborate and influencing decision-making.
- Support workshops and sandpit sessions around IDEAS/VEC activities and upskill client capabilities to facilitate knowledge exchange.
- Maintain an awareness of advances in science and technology, and continue to develop expertise in machine learning, deep learning, reinforcement learning, AI, software engineering, and autonomous and cyber-physical systems.

In addition to the above, all University of Liverpool staff are required to:

- Adhere to all University policies and procedures, completing all obligatory training and induction modules, including Equality & Diversity and Health & Safety.
- Support the University's vision to drive forward environmental and social equity through delivery of our Sustainability Strategy and associated action plans.
- Demonstrate customer service excellence and continuous improvement in engaging with all stakeholders.
- Respect confidentiality: all confidential information should be kept in confidence and not released to unauthorised persons.

- Participate in the University's Professional Development Review scheme and take a proactive approach to own professional development.
- Embody and uphold the University's Vision and Values.
- Demonstrate flexibility in on-campus-presence to enable participation in business-critical activities, including reasonable participation in such things as: open days, invigilation, welcome week activities, confirmation and clearing and financial year-end activities.

About you

Experience
Essential 1. Professional experience of Python, C, C++ or similar language for development of digital and cyber-physical solutions. 2. Experience working with **distributed or connected systems**, such as IoT ecosystems, sensors, robotics-based platforms, real-time communication and/or large-scale AI infrastructure. 3. Experience with **control and autonomous systems** (e.g. embedded technologies, robotics, drones, autonomous vehicles, industrial automation). 4. Experience and practice regarding the use of **AI and machine learning** for real-world applications, including examples of work applying machine learning techniques such as SLAM, deep learning or reinforcement learning to enable autonomous behaviours. 5. Experience with **sensor integration** (e.g. camera, lidar, radar or IMUs) or real-time data streams. 6. Substantial experience and underpinning knowledge of fundamental programming techniques, code optimisation and software versioning. 7. Experience of engaging with other stakeholders to understand and document requirements for data-driven workflows and solutions. 8. Experience of working with large datasets.
Desirable 1. Experience working with **cloud or edge computing platforms** (AWS, GCP, Azure, or on-device AI hardware such as Nvidia Jetson and ARM-based devices). 2. Experience with relational databases, including SQL and/or MongoDB programming. 3. Experience with **large-scale distributed AI training and inference pipelines**. 4. Background in **systems engineering** approaches, including requirements gathering, testing and integration. 5. Experience with **real-time operating systems (RTOS)** or embedded Linux. 6. Experience with health information governance, data standards and/or working in a highly regulated sector, ideally health, care and/or life sciences.

7. Experience of working within industry and adapting data for different use cases and platforms.
8. Experience working on projects related to digital transformation for industry and SMEs.
9. An understanding of the challenges faced by clinical and academic researchers when using data.
10. Excellent presentation skills.

Education, qualifications and training

Essential

1. Undergraduate degree in Cyber-Physical Systems, Software Engineering, Autonomous Systems Engineering, Data Science, Mathematics, Physics, Computer Science or a related Science or Engineering discipline.
2. MSc or PhD in Cyber-Physical Systems, Robotics, Autonomous Systems Engineering, AI, Mathematics, Physics, Computer Science or a related Science or Engineering discipline.

   OR

   Significant industry experience working with robotics, distributed/connected systems, autonomous systems, software engineering, data science and/or AI technologies, with reference to practical projects.

Desirable

1. Training in, or experience of working with, Agile Scrum methodologies.

Skills, general and specialist Knowledge

Essential

1. Excellent coding skills and notable professional experience in distributed/connected systems engineering, autonomous systems and/or data science. Proficiency in **Python** and at least one other programming language/platform (e.g. C++, Rust, MATLAB, MySQL, C, C#).
2. Skills related to robotics, IoT, sensor networks, control theory, real-time operating systems, embedded systems and/or hardware integration.
3. Ability to design and implement connected systems, with knowledge of **distributed or networked architectures** (ROS, MQTT, Kubernetes, Kafka or similar).
4. Understanding of **machine learning frameworks** (TensorFlow, PyTorch, ONNX), with skills related to machine learning, deep learning and/or reinforcement learning.
5. Knowledge of real-time data pipelines and processing.
6. Ability to work effectively in a cross-disciplinary team, with excellent written and verbal communication and interpersonal skills, including the ability to present to groups and articulate new ideas to multiple stakeholders.
7. Excellent analytical and problem-solving skills.
8. Excellent time management and organisational skills.

Desirable

1. Software engineering skills related to interactive applications, embedded applications, database systems, back-end and/or front-end development.
2. Skills in parallel/distributed computing frameworks (Ray, Horovod, Spark).
3. Experience in hardware acceleration for AI (CUDA, TensorRT, FPGAs, TPUs).
4. Strong grasp of cybersecurity considerations for AI-enabled connected systems.
5. Familiarity with system design for physical environments, e.g. industrial control systems, smart home technology and health monitoring systems.
6. Notable examples of previous projects involving AI techniques such as image segmentation, sentiment analysis, contextual analysis, conversational AI, ambient intelligence, agentic AI or topic modelling.
7. Familiarity with DevOps/MLOps practices for deployment and monitoring of AI models.
8. Knowledge of 5G/6G networks, V2X communication or industrial IoT protocols.
9. Awareness of systems safety, validation and verification (ISO 26262, DO-178C or similar standards).
10. Knowledge of digital twins and simulation environments (Gazebo, CARLA, MATLAB/Simulink).
11. Understanding of cyber-physical system architectures and co-simulation approaches.
12. Knowledge of commercial product development or client-focused research.
13. Awareness of emerging AI research trends (foundation models, edge federated learning, neuromorphic computing).

Personal attributes

Essential

1. Ability to work independently, and willingness to work in a team environment and contribute to the development of the team.
2. Able to demonstrate problem solving and collaboration through project delivery.
3. Willingness to collaborate across disciplines to develop real-world impact for research.
4. Ability to show initiative.
5. Attention to detail and ability to think analytically.
6. Customer-focused, with a proactive, flexible and problem-solving approach.
7. Dependable, reliable and self-motivated.
8. Ability to handle confidential matters efficiently and effectively.
9. Awareness of health data research and the opportunities and challenges of working in this field.

About us

Established in 1881, we are an internationally renowned Russell Group university recognised for our high-quality teaching and research. We are consistently ranked as one of the best universities both nationally and globally, and the majority of our research is rated world leading or internationally excellent. Find out more about us.

Why Work Here

We recognise, appreciate and celebrate the incredible work our staff do every day. As well as generous terms and conditions, we offer a range of enviable benefits and provide support for colleague's wellbeing and development. Discover more about working here.

Moving from abroad

As a global institute, we welcome applicants from all nationalities, moving from a different country can be challenging and we would like to help as much as we can, we have put together some information on eligibility to work documentation, accommodation, schools, healthcare, life in Liverpool and the UK as well as other practical information. Discover more about moving from abroad.

Our Staff

Whether it be their friendly colleagues, supportive managers or our outstanding facilities, our staff can explain better than anyone what it is like to work for us and why they enjoy their role. See what our colleagues have to say.

How to Apply

Application process

Our e-recruitment system enables you to register for an online account, where you can view, copy and edit your applications. Set up your account on our Vacancies Portal.

Once you submit your application you will receive an automatic email acknowledgment. You can view your application at any time by clicking into the application history section of your account.

The recruiting department will endeavour to respond to each application. However, if you have not heard within six weeks of the closing date, please take it that your application has not been successful on this occasion.

Job description

After the closing date this job description will be removed from our website. Should you wish to refer to this information at a later date please ensure you save a copy of this document.

Right to work

We have a legal responsibility to ensure that you have the right to work in the UK before you can start working for us. If you do not have the right to work in the UK already, any offer of employment will be conditional upon you gaining it. If the role is based outside the UK, you will need to demonstrate your right to work for the country in which you are to be based.

Disabilities and alternative formats

If you have any other requirements which will help you access the application or interview process or employment opportunities at the University, or if you require copies documentation in alternative formats, please email: jobs@liverpool.ac.uk or telephone 0151 794 6771.