Associate Research Software Engineer

Physics

Closing date: 19 May 2019
Interview date: TBC
Vacancy reference: 7537
INTRODUCTION

The Nuclear Physics Group at the University of York is presently the largest in the UK. The group has a flourishing experimental nuclear physics programme at various facilities worldwide. It also has a strong nuclear applications group which is closely linked with industrial partners. Solutions are under development for challenges in homeland security, nuclear decommissioning, oil and gas exploration and other industrial sectors. In addition, the group is extensively exploring new concepts in medical imaging. All of these areas are underpinned by GEANT4 simulation which tracks the interaction of ionising radiation with detector materials and allows novel detectors and complex existing detector arrays to be effectively modelled. While a number of existing individuals in the group have used GEANT4, we have recently recognised the advantage in having a GEANT4 specialist in the group who can provide high level expertise on this important research software. Moreover, discussions with colleagues in the York Plasma Institute have shown that GEANT4 simulation is relevant to their work which shows that such a role could be a significant underpinning position across the Department of Physics. Industrial partners have also requested that we perform funded work with GEANT4 and sometimes MCNP, a similar software tool, which we do not have the capacity to respond to at the present time.

At the outset, a significant piece of work needs to be done for an STFC Global Challenge Project partnered with two Universities in South Africa. Here, work will be needed to set up a GEANT4 in the Cloud platform to support simulations to be carried out by South African students on novel concepts in PET imaging. Following on from this, we anticipate that the GEANT4 expert will be required to respond in a timely fashion to a range of different projects of varying duration – some for external partners. They will build up a strong bank of expertise as time goes on, supporting effectively the research work in the Department of Physics.

This job is advertised for two years in the first instance with the ambition to extend it to a third (and further years) subject to related grant and industrial income.
Main purpose of the role

- To develop research software under the supervision of senior colleagues and to contribute to the production of research software
- To assist in the identification and development of potential areas of research and the development of proposals for independent or collaborative research projects

Key responsibilities

(Role holders will be required to undertake some or all of the duties below)

- To conduct individual and collaborative research projects by the development of appropriate research software, duties to include: analysis and interpretation of research data; use of appropriate research techniques and methods; writing up of research results and dissemination through publications, seminar and conference presentations and public engagement and outreach activities; contributing to the identification of possible new areas of research
- To assist in the training of other researchers in creating research software
- To contribute to the preparation of research proposals and applications to external bodies
- To undertake appropriate organisational and administrative activities connected to the research project, including conference organisation, and the development of promotional or educational material including website maintenance and development
- To develop and initiate collaborative working internally and externally, duties to include: the building of internal contacts and participation in internal networks; collaboration with colleagues on joint projects as required; participation in and identification of external networks in order to share information and identify potential opportunities for collaboration and possible sources of funding; attendance at and contribution to relevant meetings
- To provide guidance to other staff and students, as required, as well as coordinating the work of small research teams
- To assist with undergraduate teaching in own area of expertise.
## PERSON SPECIFICATION

<table>
<thead>
<tr>
<th>Qualifications</th>
<th>Essential / Desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>First degree in Physics</td>
<td>Essential</td>
</tr>
<tr>
<td>PhD in nuclear or particle physics</td>
<td>Essential</td>
</tr>
</tbody>
</table>

## Knowledge

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Essential / Desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge in nuclear/particle physics allowing them to engage in high quality research</td>
<td>Essential</td>
</tr>
<tr>
<td>Knowledge of a range of research software techniques and methodologies especially in the field of Monte Carlo simulation, in particular, GEANT4</td>
<td>Essential</td>
</tr>
<tr>
<td>Has research expertise in an area that will complement and enhance the department’s research strategy and goals</td>
<td>Essential</td>
</tr>
<tr>
<td>Advanced and specialist IT knowledge; high-level of coding ability in C++</td>
<td>Essential</td>
</tr>
<tr>
<td>Knowledge of MCNP Monte Carlo simulation software</td>
<td>Desirable</td>
</tr>
</tbody>
</table>

## Skills, abilities and competencies

<table>
<thead>
<tr>
<th>Skills, abilities and competencies</th>
<th>Essential / Desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly developed communication skills to engage effectively with a wide ranging audience, both orally and in writing, using a range of media</td>
<td>Essential</td>
</tr>
<tr>
<td>Ability to write up research work for publication in high profile journals and engage in public dissemination</td>
<td>Essential</td>
</tr>
<tr>
<td>Ability to develop research software for own and joint research, with the assistance of a mentor if required</td>
<td>Essential</td>
</tr>
<tr>
<td>Competency to conduct individual and collaborative research projects</td>
<td>Essential</td>
</tr>
<tr>
<td>Ability to identify sources of funding and contribute to the process of securing funds, with collaborators if required</td>
<td>Essential</td>
</tr>
<tr>
<td>Competency to make presentations at conferences or exhibit work in other appropriate events</td>
<td>Essential</td>
</tr>
</tbody>
</table>
## PERSON SPECIFICATION

<table>
<thead>
<tr>
<th>Experience</th>
<th>Essential / Desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience of carrying out both independent and collaborative research</td>
<td>Essential</td>
</tr>
<tr>
<td>Experience of writing up research work for publication</td>
<td>Essential</td>
</tr>
<tr>
<td>Ability to work as part of a team and also to work independently using own initiative</td>
<td>Essential</td>
</tr>
<tr>
<td>Experience of developing complex GEANT4 simulations to assist with independent and collaborative projects</td>
<td>Essential</td>
</tr>
</tbody>
</table>

## Personal attributes

<table>
<thead>
<tr>
<th>Personal attributes</th>
<th>Essential / Desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention to detail and commitment to high quality</td>
<td>Essential</td>
</tr>
<tr>
<td>Collaborative ethos</td>
<td>Essential</td>
</tr>
<tr>
<td>Interest in and enthusiasm for the subject matter of the project(s)</td>
<td>Essential</td>
</tr>
<tr>
<td>Positive attitude to colleagues and students</td>
<td>Essential</td>
</tr>
<tr>
<td>Willingness to work proactively with colleagues in other work areas/institutions</td>
<td>Essential</td>
</tr>
<tr>
<td>Ability to plan and prioritise own work in order to meet deadlines, including using initiative to plan research programmes</td>
<td>Essential</td>
</tr>
<tr>
<td>Commitment to personal development and updating of knowledge and skills</td>
<td>Essential</td>
</tr>
</tbody>
</table>
The Nuclear Physics Research Group with 13 academic staff, 2 Ernest Rutherford Fellows, 8 post-doctoral researchers and 33 PhD students is the largest nuclear physics group in the UK and has a strong profile internationally. Our aim is to carry out world-leading research aimed at the study of the fundamental properties of atomic nuclei and the origin of elements in the cosmos, employing and developing state-of-the-art experimental and theoretical techniques. As well as pursuing fundamental research focussing on key questions at the forefront of the field, we work to develop new techniques in nuclear technology, working closely with industrial partners.

Our group has research interests that span almost the full range of major topics in the field, arranged into a number of research themes. Our research is carried out at leading laboratories across the globe. A major focus of the research is nuclear structure, in particular the physics of exotic, short-lived nuclei. This is supported by two world-leading nuclear structure theorists. This research is strongly linked to our active programme in nuclear astrophysics – the origin of the chemical elements in massive stars and explosive astrophysical scenarios. A further strand is hadron physics – the structure of the nucleon. This is also linked to nuclear structure and to the physics of neutron stars. The experimental work of the group has historically focussed on developing instrumentation and taking this to overseas laboratories. This has led on, in the last five years, to the development of a nuclear applications group. This group is developing detectors for areas of industry such as homeland security, nuclear decommissioning and oil/gas exploration. The group is also developing new concepts in medical imaging. For further information on group research, see: https://www.york.ac.uk/physics/research/nuclear/

Applicants called for interview are strongly advised to have a good knowledge, and understanding, of the work in this research group and its recent publications.

The post-holder will join a team led by Professor David Jenkins (the head of the Nuclear Physics Group) to carry out GEANT4 simulations in support of the group’s experimental programme and its applications and global challenge-related activities.

The Department of Physics
The Department of Physics: http://www.york.ac.uk/physics is a department at the forefront of pioneering
THE DEPARTMENT

global research and technological advancement in our world leading research centres, focused around condensed matter physics, nuclear physics, and plasma physics and fusion energy at the York Plasma Institute.

The Department has a lively and expanding research programme, and the research interests span a wide range, within both physics and the interactions of physics with other disciplines. We have benefited from substantial investment in these research groups, to help them play a leading role on the national and international stage, collaborating with major research institutions and industries. The research groups have international recognition, and each group regularly publishes papers in major journals and presents papers at international conferences.

The Department has many collaborations with other research groups in the UK and abroad, and contacts with industrial researchers. The Department also leads several inter-departmental ventures, including the Biological Physical Sciences Institute (BPSI), the York Quantum Technologies Centre (YQTC) and the recently established EPSRC Quantum Communications Hub. There has been significant major investment in laboratories and facilities including the York-JEOL Nanocentre and the York Plasma Institute, and we have excellent mechanical, computing and electronic workshop facilities, which support our research and teaching activities.

We have developed a range of undergraduate and postgraduate programmes that provide all our students with the skills to succeed in careers across a broad range of scientific, technological, and related disciplines, and provide opportunities for students to spend a year at one of a number of overseas universities or in industry as an integral part of their degree programme. The Department offers both three year BSc and four year MPhys degree programmes in Physics, Theoretical Physics and Physics with Astrophysics; and joint degree programmes in Maths and Physics and Physics with Philosophy. For postgraduates it offers a taught MSc in Fusion Energy, an MSc by Research and PhD degrees, including leading the EPSRC Centre for Doctoral Training in the Science and Technology of Fusion Energy.

The Department has 55 academic staff members (including teaching-only staff) and amongst our
academic staff we have Fellows of the Royal Society and the Institute of Physics, many national and international prize winners, contributing to a dynamic and thriving department. We also have an increasing number of postdoctoral Research Fellows and visitors, and 40 support staff (technical and administrative). The student population comprises around 450 undergraduates and 115 postgraduates (mostly PhD).

The Department of Physics operates a set of family-friendly policies and welcomes applications that are made on a part-time and job share basis, and we will do our best to accommodate such requests where possible. Staff working patterns are flexible and a formal flexitime system is also in operation. We provide support and advice for staff taking maternity, paternity, adoption and parental leave, and the University has a nursery and a Child Care voucher scheme.

The Department provides support for all categories of staff in their applications for promotion, role reviews, awards, prizes and rewarding excellence nominations. Staff are encouraged to attend training events and take up opportunities for professional development including those offered by the award-winning University Learning and Development Team: http://www.york.ac.uk/admin/hr/training/. The Department is committed to establishing a culture of environmental good practice and all staff are asked to go about their duties in a resource efficient way and minimise impacts to the environment wherever possible. Social events are also held regularly for members of staff.

The Department strives to address diversity inequalities to ensure that there is a culture that supports equality and encourages better representation throughout the Department. The Department of Physics fully endorses and adheres to the University's policies on equality of opportunity, and support for staff at all stages of their career is recognised as being extremely important. In recognition of our commitment to equality the Department has been awarded both Athena Swan Silver (the Athena SWAN Charter recognises and celebrates good employment practice for women working in science, engineering and technology (SET) in higher education and research) and Champion status within the Institute of Physics’ Juno programme (the intention of which is to recognise and reward departments that can demonstrate they have taken action to address the under-representation of women in university physics and to encourage better practice for both women and men). We have a well-established Equality Committee in the department which regularly reviews

Further information about the department is available at: http://www.york.ac.uk/physics
Founded on principles of excellence, equality and opportunity for all, the University of York opened in 1963 with just 230 students. In 2019 it is the home of more than 18,000 students across more than 30 academic departments and research centres. Since opening over fifty years ago, we have become one of the world's leading universities and a member of the prestigious Russell Group.

We are consistently recognised as one of the leading Higher Education Institutes and one of just six post-war universities to have appeared in the world top 100. We were rated 22nd in the 2019 Times & Sunday Times league table. The University of York has won six Times Higher Education (THE) Awards and five Queen’s Anniversary Prizes.

The University is proud of its association with Athena SWAN, holding multiple awards in support of gender equality, representation and success for all, with gold awards for Chemistry and Biology and a University-wide bronze award.

Of 154 universities that took part in the Research Excellence Framework (REF) in 2014, The University of York ranked 14th overall and 10th for the impact of our research. The University is consistently in the top ten UK research universities and attracts over £60m a year of funding from research alone.

Our vision is to make the University of York a world leader in the creation of knowledge through fundamental and applied research, the sharing of knowledge by teaching students from varied backgrounds and the application of knowledge for the health, prosperity and well-being of people and society.
Attractive workplace

Centred around the picturesque village of Heslington on the edge of the city of York, our colleges are set in an attractive landscaped campus. York enjoys a safe, friendly atmosphere with facilities including bars, shops, theatres and concert halls all within easy walking distance.

The University has undergone an unprecedented period of expansion and renewal since 2000. We have invested in twenty new buildings on the original campus and have completed the first and second phases of a £750m campus expansion. Our investment in new colleges, teaching and learning spaces, laboratories, research facilities and a new sports village mean there has never been a better time to join us.

During this period of change we’ve worked hard to retain our friendly, informal and collegiate atmosphere, which is important to our core values of inclusivity and interdisciplinarity.

We have a thriving international community and are committed to providing staff moving to York with as much support as possible through our Relocation Package and Welcome Officers.

The University is committed to promoting a diverse and inclusive community - a place where we can all be ourselves and succeed on merit. We offer a range of family friendly, inclusive employment policies, flexible working arrangements, staff engagement forums, campus facilities and services to support staff from different backgrounds.

For further information please visit our employee benefit pages.
THE CITY AND THE REGION

The City of York

Internationally acclaimed for its rich heritage and historic architecture, York’s bustling streets are filled with visitors from all over the world. Within its medieval walls you will find the iconic gothic Minster, Clifford’s Tower and the Shambles - just a few of the many attractions.

But York isn’t just a great place to visit - it’s also a great place to live and work. While nourishing a vibrant cosmopolitan atmosphere, York still maintains the friendly sense of community unique to a small city.

Visit www.visityork.org for more information on the city of York

Shopping, culture and entertainment

York boasts specialist and unique boutiques but also all the high street stores on its busy shopping streets. Alongside them you will find cinemas, theatres, an opera house, art galleries, a vast range of restaurants, live music venues and clubs. York is particularly renowned for its multitude of pubs and bars, from the modern to the medieval.

Housing and schools

Whether you choose to live close to the city, in one of the surrounding villages or further afield, you will find a wide range of housing within comfortable distance of York and the University. For families, the area has a range of excellent schools both in the state and independent sector.

Great location

York is one of Britain’s best-connected cities. Halfway between London and Edinburgh on the East Coast mainline, on intercity trains you can reach London King’s Cross in less than two hours and Edinburgh in two and a half hours. York is also well served by road links, and it is easily accessible from the A1, M1 and the M62.

For those travelling from overseas, Manchester Airport is two hours away and Heathrow Airport just three and a half. Flights from nearby Leeds Bradford Airport provide easy access to mainland Europe. By Eurostar from London St Pancras, Paris is just over six hours away.

Yorkshire

The Lonely Planet guide recently declared Yorkshire the third best region in the world to visit. There is something to cater to every taste, whether it be the rugged landscapes of the Moors or the Dales, the picturesque seaside towns of Scarborough and Robin Hoods Bay, the gothic architecture of Whitby or the vibrancy of cosmopolitan Leeds.
Apply online

- Go to https://jobs.york.ac.uk
- Find this job using reference 7537
- Complete the online application form

You will need to submit your completed application by midnight (local UK time) on 19 May 2019

What will I need?

You will need to upload:

- your CV
- a letter describing how you meet the requirements of the job

You will also need details of two referees.

Help and assistance

Direct any informal queries to
nameofperson@york.ac.uk or
nameofanotherperson@york.ac.uk

If you have any questions about your application, contact the HR Services team:

recruitment@york.ac.uk
+44 (0)1904 324835