Research Fellow
Department of Chemistry

Closing date: 5 January 2018
Interview date: 26 January 2018
Vacancy reference: 6233
INTRODUCTION

This post is available immediately until 31st July 2022 to study the structure and mechanism of protein-nucleic acid assemblies using Cryo-Electron microscopy. The project is funded by a Wellcome Trust grant 'Structure and mechanism of nucleic acid-processing machines in viral biogenesis'. You will principally be discussing the research with Fred Antson but expected to work closely with other members of Fred’s group, in particular Sandra Greive, Huw Jenkins and Maria Chechik. You will be based in the internationally renowned York Structural Biology Laboratory (YSBL) in the Department of Chemistry; the laboratory has all the equipment that is necessary for protein production, crystallisation and structure determination.

This post will focus on structural and mechanistic analysis of several protein-nucleic acid motor assemblies by Cryo-Electron microscopy. The post requires substantial prior experience in Cryo-EM or X-ray crystallographic software development, as well as experience in preparing and handling protein-nucleic acid complexes.

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/

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 contribute to and/or lead on the production of research outputs and research outcomes.
- To participate actively in the planning and management of research projects, including supervising the work of others and providing expert advice and guidance.
- To contribute to and/or lead the obtaining of external research funding.
- To contribute to the public understanding of research and scholarship.

Key responsibilities

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

- To participate actively in the planning and advancement of research programmes, duties to include: the management of small research projects or identified parts of a large project; the management of other research staff, support staff and research students to ensure that the project is successfully completed and that the researchers working on the project are supported in their personal and professional development; the management of research resources, ensuring that effective use is made of them.
- To write or contribute to publications or disseminate research findings, including public engagement to non-research specialist organisations using other appropriate media.
- Undertake peer review of research publications and actively contribute to the Research Excellence Framework (REF).
- To make presentations at conferences or exhibit work in other appropriate events.
- To develop ideas and necessary collaborations for application of research outcomes.
- To decide on research programmes and methodologies, often in collaboration with colleagues.
- To develop ideas for generating income and promoting the research area, including contributing to the process of securing external funding.
- Extend, transform and apply knowledge acquired from scholarship to research and appropriate external activities.
- To supervise postgraduate research students and mentor colleagues with less experience. Advising on their personal development and supporting them in developing their research techniques.
- To attend departmental meetings as required and undertake appropriate managerial and administrative tasks in connection with the research activity.
- To develop and initiate collaborative working internally and externally, and the fostering of internal and external networks in order to advance research and exploit opportunities for collaboration and funding sources.

Post-specific responsibilities

- To prepare stable protein-nucleic acid complexes, for structural analysis by X-ray crystallography and/or Cryo-EM.
- To perform 3D reconstructions using Cryo-EM images; to apply and if necessary adopt/develop software for asymmetric reconstruction of capsid-motor assemblies.
- To lead the development and application of micro-ED technique to projects within the group.
- Based on structural information, to analyse the mechanism of protein-nucleic acid assemblies and develop strategies for further studies.
- To participate in application for major research awards, as a Researcher Co-I.
## PERSON SPECIFICATION

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<tr>
<th>Qualifications</th>
<th>Essential / Desirable</th>
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<tr>
<td>First degree in Biochemistry or Biophysics</td>
<td>Essential</td>
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<tr>
<td>PhD in Structural Biology, Biochemistry or Biophysics</td>
<td>Essential</td>
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### Knowledge

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<tr>
<td>Knowledge in structural biology to engage in high quality research</td>
<td>Essential</td>
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<td>Knowledge of a range of research techniques and methodologies</td>
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<td>Has research expertise in an area that will complement and enhance the department's research strategy and goals</td>
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<td>Advanced and specialist IT knowledge</td>
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<td>Knowledge of protein-nucleic acid machines’ mechanisms and experience in elucidating such mechanisms based on X-ray or Cryo-EM structures, demonstrated by publications in high-impact journals</td>
<td>Essential</td>
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<tr>
<td>Knowledge of crystallographic and/or Cryo-EM software and demonstrable experience in software development</td>
<td>Essential</td>
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### Skills, abilities and competencies

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<th>Essential / Desirable</th>
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<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>
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<td>Ability to lead and/or take responsibility for a small research project or identified parts of a large project</td>
<td>Essential</td>
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<td>Ability to supervise the work of others, for example in research teams or projects</td>
<td>Essential</td>
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<td>Ability to write up research work for publication and onward dissemination</td>
<td>Essential</td>
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<td>Ability to persuade and influence project stakeholders</td>
<td>Essential</td>
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<td>Ability to develop research objectives, projects and proposals for own and joint research</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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<tr>
<td>Ability to extend, transform and apply knowledge acquired from scholarship to research and appropriate external activities</td>
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## PERSON SPECIFICATION

| Competency to make presentations at internationally recognised conferences or exhibit work in other appropriate events | Essential |
| Well-developed analytical skills | Essential |

### Experience

| Experience of undertaking publicly evidenced high quality research | Essential |
| Evidenced active participation in the planning and advancement of research projects | Essential |
| Proven ability to participate in internal and external funding applications | Essential |
| Successful management of research projects including supervision of the work of others and providing expert advice and guidance to teams | Essential |
| Evidence of dissemination of scholarly work which may include: the presentation of papers at conferences and workshops; participation in public engagement events to disseminate research; the publishing of chapters in text books; the publishing of papers; articles or reviews in academic journals or elsewhere; the development of websites | Essential |
| Experience in structural analysis of protein-nucleic acid complexes | Essential |
| Experience in X-ray and/or Cryo-EM software development | Essential |
| Experience in protein construct design, expression and purification | Desirable |
| Characterisation of protein-nucleic acid assemblies using biochemical and biophysical approaches | Desirable |

### Personal attributes

| Attention to detail and commitment to high quality | Essential |
| Collaborative ethos | Essential |
| Commitment to promoting the public understanding of research and scholarship | Essential |
| Positive attitude to colleagues and students | Essential |
| Willingness to work proactively with colleagues in other work areas/institutions | Essential |
| Ability to plan and prioritise own work in order to meet deadlines | Essential |
| Commitment to personal development and updating of knowledge and skills both for themselves and the personal development of those they supervise | Essential |
The Antson group

The Antson group is investigating how viruses use molecular machines to manipulate their DNA and RNA, and how does communication between proteins and nucleic acids enable the processes that are critical to viral biogenesis. The specific research questions are:

What is the structure and mechanism of genome packaging motors of dsDNA viruses? What is the role of each component of the DNA-translocating motor, and what are the molecular interactions between individual protein components and DNA? How is ATP hydrolysis coupled to mechanical movement during DNA translocation?

What is the structure and mechanism of RNA helicases in positive-sense ssRNA viruses? What is the molecular basis of communication between ATP hydrolysis and RNA separation?

How can we translate structural and mechanistic knowledge about these systems into biomedical and biotechnological applications?

The group currently includes Dr Sandra Greive working on biochemical & biophysical characterization, Dr Huw Jenkins working on structural biology of protein-nucleic acid machines, Dr Vladimir Levdikov working on structure determination of an enterovirus 2C helicase, Ms Maria Chechik (a senior research technician) working on protein production and electron microscopy investigations and also three PhD students working on understanding the structure and mechanism of several protein-nucleic acid assemblies.

The York Structural Biology Laboratory

Professor Fred Antson is a member of the York Structural Biology Laboratory [http://www.york.ac.uk/chemistry/research/ysbl/](http://www.york.ac.uk/chemistry/research/ysbl/), a large and internationally renowned grouping focusing on structural biology and biological chemistry whose 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. 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.

- Chemical Biology and Biological Chemistry: 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 uses structure based methods to design ligands to act as chemical tools to
THE DEPARTMENT

- 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

The Department of 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 Gold award from Athena SWAN: [https://www.york.ac.uk/chemistry/ed/](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/](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 of Chemistry operates a set of family-friendly practices. Staff working patterns are flexible and a formal Flexitime system is also in operation. The Department has developed a maternity and paternity leave procedure to help provide support for staff and the University has a nursery [http://www.york.ac.uk/univ/nrsry/](http://www.york.ac.uk/univ/nrsry/) 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/](http://www.york.ac.uk/admin/hr/training/). 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 department 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.
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 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 6233
- Complete the online application form

You will need to submit your completed application by midnight (local UK time) on 5 January 2018

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 fred.antson@york.ac.uk

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

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