Postdoctoral Research Associate in Structural Biology

Department of Chemistry

Closing date: 15 November 2017
Interview date: 7 & 8 December 2017
Vacancy reference: 6103
INTRODUCTION

The position is to work in the group of Professor Gideon Davies, FRS, FMedSci on a dissection of the metabolic pathways of the unusual sulfoglycolipid, sulfoquinovose (SQ). The work is a collaboration with Spencer Williams and Ethan Goddard-Borger in Melbourne and Yi Jin in Cardiff. The work will feature structural, kinetic and chemical biologic analyses and is funded by the Leverhulme Trust.

Over ten billion tonnes of sulfolipids, a class of glycolipids, are synthesised annually. They function as essential components of the chloroplast thylakoid membrane where they are present at such high levels that sulfolipids represent a, perhaps, the major reservoir of organic sulfur in the biosphere, with sulfur quantities at least equalling that present in the amino acids cysteine and methionine.

Despite their discovery in 1959, their undoubted prevalence, and importance, until very recently little was known about sulfolipid metabolism. The first catabolic pathways were only reported in Nature in 2014. We recently discovered and analysed the "vanguard" enzyme YihQ that acts upstream of these pathways; that required to cleave SQ from its glycolipid, published in Nature Chemical Biology (see http://www.nature.com/nchembio/journal/v12/n4/full/nchembio.2023.html). Applicants should also read http://www.biochemj.org/content/474/5/827.full-text.pdf

The PDRA, and a PhD student working alongside, will clone and express enzymes of the SQ degradation pathways. Perform X-ray crystallographic analyses of enzyme structure, obtain ligand complexes, analyse enzyme kinetics and potentially develop activity-based probes to identify SQ pathways in environmental pathways.

The Department of Chemistry is one of the UK's leading Chemistry departments and we are renowned internationally for our research. This is combined with a commitment to teaching and outstanding student satisfaction, and we have been recognised consistently for our family-friendly policies and are proud of our Athena SWAN Gold Award: https://www.york.ac.uk/chemistry/ed/

As a Department we strive to provide a working environment which allows all staff and students to contribute fully, to flourish, and to excel. We aim to ensure that there is a supportive and egalitarian culture at all levels and across all staff groups. We promote good practice and a strong culture of equality in higher education. Further information can be found within this brief and on our website: www.york.ac.uk/chemistry/
Main purpose of the role

- To conduct research on sulfoquinovose metabolism, under the supervision of senior colleagues
- To express genes in E. coli, purify and crystallise proteins, solve structures by X-ray crystallography
- To perform enzyme kinetics, where appropriate
- To prepare manuscripts for publication
- To work in a large research group and contribute to its diverse functions
- 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, 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 keep up to date with diverse literature related to the project and its techniques.
- To contribute to the preparation of research proposals
- 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; notably by the supervision of project students.
PERSON SPECIFICATION

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<th>Qualifications</th>
<th>Essential / Desirable</th>
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<tr>
<td>First degree in Biochemistry, Chemistry or a related discipline</td>
<td>Essential</td>
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<td>PhD in Structural Biology or equivalent experience</td>
<td>Essential</td>
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Knowledge

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<tr>
<td>Knowledge in Protein Crystallography sufficient to engage in high quality research</td>
<td>Essential</td>
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<td>Knowledge of CCP4 programs for structure solution</td>
<td>Essential</td>
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<td>Knowledge of work in the Davies group</td>
<td>Essential</td>
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<tr>
<td>Knowledge of carbohydrate (Bio)Chemistry</td>
<td>Desirable</td>
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<td>Knowledge of modern chemical biology approaches</td>
<td>Desirable</td>
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Skills, abilities and competencies

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<th>Essential / Desirable</th>
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<tr>
<td>Skill in the determination and refinement of protein structures.</td>
<td>Essential</td>
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<td>Skill in the obtention and analysis of ligand complexes</td>
<td>Essential</td>
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<td>Highly developed communication skills to engage effectively with a wide ranging audience, both orally and in writing in the English language, using a range of media</td>
<td>Essential</td>
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<td>Ability to write up research work for publication in high profile journals and engage in public dissemination. The post holder must have a proven ability and strong drive to write up research work for publication in high profile journals and engage in public dissemination</td>
<td>Essential</td>
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<tr>
<td>Ability to develop research objectives, projects and proposals for own and joint research, with the assistance of a mentor if required</td>
<td>Essential</td>
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<td>Competency to conduct individual and collaborative research projects</td>
<td>Essential</td>
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<td>Ability to identify sources of funding and contribute to the process of securing funds, with collaborators if required</td>
<td>Essential</td>
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<td>Competency to make presentations at conferences or exhibit work in other appropriate events</td>
<td>Essential</td>
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**PERSON SPECIFICATION**

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<th>Experience</th>
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<tr>
<td>Experience of carrying out both independent and collaborative research</td>
<td>Essential</td>
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<td>Quantifiable experience of writing up research work for publication</td>
<td>Essential</td>
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<td>Ability to work as part of a team and also to work independently using own initiative</td>
<td>Essential</td>
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<td>Experience in gene expression and protein purification</td>
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<td>Experience in protein structure solution by x-ray crystallography</td>
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**Personal attributes**

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<tr>
<td>Interest in and enthusiasm for structural enzymology and the project</td>
<td>Essential</td>
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<td>Collaborative ethos, and ability to contribute to a happy and stimulating working atmosphere</td>
<td>Essential</td>
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<tr>
<td>Interest in and enthusiasm for structural enzymology</td>
<td>Essential</td>
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<td>Positive attitude to colleagues and students</td>
<td>Essential</td>
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<td>Willingness to work proactively with colleagues in other work areas/institutions</td>
<td>Essential</td>
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<td>Ability to plan and prioritise own work in order to meet deadlines, including using initiative to plan research programmes</td>
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<td>Commitment to personal development and updating of knowledge and skills</td>
<td>Essential</td>
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THE DEPARTMENT

Gideon Davies is the Royal Society Ken Murray Research Professor based in the York Structural Biology Laboratory. The Davies group studies the world of carbohydrates and their interactions with proteins, sometimes described as “The last frontier of cellular and molecular biology”. We use molecular biology, protein crystallography, enzyme kinetics, calorimetry and enzyme inhibition to study the structural enzymology of proteins involved on the synthesis, modification and degradation of diverse glycoconjugates, oligo- and polysaccharides. We have active projects involved in eukaryotic O- and N-glycan synthesis and degradation, the role of O-GlcNAc in neurodegeneration, rational drug design and ligand screening, mannose chemistry and diverse aspects of plant polysaccharide degradation. One of the group’s major projects is the fundamental study of enzyme reaction coordinates, in order to unveil the secrets of catalysis and inform strategies for therapeutic intervention.

For a more detailed view of the work in the Davies group please visit https://www.york.ac.uk/chemistry/staff/academic/d-g/gdavies/

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.

YSBL (http://www.york.ac.uk/chemistry/research/ysbl/) consists of some 60-70 scientists (30 or so post-doctoral) studying the structure and function of proteins. It is situated in the Department of Chemistry on the York campus.

The York Structural Biology Laboratory currently comprises around 70 staff and PhD students, including nine academic staff and one professor emerita. The laboratory’s research can be categorised broadly under three main headings:

- **Structural Biology**: The determination of the structure(s) of proteins and their complexes with other proteins, nucleic acids and ligands. Increasing use of high throughput technologies means that many hundreds of different proteins are under study at any one time, with the targets selected on the basis of their biochemical or biological function. In addition, there is great expertise in York in protein chemistry and crystallisation for tackling challenging proteins, such as multi-molecular complexes or membrane proteins. When integrated with exploration of the cell and molecular biology of the targets, the structural work is providing major insights into the molecular mechanisms underlying biological function. The laboratory has recently invested in CryoEM which will come on-stream in 2018.

- **Chemical Biology and Biological Chemistry**: The group has considerable strength in probing the chemistry of biological processes in areas such as structural enzymology, reaction mechanisms and fundamental studies of molecular interactions.
There is also growing interest in biocatalysis: the discovery, optimisation and exploitation of enzymes for chemical synthesis. In addition, the group is using structure-based methods to design ligands to act as chemical tools to disrupt and probe the biology of specific proteins and pathways.

Crystallographic Methods: York is world renowned for the development of the experimental and in particular computational methods used by crystallographers worldwide. This includes new approaches in molecular replacement and refinement (MOLREP, REFMAC) as well as increased streamlining model building into electron density (QUANTA and COOT). York is also a major centre for the UK collaborative effort in crystallographic computing, CCP4.

The Department of Chemistry: [http://www.york.ac.uk/chemistry](http://www.york.ac.uk/chemistry) is one of the largest and most successful academic departments at York. The Department was placed in the top ten UK universities for Research Power by the 2014 Research Excellence Framework exercise (REF). Amongst our academic staff we have five Fellows of the Royal Society and many national and international prize winners, contributing to a dynamic and thriving department. The excellence of Chemistry at York was recognised in the 2018 Guardian League Table Guide, Complete University Guide and Times University League Tables where it achieved an outstanding 2nd and two 4th places, respectively.

The Department has nearly 60 academic staff (including teaching-only staff), more than 600 undergraduate students, approximately 160 graduate students (mainly studying for PhDs) and over 80 research associates and fellows. The Department has a group of coherent laboratories, recently extended and modernised, which provide an excellent environment for both teaching and research; £35M has been spent on new buildings and equipment in the last seven years.

Staff in the Department of Chemistry undertake research in a wide range of fields and there are particular strengths in analytical and archaeological science, atmospheric chemistry, chemical and structural biology, green chemistry, materials chemistry, metalloproteins, organometallic and catalytic chemistry, synthetic organic chemistry and time-resolved spectroscopy.

We have nearly 30 administrative staff (including those funded externally), as well as over 50 technical staff who provide assistance in the teaching and research laboratories and maintain the workshops (mechanical, glass and electronics) supporting these activities.

The undergraduate programmes, which typically attract over 1200 applications for the ca 180 places, have a flexible, modular structure with opportunities for specialisation in environmental, industrial and medicinal chemistry. There are three-year (BSc) and four-year (MChem) courses with opportunities for students to spend a year at one of a number of overseas universities or in industry.

The degree programmes within the Department of Chemistry at the University of York are recognised nationally and internationally for the quality of their student experience, novel teaching methods and final outcomes. The undergraduate courses, which typically attract over 1200 applications for the ca 180
places, have a flexible modular structure with opportunities for specialisation in environmental, industrial and medicinal chemistry. There are three-year (BSc) and four-year (MChem) courses with opportunities for students to spend a year at one of a number of overseas universities or in industry. Students rated the Department with an overall satisfaction rating of 95% in the National Student Survey 2017. Central to York's teaching is the college system. All Chemistry students belong to one of the eight teaching colleges which contain a number of tutors from different disciplines, one of whom is also the student's pastoral supervisor. The college system provides the majority of the Department’s learning support through either tutorials (5 students per session) or workshops (whole college group, maximum 25 students). The Core undergraduate Chemistry programme is delivered through lecture courses comprising between 5 and 9 lectures. Although some core modules are themed, they are intended to be interdisciplinary and are not delivered under traditional I,O,P,A lines. Student laboratory teaching laboratory work is undertaken in the recently built chemistry F-block. In Years 1 and 2, students typically spend one whole day a week in the laboratory. MChem students in Year 3 undertake three experiments in the Autumn Term and an open-ended group mini-project in the SpringTerm, designed to act as preparation for final year research projects. The Department offers a number of transferable skills course throughout the programme covering topics such as ethics, presentation skills, team working, quantitative skills and mathematics.

The Gold award from Athena SWAN: [https://www.york.ac.uk/chemistry/ed/] for promoting women in science was won by the Department of Chemistry in 2007 and renewed in 2010 and 2015. This was the first Gold award made in this scheme. The Athena SWAN Charter recognises and celebrates good employment practice for women working in science, engineering and technology (SET) in higher education and research.

The case studies on our Equality and Diversity website: [https://www.york.ac.uk/chemistry/ed/fam-friendly-work/] illustrate the variety of working arrangements of staff which are supported by the Department.

The Department strives to address diversity inequalities to ensure that there is a culture that supports equality and encourages better representation throughout the Department. Support for all staff at all stages of their career is recognised as being extremely important; individuals will be allocated a specific mentor to help support them in future career development. Social events are also held regularly for members of staff.

Opportunities for employment for partners exist across the University, Science City York or within the City of York. The Department recognises that employment for partners can be an issue for new employees and will be understanding if you raise this and will do its best to help.

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.

The University has recently invested heavily in Chemistry. The Dorothy Hodgkin Building was completed in two phases. The first, housing Analytical Science and Synthetic Chemistry, opened in 2005, while the second phase housing catalytic, materials and synthetic chemistry was completed in 2012. The departmental is exceptionally well equipped for NMR spectroscopy and departmental instruments are housed in a purpose-built building opened in 2006, while the Wellcome-Wolfson-funded Centre for Hyperpolarisation in Magnetic Resonance (CHyM) was completed in October 2012. The Wolfson Atmospheric Chemistry Laboratories were opened in 2013 and are currently being extended (2017), while most recently, a two-storey building housing new teaching and research laboratories (to house Green Chemistry) and offices was completed in March 2014. The department has recently secured funding from the Wellcome Trust, the Wolfson Foundation, a generous alumnus and the university to acquire a 200 kV cryo-electron microscope and a building in which to house it. Construction and installation are anticipated in 2018.
Founded on principles of excellence, equality and opportunity for all, the University of York opened in 1963 with just 230 students. In 2017 it is the home of more than 17,000 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 which appear in the world top 100 (2013-14) and 15th in the Times & Sunday Times league table (2016). 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 12 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 aims to offer a nurturing and supportive environment as an employer. Flexible working hours, nursery facilities, childcare vouchers, cycle to work scheme, generous holidays and an attractive pension scheme all make the University of York one of the region’s leading employers.

For further information please visit our employee benefit pages.
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](http://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](https://jobs.york.ac.uk)
- Find this job using reference 6103
- Complete the online application form

You will need to submit your completed application by midnight (local UK time) on 15 November 2017.

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 2 referees.

Help and assistance

Direct any informal queries to gideon.davies@york.ac.uk

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

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