Marie Curie Early Stage Researcher
ETN Zulf

Department of Chemistry

Closing date: 15 April 2018
Interview date: To Be Confirmed
Vacancy reference: 6387
Applications are invited to join the York Centre for Hyperpolarisation in Magnetic Resonance (CHyM) to work on a research project as part of the Horizon 2020 Marie Curie European Training Network (ETN) entitled Zero and ultra-low nuclear magnetic resonance (ZULF). It is expected that the successful applicant will enroll on a PhD programme at the University of York. PLEASE NOTE: An application must also be submitted via the ZULF website: www.zulf.eu. You will be supervised by Prof Simon Duckett and Dr Meghan Halse, in the Department of Chemistry.

The goal of this ZULF (ETN) is to develop, explore and apply methods of nuclear magnetic resonance (NMR) in the regime of zero and ultra-low magnetic fields (ZULFs). The researcher will undertake a study that will use the hyperpolarisation methods known as SABRE and PHIP to do this. NMR and MRI play unique roles in chemistry and clinical research where they impact directly on diagnosis. The inter-disciplinary training and cross-sectoral research activities, will help bring together several rapidly developing, yet largely separated, areas of modern science to provide NMR with new capabilities. These approaches will benefit from the improved sensitivity provided by hyperpolarization where the detected response can be improved by up to several hundred thousand fold. They will get experience in a broad range of activities which will include synthesis, catalysis, NMR and MRI detection, J-spectroscopy, sensor technologies and hyperpolarisation.

We will start out by training the student to prepare the catalysts used for polarisation transfer in SABRE and PHIP. These catalysts will then be used to increase the magnetic resonance response of an array of materials. We will seek to establish optimal conditions to lead to high levels of polarisation and then detected them through ZULF NMR. This will involve studies of normally inaccessible NMR coherences at low field. Opportunities will exist to use a synthetic strategy to prepare a series of deuterium labelled molecules to enhance understanding. There will be extensive opportunities to engage with the other groups of the consortium.
JOB DESCRIPTION

At a glance

<table>
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<tr>
<th>Salary</th>
<th>£30,800—£34,250 (family allowance) per year</th>
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<tbody>
<tr>
<td>Hours of work</td>
<td>37 Hours per week</td>
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<tr>
<td>Contract type</td>
<td>Fixed term, 36 months</td>
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<tr>
<td>Based at</td>
<td>Department of Chemistry, Campus West</td>
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Main purpose of the role

• To provide support to research project/s, undertaking research work within the overall programme and assisting with the day to day operation of the project/s

• To undertake a programme of learning and development, in the form of a PhD, as an integral part of the role

Key responsibilities

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

• To undertake work, which may be as part of a research team, investigating a designated area of subject knowledge to promote further understanding

• To contribute to the intellectual development of the project and plan own activities within the overall research effort

• With the guidance of the project supervisors, to undertake a combination of literature searches/scholarly reading, desk and/or lab-based research, subject interviews, questionnaires/sampling or other research activity. Using specialist knowledge, techniques and/or instrumentation as required.

• To document work appropriately and in accordance with research best practice.

• To work closely with the project supervisors to prepare work for dissemination, presenting preliminary findings at meetings within the research group as appropriate.

• Under the guidance of the project supervisors, to assist in writing articles, papers, reports or books as appropriate.

• To liaise and collaborate with students and researchers and relevant external contacts and organisations.

• To participate in the dissemination of research findings internally and externally at seminars, workshops and conferences.

• To consider the public engagement and impact of the project and take appropriate steps to maximise these with the support of the research leader

• To provide instruction to students as required

• To undertake appropriate organisational and administrative activities as delegated by the Research Supervisors. Examples may include: organising meetings, conferences and workshops; monitoring budgets and stock control; developing promotional or educational material, including website maintenance and development.

• To prioritise tasks within an agreed work schedule to ensure that the project(s) are delivered on time.

• To undertake a programme of development, in the form of a PhD, to further specialist understanding and expertise in the subject area.
## PERSON SPECIFICATION

<table>
<thead>
<tr>
<th>Qualifications</th>
<th>Essential / Desirable</th>
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<tr>
<td>Undergraduate degree in Chemistry or Physics</td>
<td>Essential</td>
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<tr>
<th>Knowledge</th>
<th>Essential / Desirable</th>
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<tr>
<td>Broad knowledge of chemistry or physics</td>
<td>Essential</td>
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<tr>
<td>Knowledge of NMR spectroscopy</td>
<td>Essential</td>
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<tr>
<td>Understanding of relevant health &amp; safety practices</td>
<td>Essential</td>
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<th>Skills, abilities and competencies</th>
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<tr>
<td>Ability to undertake academic research. Examples may include preparing, setting up, conducting and record-</td>
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<td>Ability to organise own research activities to agreed deadlines and quality standards</td>
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<td>Excellent IT skills including the use of Word and Excel</td>
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<td>Ability to provide support to staff and any students who may be assisting with the research</td>
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<td>Excellent written communication in order to contribute effectively to the production of research reports and</td>
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<td>High level oral communication skills to enable the effective presentation of research progress and outcomes</td>
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<td>Ability to communicate new and complex information effectively to a range of audiences</td>
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<td>Ability to work as part of a team and also to work independently using own initiative</td>
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<td>Ability to develop internal and external contacts in order to enhance knowledge and understanding and form</td>
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<table>
<thead>
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<th>Experience</th>
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<tr>
<td>Experience of working in chemistry or physics and undertaking a research project</td>
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<td>Experience of writing up a research project</td>
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<th>Personal attributes</th>
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<tr>
<td>Interest in and enthusiasm for the subject matter of the project</td>
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<td>Positive attitude to colleagues and students</td>
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<td>A passion for conducting high quality research with impact</td>
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<td>Willingness to work proactively with colleagues in other work areas/institutions</td>
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<td>Ability to plan and prioritise own work in order to meet deadlines</td>
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<td>Commitment to personal development and updating of knowledge and skills</td>
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THE DEPARTMENT

The ZULF European Training Network (ETN) comprises groups from eight leading European universities and one scientific research centre, dedicated to developing, exploring and applying methods of nuclear magnetic resonance (NMR) in the regime of zero and ultra-low magnetic fields (ZULFs). The project is aimed at providing absolutely unique training, combining the experience of world-leading experts in diverse fields and disciplines to 11 individuals, and leading to a doctoral degree. The tuition fees for the successful applicant will be covered. Apart from the opportunity to participate in groundbreaking research, the young scientists will acquire soft and transferrable skills including scientific writing, communication and presentation, data mining, curation and analysis, entrepreneurship, knowledge of intellectual property law, business administration and finance. All of them absolutely indispensable for any modern scientist.

Centre for Hyperpolarisation in Magnetic Resonance Imaging (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 revolutionized 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 hyperpolarization technologies for both NMR and MRI that are focussed on solving the inherent low sensitivity issues. Researchers in CHyM employ a technique to transfer magnetization from parahydrogen to molecules without the need for a formal chemical reaction, amongst other techniques, to do this. A number of patents have been awarded and several complementary 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. Further UV-vis, IR and MS facilities are also available. In NMR applications these can be used to detect low-concentration, short-lived chemical intermediates and offer significant opportunities in the fields of heterogeneous and homogeneous catalysis. In MRI applications, they have the potential to revolutionise clinical imaging. A hyperpolarise DNP, a 1 T Magritek SpinSolve and a Terranova are 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.

CHyM seeks to complete internationally leading research with the aim of developing and implementing a wide array of applications spanning catalysis and molecular and cellular, tissue and organ, system and whole-organism responses. A
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; £35 M 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/unity/nursery/](http://www.york.ac.uk/unity/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](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.
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 6387
- Complete the online application form

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

An application much also be submitted via the ZULF website: [www.zulf.eu](http://www.zulf.eu)

Help and assistance

Direct any informal queries to simon.duckett@york.ac.uk or 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