The original redbrick university and a member of the Russell Group

Faculty of Science and Engineering

INSTRUMENTATION ENGINEER/PHYSICIST

Area: School of Physical Sciences, Department of Physics.

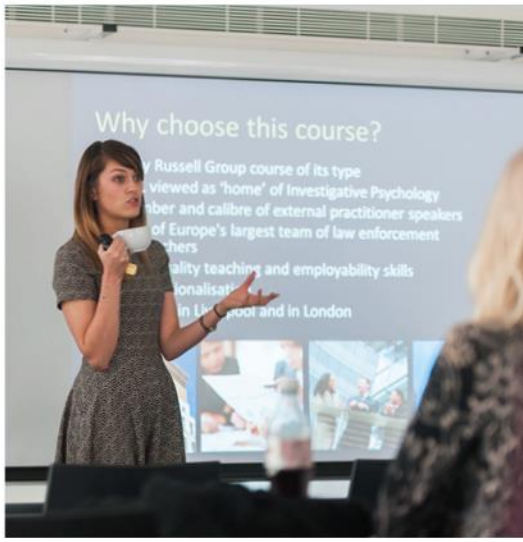
Job Ref: 041450

Location: University campus

Salary: £35,327 - £40,928 pa – Grade 7
£42,149 - £53,348 pa – Grade 8

Working Hours: Full-Time.

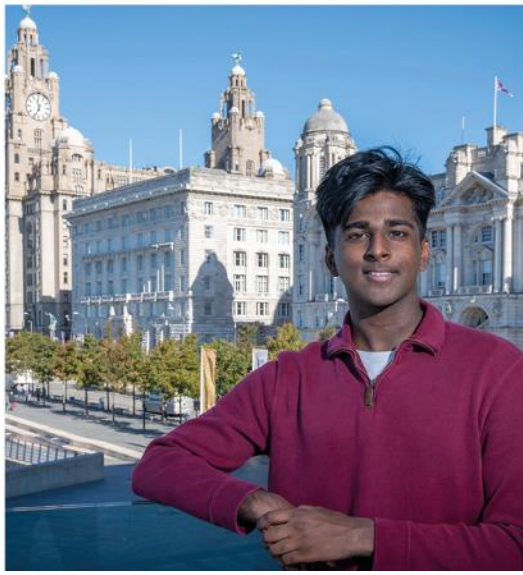
Tenure: this post is available on a fixed term basis until 31 March 2024.



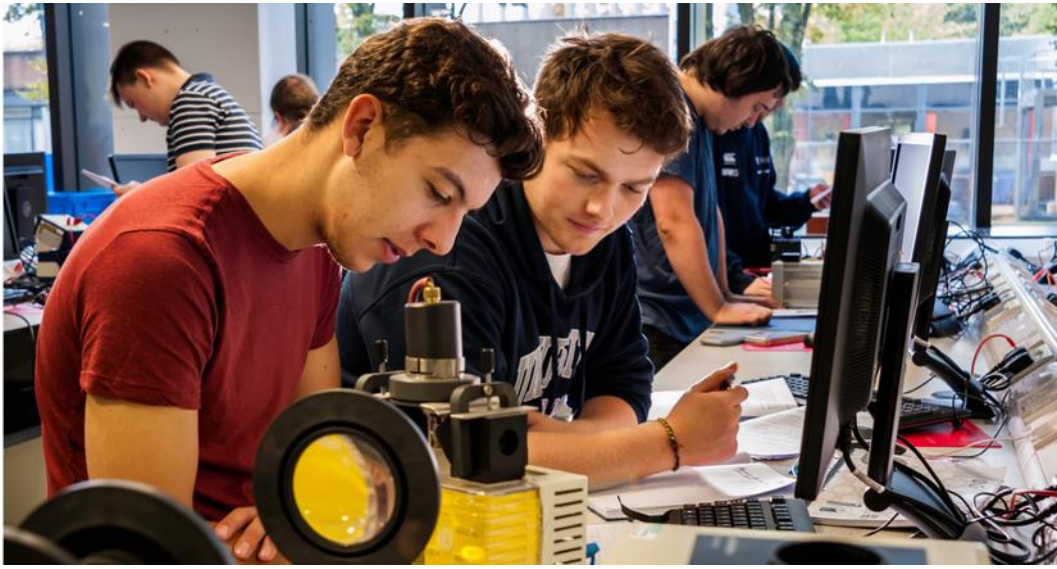
Outstanding development opportunities through our Academy

Online application> Shortlisting > Interview Process> Job Offer

Campus located in the heart of the vibrant city of Liverpool with excellent facilities



About the Role



Role overview and University context:

We are recruiting an experienced electrical engineer or physicist to lead the commissioning, maintenance and operation of the data acquisition systems for the electrical testing of silicon modules in the context of the silicon pixel "endcap" detector being constructed at the University of Liverpool for the upgrade of the Inner Tracker (ITk) for the ATLAS experiment at CERN's Large Hadron Collider. This post is initially available until 31st March 2024. An extension of the post beyond this date is likely, but subject to confirmation of continued funding.

The Department of Physics at the University of Liverpool is one of the worldwide construction sites for the upgrade of the ATLAS Inner Tracker (ITk). We are developing and building a state-of-the-art pixel-detector. This activity includes the production and testing of pixel modules and their assembly onto the cylindrical carbon fibre supports. Electrical testing throughout this process is vital to ensure the full functionality of the detector.

Responsibilities:

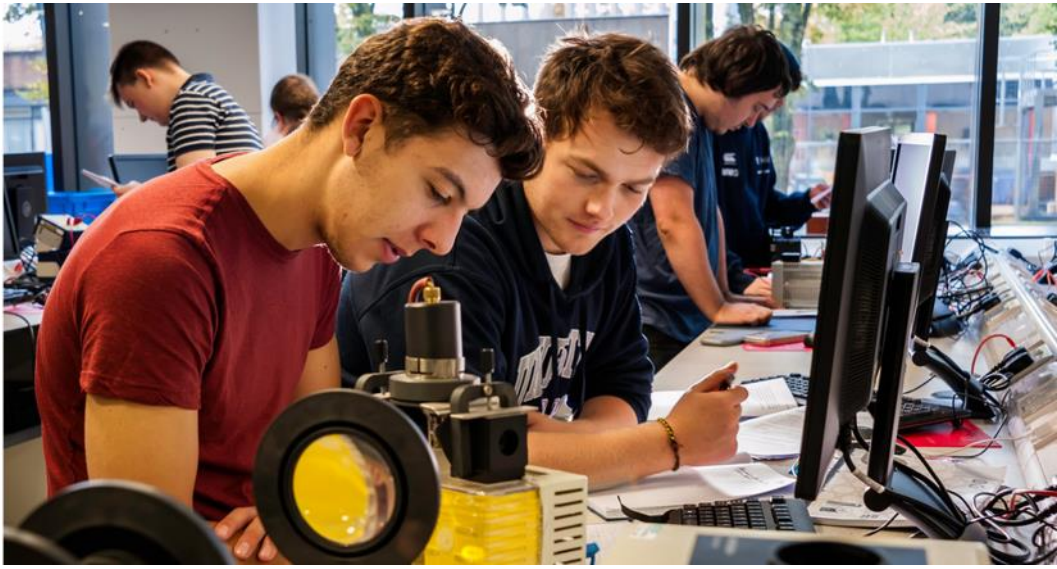
This role will be based in the Liverpool Semi-conductor Detector Centre cleanroom complex within the Department of Physics at Liverpool. The successful candidate will be responsible for developing and commissioning the data acquisition system hardware at Liverpool, in close collaboration with experts across the ATLAS community, and developing the software systems to support module testing during integration. During the integration phase they will play a leading role in the routine electrical testing of modules to ensure the endcap meets the performance requirements. The successful candidate will be expected to attend technical meetings at Liverpool and occasionally off-site as the project proceeds.

This role requires the highest standard of cleanroom working disciplines to be applied.
Good sensory and physical coordination is essential given the small scale and delicate nature of the detectors. Past experience of working in a clean room environment is highly desirable. Good communication skills are required.

- Continued development of and support for the electrical testing of pixel modules both for module production and during testing and integration into larger detector structures.
- Micro-electronics assembly and testing experience
- Support for the quality control procedures during module production
- Installation and commissioning of systems and interfacing electronics laboratory equipment for the Liverpool ATLAS upgrade pixel programme
- Responsibilities will include the design, verification and testing of analog or digital circuits, the development of FPGA-based data acquisition systems, and development of corresponding testing software and infrastructure.
- Overseeing technical staff as appropriate

Accountable To: ATLAS Upgrade PI in respect to duties, then the School Head of Operations.

About the Role



Duties:

The Department of Physics at the University of Liverpool is one of the worldwide construction sites for the upgrade of the Inner Tracker (ITk) for the high-luminosity upgrade of the ATLAS experiment at CERN's Large Hadron Collider. The ITk upgrade is a new detector for measuring the momentum and origin of charged particles emanating from the proton-proton collisions in the centre of the experiment.

You will be based in the Liverpool Semi-conductor Detector Centre cleanroom complex within the Department of Physics at Liverpool. You will join a team of 15 physicists and engineers working together on the manufacture and quality-control testing of silicon detectors for the endcap pixel tracker and the barrel strip tracker.

You will be expected to attend technical meetings at Liverpool and occasionally off-site as the project proceeds.

This role requires the highest standard of cleanroom working disciplines to be applied. Good sensory and physical co-ordination is essential given the small scale and delicate nature of the detectors. Past experience of working in a clean room environment is highly-desirable. You will have good communication skills and the ability to instruct others (e.g. students) in the production procedures.

This post coincides with the production phase of the ATLAS ITk upgrade. Subject to funding availability, there could be future possibilities of employment within the Department on other projects requiring similar skills and experience.

Additional requirements:

Manual Handling

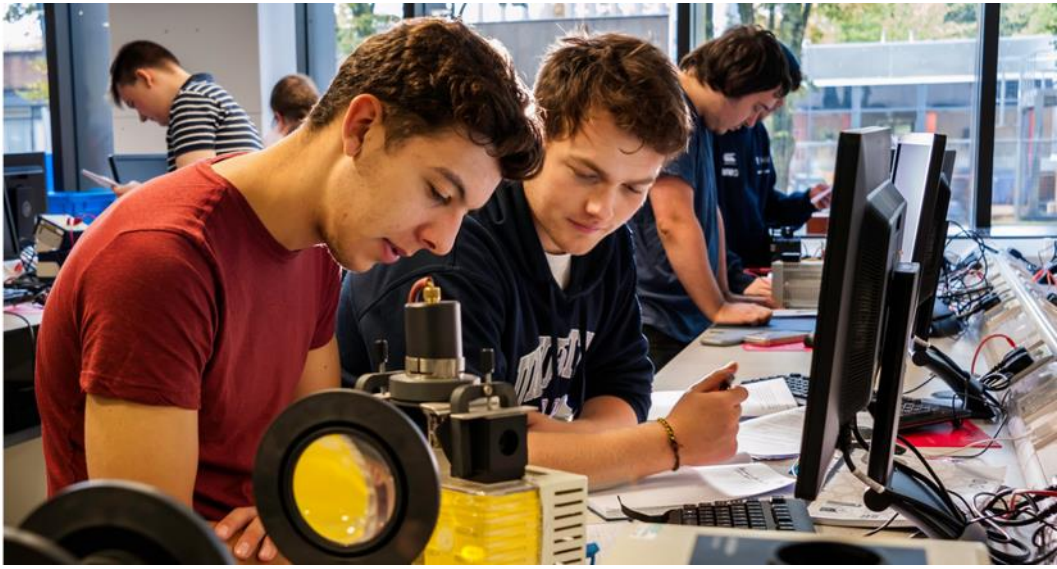
The post involves bending, stretching and the manual handling of loads up to 15kg. A system to control the risks is in place. The appointee will be required to complete a health questionnaire. Appointment will be subject to Occupational Health screening.

THE DEPARTMENT OF PHYSICS

The Physics Department, now part of the School of Physical Sciences, was one of the first departments established in the University in 1881 and has a long tradition of excellence in physics research. The Department has scored highly in three consecutive reviews by HEFCE - the national Research Assessment Exercise (RAE). This considerable achievement reflects the Department's international reputation in the fields of condensed matter physics, nuclear physics, particle physics and accelerator science.

The first Professor of Physics at Liverpool was Sir Oliver Lodge, who made the world's first public radio transmission in 1894. Two years later, Lodge demonstrated the use of X-ray photography by taking an image

About the Role



of a bullet in a boy's wrist. It was the first time an X-ray had been used for surgical purposes in the UK. Professor Charles Glover Barkla's research into X-Rays won him the Nobel Prize for Physics in 1917, and Sir James Chadwick was awarded the Nobel Prize for Physics in 1935 for discovering the neutron. More recently, Sir Joseph Rotblat was awarded the Nobel Peace Prize in 1995 for his work on limiting the threat posed by nuclear weapons.

The Department is very well funded for research. There are currently approximately 40 academic staff who are responsible for the teaching and supervision of around 360 undergraduate and 170 postgraduate students. Over 40 full time research and computer physicists, professional, technical and electronic support staff together with extensive laboratory, workshop and design office facilities, support the research groups. Much of our research is carried out in the leading international centres for physics research: ILL (Grenoble), ESRF (Grenoble), ELETTRA (Trieste), CERN (Geneva), DESY (Hamburg), SLAC (Stanford), FNAL (Chicago), JYFL (Jyväskylä), GANIL (Caen), GSI (Darmstadt) and ATLAS (Argonne).

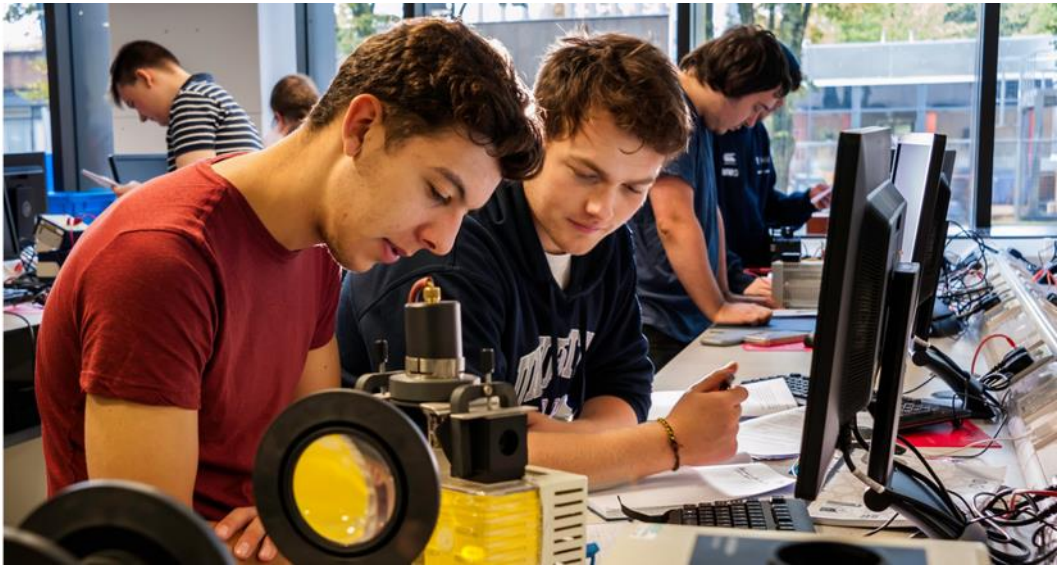
The Department performs extremely well in both teaching and research as evidenced by excellent scores in teaching quality assessment, research assessment exercises and the national student survey. Further details of the department can be found on the web site www.liverpool.ac.uk/physics

PARTICLE PHYSICS GROUP

The Particle Physics Group at the University of Liverpool is one of the UK's premier Particle Physics Groups. It holds research grants of £15M and research infrastructure facilities worth £30M. With a staff complement of 50 leading academics, physicists, engineers and technologists, it trains 20 graduate students at any one time.
Particle Physics is a major theme for the University of Liverpool and the group has strong support at the School and Faculty levels. The group has always been recognised for the world-leading contributions made to both the construction of experimental facilities and the data analysis and publication of physics results. In recent years the group has delivered detector sub-systems for ATLAS (Silicon Endcap-C), LHCb (VeLo), NA62 (K-Tag) and the ND280 ECAL (for T2K).The group is currently active at CERN (ATLAS, LHCb, NA62), at J-PARC (T2K), at SNOLAB (SNO+), at FNAL (g-2, LBNE), and is expanding into astro-particle physics (CTA), Dark Matter and Dark Energy searches (L-Z and Hyper-K).

The PP Group is an international leader in R&D in radiation-hard silicon detectors for future experiments and upgrades. Our facilities include the unique Liverpool Semiconductor Detector Centre (LSDC), a 350m2 clean-room complex equipped with automated probe stations, wire-bonders, metrology systems, materials testing, etc. The group also has an in-house R&D programme in Liquid Argon (LAr) tracking detectors for future neutrino oscillation experiments and direct Dark Matter searches. The group is the main user of the departmental mechanical workshop (CNC milling, turning, wire EDM) and the advanced materials laboratory (CFRP layup, autoclave/oven curing, etc).

About the Role



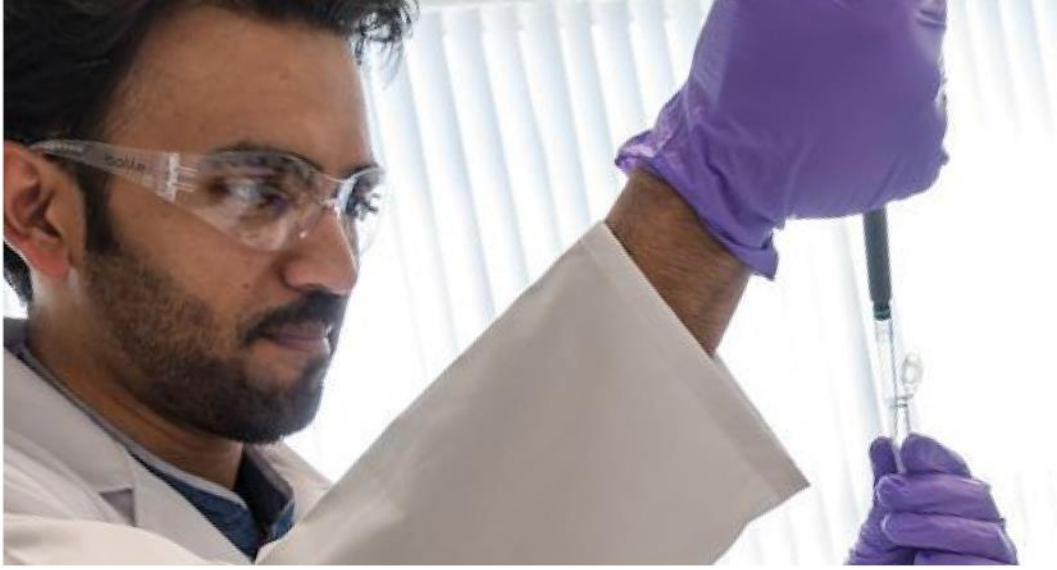
The ATLAS Upgrade

The ATLAS Upgrade project at Liverpool is led by Dr Helen Hayward. Her team comprises about 15 physicists, engineers and technicians working on a programme to replace the charged particle tracker of the ATLAS experiment by 2027. The new detector will allow ATLAS to continue taking physics data until the late-2030's securing future physics output and leadership for Liverpool's academics and research students. The team will assemble silicon detector modules and mechanical support structures for the barrel strip and endcap pixel tracking systems. The Liverpool group's contribution is the largest within the UK with several staff occupying major positions of leadership and responsibility. The project will culminate in the delivery of a completely assembled and tested pixel endcap tracking system to CERN by 2026.

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

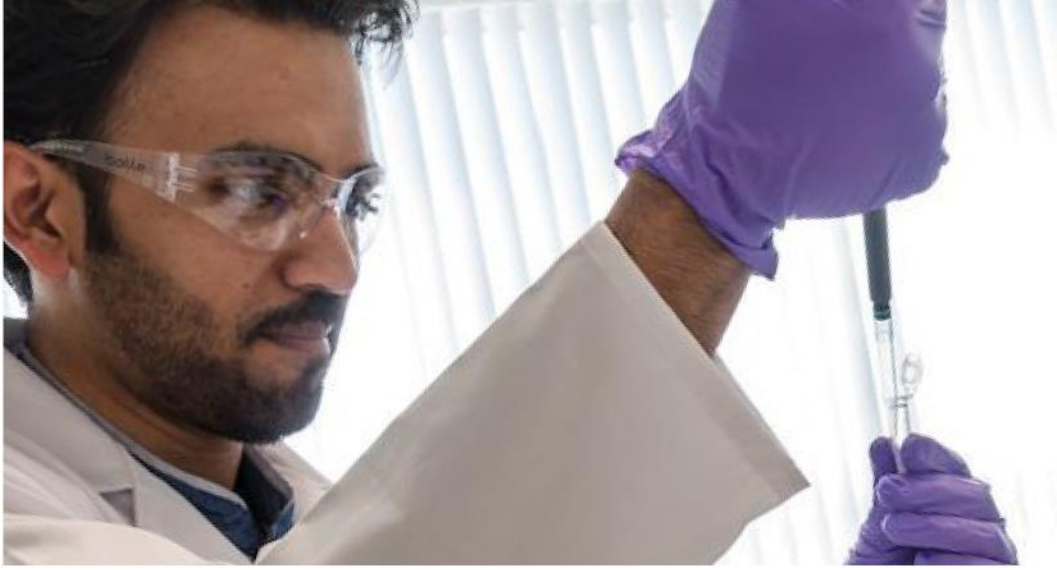
- Adhere to all University policies and procedures, completing all obligatory training and induction modules, including Equality & Diversity and Health & Safety.
- Respect confidentiality: all confidential information should be kept in confidence and not released to unauthorised persons.
- Participate in the University's Professional Development Review scheme and take a proactive approach to own professional development.
- Demonstrate customer service excellence in dealing with all stakeholders.
- Embody and uphold the University's Vision and Values

About You



Essential Criteria	Desirable Criteria
Experience	
Experience in a technical capacity in electronics in a scientific environment	Experience of production, commissioning or operation of tracking detectors, including the use of high-speed Data Acquisition equipment **Required for appointment at Grade 8**
Experience of working to health and safety regulations and legal requirements	Experience of working within a production environment
Experience with hardware test instrumentation	Advanced instrumentation development **Required for appointment at Grade 8**
Experience in firmware development and digital circuit design using hardware description language(s) such as Verilog or VHDL	Demonstrated experience in the use of ALTIUM for PCB design and experience in circuit simulation using SPICE (LTSPICE, SIMetrix or similar)
Experience with databases and GUI tools	Software development in Python and C++ for application in detector operation or commissioning **Required for appointment at Grade 8**
Experience in the use of electronic instrumentation such as digital oscilloscopes, pulse and arbitrary waveform generators in the MHz-GHz domain	Data analysis with ROOT
Education, Qualifications and Training	
Advanced degree in Physics, Electrical Engineering or a closely related field	Higher level qualifications in an engineering or science-based discipline (or a clear desire to achieve this) **Required for appointment at Grade 8**

About You



Skills, General and Special Knowledge	
Relevant experience of and extensive knowledge of the electrical testing of complex micro-electronic assemblies	Knowledge PCB layout software – Altium
Commissioning and using computer-based high-speed Data Acquisition Systems	Operation and development of Data Acquisition software **Required for appointment at Grade 8**
Ability to understand and work from formal specification documents, engineering drawings, manufacturer's data-sheets and user-guides. Ability to develop specifications for electronic systems based on performance requirements	
Ability to read mechanical drawings and interact with mechanical designers to understand system integration, using STEP and DXF files	
Personal Attributes and Circumstances	
Ability to communicate across all levels e.g. research students, senior technical staff, senior academics, external suppliers	Willingness to travel in the UK and abroad
Ability to work in a team	Willingness to maintain and improve skill set
Ability to work to targets and meet deadlines	
Ability to take initiative and solve problems on a day-to-day basis	
Ability to work with industrial partners on the development and procurement on custom electronics components	

About Us

"Our vision is to be a connected, global University at the forefront of knowledge leadership."
Vice-Chancellor, Professor Dame Janet Beer

Established in 1881, we are an internationally renowned Russel 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 here.

Our Areas

When you work at the University of Liverpool you are more than just your job role. You are a crucial part of our mission to improve lives on a local, national and international scale. Click on the relevant links below for more information on area you will be working in.

Faculty Department of Physics Particle Physics Research Cluster

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 here.

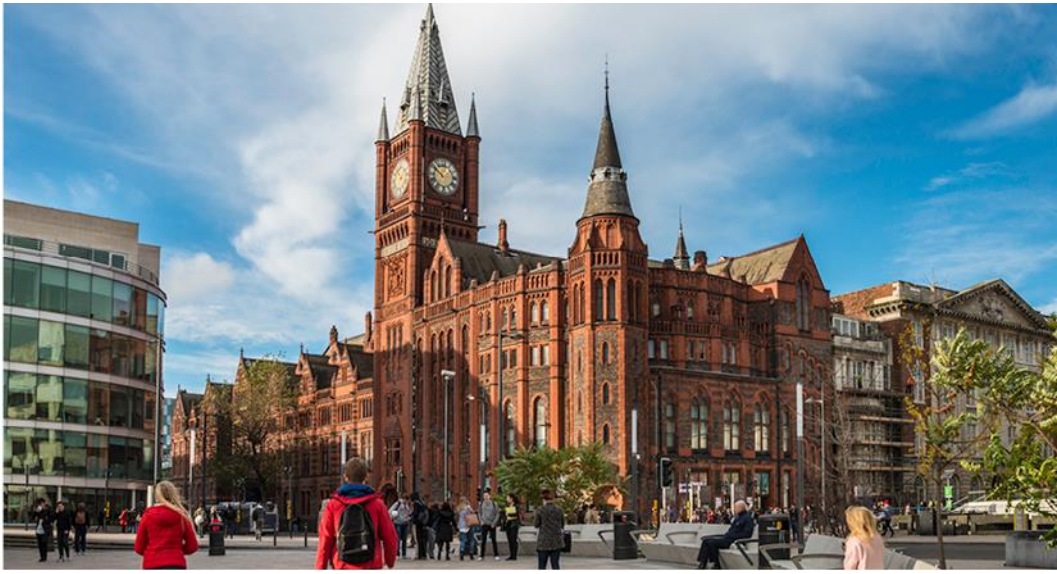
Moving from abroad

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 **here**

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 they have to say here.

How to Apply



The University of Liverpool is committed to being an inclusive employer. We welcome applications from everyone regardless of age, gender, ethnicity, sexual orientation, faith or disability.

Contacting us

Shortlisting and interview arrangements are the responsibility of the recruiting department. Please contact Dr Helen Hayward email: h.s.hayward@liverpool.ac.uk.

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 here.

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

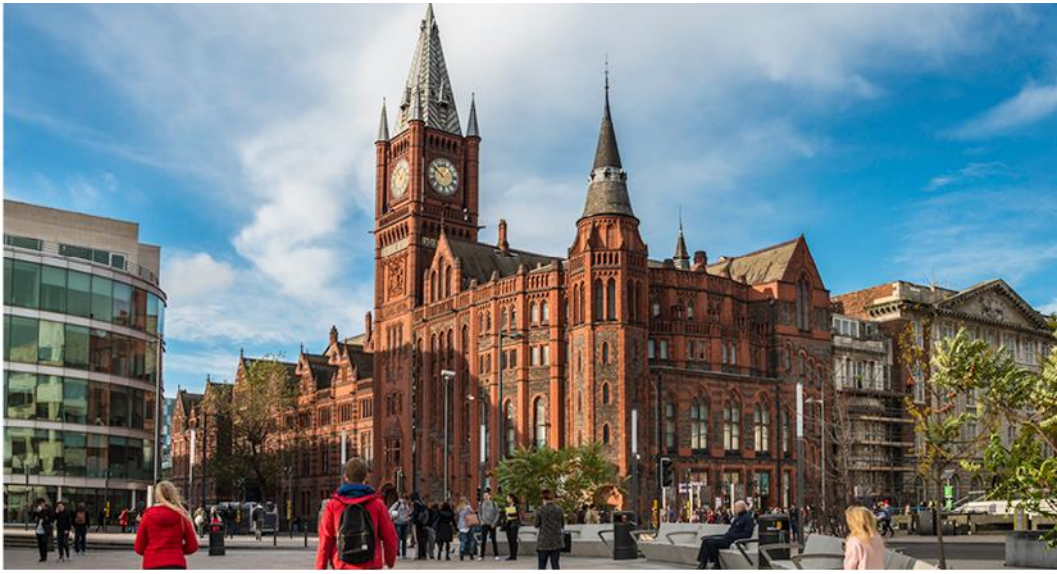
Job Description

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 with us. If you do not have the right to work in the UK already, any offer of employment we make to you will be conditional upon you gaining it. The UKVI have an interactive tool allowing you to immediately see if vacancies are eligible for a Skilled Worker visa. You will need to know the SOC code for the role, our most used SOC codes can be found here, if none of these apply to this role, there are more codes on the eligibility checker. The skilled worker eligibility checker can be found on GOV.UK.

How to Apply



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 of documentation in alternative formats, please email: jobs@liverpool.ac.uk or telephone 0151 794 6771.

Outcome of your application

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.