Research Associate (in situ Hyperpolarisation)
Centre for Hyperpolarisation in Magnetic Resonance (CHyM)

Closing date: 29 April 2018
Interview date: 29 May 2018
Vacancy reference: 6526
INTRODUCTION

Applications are invited for a Research Associate position in physical chemistry to work with Dr Meghan Halse in the Centre for Hyperpolarisation in Magnetic Resonance (CHyM) at the University of York. The position is available for 24 months from 1 July 2018 or as soon as possible thereafter. The project, funded by the Engineering and Physical Sciences Research Council (EPSRC), involves the implementation of new instrumentation and methods to study the signal amplification by reversible exchange (SABRE) hyperpolarisation method in situ within the micro-to-millitesla magnetic field regime. You will join a team lead by Dr Meghan Halse within CHyM and, in addition to research responsibilities, you will be expected to assist with the supervision of more junior group members.

The position would suit a candidate with experience in magnetic resonance research, particularly in the development and application of new magnetic resonance methods and/or instrumentation. The role will require a combination of low-field Nuclear Magnetic Resonance (NMR) instrumentation and pulse sequence development along with data analysis and interpretation. Experience in either hyperpolarisation techniques and/or low-field NMR development is desirable.

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/](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/](http://www.york.ac.uk/chemistry/)
SABRE optimisation powered by in situ detection

Magnetic resonance imaging (MRI) and nuclear magnetic resonance (NMR) spectroscopy are powerful tools in applications ranging from synthetic chemistry to medical diagnosis. In a typical NMR or MRI experiment only tens out of every million atomic nuclei are actually detected and so only relatively large quantities of substances can be investigated and expensive high-magnetic-field devices are required. One way to overcome this is through the use of hyperpolarisation, which can increase the fraction of detected nuclei by factors of up to 100,000. In this project we focus on the SABRE (signal amplification by reversible exchange) method, which catalytically transfers polarisation from parahydrogen (p-H2), to a molecule of interest. Compared to other approaches, SABRE is a relatively new technology. While many theoretical models of SABRE have been proposed, they are difficult to test experimentally because the detection stage of the SABRE experiment is separated in time and space from the polarisation stage, making direct interrogations of the polarisation transfer process challenging.

In this project, low-field NMR instrumentation and methods for the direct measurement of the SABRE effect in situ – that is under the same conditions of magnetic field as where the polarisation transfer takes place – will be developed in order to build up a rigorous experimental picture of SABRE and thus enable rational and rapid optimisation going forward. The ultimate goal is to devise new strategies for optimisation in order to increase the scope of SABRE applications in areas like medicine and industrial process monitoring and control.

Main purpose of the role
• To conduct research into low-field NMR with in situ SABRE hyperpolarisation under the supervision of senior colleagues and to contribute to the production of research relating to this

Key responsibilities
(Role holders will be required to undertake some or all of the duties below)
• To assist in the identification and development of potential areas of research and the development of proposals for independent or collaborative research projects
• 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 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

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<tr>
<th>Qualifications</th>
<th>Essential / Desirable</th>
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<tbody>
<tr>
<td>First degree in Chemistry, Physics, Engineering or related area</td>
<td>Essential</td>
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<tr>
<td>PhD in Chemistry, Physics, Engineering or equivalent experience</td>
<td>Essential</td>
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### Knowledge

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<th>Essential / Desirable</th>
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<tr>
<td>Knowledge of Magnetic Resonance to engage in high quality research</td>
<td>Essential</td>
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<td>Knowledge of a range of research techniques and methodologies and the operation of a modern research laboratory</td>
<td>Essential</td>
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<td>Has research expertise in an area that will complement and enhance the department's research strategy and goals of CHyM</td>
<td>Essential</td>
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<tr>
<td>Knowledge of different hyperpolarisation techniques</td>
<td>Desirable</td>
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<td>Knowledge of the theory of magnetic resonance</td>
<td>Desirable</td>
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### Skills, abilities and competencies

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<th>Skills, abilities and competencies</th>
<th>Essential / Desirable</th>
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<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>
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<td>Ability to write up research work for publication in high profile journals and engage in public dissemination</td>
<td>Essential</td>
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<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>Competency to make presentations at conferences or exhibit work in other appropriate events</td>
<td>Essential</td>
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<td>Good IT skills including the ability to analyse and interpret complex data</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>Desirable</td>
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<td>Ability to design and construct new instrumentation</td>
<td>Desirable</td>
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## PERSON SPECIFICATION

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<th>Experience</th>
<th>Essential / Desirable</th>
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<tr>
<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>Awareness of Health and Safety Issues</td>
<td>Essential</td>
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<tr>
<td>Experience of carrying out both independent and collaborative research</td>
<td>Desirable</td>
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<td>Experience of writing up research work for publication</td>
<td>Desirable</td>
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<tr>
<td>Experience of hyperpolarised NMR or MRI</td>
<td>Desirable</td>
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<td>Experience with low-field NMR or MRI devices</td>
<td>Desirable</td>
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<td>Experience of instrument development</td>
<td>Desirable</td>
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## Personal attributes

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<tr>
<td>Attention to detail and commitment to high quality</td>
<td>Essential</td>
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<td>Collaborative ethos</td>
<td>Essential</td>
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<tr>
<td>Interest in and enthusiasm for magnetic resonance research with the ability to work creatively</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>
<td>Essential</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

The role will be carried out under the supervision of Dr Meghan Halse (http://www.york.ac.uk/chemistry/staff/academic/b-n/mhalse/) and will be based in the Centre for Hyperpolarisation in Magnetic Resonance (CHyM) within the Department of Chemistry at the University of York.

Centre for Hyperpolarisation in Magnetic Resonance (CHyM) (http://www.york.ac.uk/chym)

The Centre is based in a purpose-built facility on the York Science Park and has a dedicated chemical laboratory, biological preparation areas and an instrument design area. The aim of the Centre is to bring together research scientists to explore the fundamental processes that underpin hyperpolarisation techniques. These methods have the potential to address the sensitivity issues associated with NMR and MRI.

Magnetic Resonance Imaging (MRI) has revolutionised modern healthcare by providing a fast and non-invasive method for diagnosing disease, guiding medical interventions and monitoring brain function. Its value, however, is greatly limited by low sensitivity. Nuclear magnetic resonance (NMR), a technology used heavily in chemistry, is directly analogous to MRI. CHyM seeks to develop hyperpolarisation technologies for both NMR and MRI that are focussed on solving the inherent low sensitivity issues. Amongst other methods, researchers in CHyM employ a technique to transfer magnetisation from parahydrogen to target molecules without the need for a formal chemical reaction to do this. A number of patents have been awarded and several high profile papers have been published on this research.

The Centre houses state-of-the-art magnetic resonance equipment including four high resolution NMR spectrometers, and a 7 T pre-clinical MRI scanner, all of which are equipped for hyperpolarisation research. The centre also includes a range of low-field, portable NMR instruments that are also equipped for hyperpolarisation research, including a 1 T (43 MHz) Magritek Spinsolve and a Magritek Terranova Earth's field NMR/MRI device. Further UV-vis, IR and MS facilities are also available.

The Centre has received high levels of support from the Wellcome Trust, Wolfson Foundation, University of York, EPSRC and industrial collaborators totalling in excess of £13m, in order to archive these aims.

The technical activities of CHyM are supported directly by two full-time Experimental Officers with expertise in NMR and MRI, and a Research Technician.
The Department of Chemistry

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 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 DEPARTMENT

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 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/ 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 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 (2018), 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.
THE UNIVERSITY

Founded on principles of excellence, equality and opportunity for all, the University of York opened in 1963 with just 230 students. In 2018 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 are ranked 16th in the Times & Sunday Times league table (2017). 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 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 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
- Find this job using reference 6526
- Complete the online application form

You will need to submit your completed application by midnight (local UK time) on 29 April 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 Dr Meghan Halse (meghan.halse@york.ac.uk).

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

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