Research Associate in Digital Microfluidics for Molecular Computation
Department of Electronic Engineering

Closing date: 15 April 2018
Interview date: TBC
Vacancy reference: 6521
Applications are invited for an interdisciplinary postdoctoral Research Associate position in the Department of Electronic Engineering within the Faculty of Sciences at the University of York. The post holder will investigate approaches to control and programme DNA machines using digital microfluidic systems. The post is part of a large research project, supported by the UK Engineering and Physical Sciences Research Council.

The aim of the programme is to develop and demonstrate autonomous DNA computation by combining DNA machines with a digital microfluidic (DMF) system based on droplet actuation by electrowetting on dielectric. Here, a DNA computational machine will be activated and programmed by the DMF system which will introduce input and control signals encoded in DNA in response to the activation of fluorescently labelled DNA output strands. The DMF electronic hardware and associated control software have been developed. The post holder will thus be responsible for developing robust approaches for the fabrication of the DMF chip, integration with a fluorometer for monitoring the results of DNA computation and finally demonstration of a DMF-controlled autonomous DNA machine.

You will have a PhD in a relevant scientific area, for example in electronic engineering, physics or computer science, a strong publication record, a pro-active approach and research experience in DNA nanotechnology. Experience of microfabrication and basic electronics would be an advantage but not essential. The position is funded until 28/02/19
Main purpose of the role

- To conduct research under the supervision of senior colleagues and to contribute to the production of research outputs.
- To assist in the identification and development of potential areas of research and the development of proposals for independent or collaborative research projects.
- To develop robust approaches for the microfabrication of a functional DMF chip.
- To demonstrate operation of a completed DMF system and implement as an autonomous DNA machine.

Key responsibilities

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

- The analysis and interpretation of research data
- The use of appropriate research techniques and methods
- The design of new experiments
- The 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 undertake appropriate organisational and administrative activities connected to the research project
- 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 external networks, including medical and industrial partners, 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

At a glance

Salary £31,604—£38,832 a year

Hours of work Full time, 37 hours a week

Contract type Fixed term until 28 February 2019

Based at Heslington Campus West
## PERSON SPECIFICATION

### Qualifications

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<tr>
<th>Description</th>
<th>Essential/Desirable</th>
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<tr>
<td>PhD (completed or near completion) or equivalent experience in Electronic Engineering, Physics Computer Science or cognate area</td>
<td>Essential</td>
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<td>First degree in Engineering or a Physical Science or equivalent (minimum 2:1 or equivalent)</td>
<td>Essential</td>
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### Knowledge

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<th>Description</th>
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<tr>
<td>Knowledge and experience of DNA nanotechnology and DNA machines</td>
<td>Essential</td>
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<td>Knowledge and experience of handling biological molecules and using basic biochemistry techniques e.g. gel electrophoresis, UV/Vis spectrophotometry</td>
<td>Essential</td>
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<td>Knowledge and experience of working safely within biochemistry laboratory</td>
<td>Essential</td>
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<td>Knowledge and experience of microfabrication techniques</td>
<td>Desirable</td>
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<td>Knowledge of analogue and digital electronic design</td>
<td>Desirable</td>
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<td>Knowledge of digital microfluidics</td>
<td>Desirable</td>
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<td>Knowledge of the design of instrumentation for the detection of fluorescence</td>
<td>Desirable</td>
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### Skills, abilities and competencies

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<tr>
<td>Skilled in experimental design, experimental practice and data analysis</td>
<td>Essential</td>
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<td>Experience of carrying out both independent and collaborative research</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, using a range of media</td>
<td>Essential</td>
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<td>Ability to write up research work for high-profile publications 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>Desirable</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>Competency to make presentations at conferences or exhibit work at other appropriate events</td>
<td>Essential</td>
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## PERSON SPECIFICATION

### Experience

| Practical experience of DNA nanotechnology | Essential |
| Practical experience of microfabrication techniques | Desirable |
| Practical experience of cleanroom environments | Desirable |
| Practical experience of electronic circuit design | Desirable |
| Experience of inter-disciplinary research | Essential |
| Experience of carrying out both independent and collaborative research | Desirable |
| Experience of writing up research work for publication | Essential |
| Ability to work as part of a team and also to work independently using own initiative | Essential |

### Personal attributes

| Attention to detail and commitment to high quality standards | Essential |
| Collaborative ethos | Essential |
| Interest in and enthusiasm for the subject matter of the project(s) | Essential |
| Positive attitude towards 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, including using initiative to plan research programmes | Essential |
| Commitment to personal development and updating of knowledge and skills | Essential |
THE DEPARTMENT

Department of Electronic Engineering

The Department of Electronic Engineering at York has a long-standing reputation for high-quality degrees and successful graduates. Our MEng and BEng courses in a number of subject areas (http://www.york.ac.uk/electronics/undergraduate/) are fully accredited by the IET (Institution of Engineering and technology) at CEng (Chartered Engineer) level and our BSc in Music Technology at IEng (Incorporated Engineer) level. The Department is consistently highly ranked for electronic engineering in the annual National Student Survey. Our suite of taught MSc programmes covers the latest technologies and tools in important industry sectors.

In REF 2013 87% of our research outputs, was judged world-leading or internationally excellent. Our research groups in physical layer electronics, engineering management, communications and signal processing, intelligent systems work with industry and universities across the world while providing a friendly and supportive environment for staff and students.

The Department has 40 academic staff (including part-time and job share), nearly 450 undergraduate students and approximately 200 postgraduate students. There are 13 administrative staff (including part-time and job share) as well as the team of 14 technical staff who provide assistance in the teaching and research laboratories, departmental infrastructure and maintain the workshops supporting these activities.

The Bronze Award from Athena SWAN for promoting women in science was won by the Department of Electronics in 2013 and retained in 2017. 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 of Electronic Engineering operates a family friendly policy and is committed to gender equality and diversity. The Department recognises that a flexible approach to working is vitally important in the recruitment and retention of staff who have family commitments. The Department offers flexible working hours to all staff and will actively support job sharing and career break requests where it is reasonable and practical to do so and where operational needs will not be adversely affected.

The Department provides support for all categories of staff in their applications for promotion, role reviews, awards and prizes and rewarding excellence nominations. The Department strives to address gender inequalities and ensure
THE DEPARTMENT

that there is a culture that supports equality and encourages better representation throughout the department. Support for women at all stages of their career is recognised as being extremely important.

Further details of the Department can be found on its website: https://www.york.ac.uk/electronic-engineering/

Intelligent Systems and Nanoscience Research Group

Our research links engineering and technology with nature. We focus on electronic, computational and robotic platforms and their interactions with biological systems. We also undertake fundamental research into the next generation of nano-electronic hardware.

We develop novel biologically-inspired electronic, computational and robotic systems. We work to characterise and understand biological and biomedical signals, and exploit evolutionary mechanisms in system design and optimisation. This systems-level research is underpinned by our fundamental studies into the next generation of innovative nano-electronic materials and devices, including bio-molecular electronic systems and spin-based electron devices.
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
• Find this job using reference 6521
• 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.

Help and assistance
Direct any informal queries to andy.tyrrell@york.ac.uk or steven.johnson@york.ac.uk
If you have any questions about your application, contact the HR Services team:
  recruitment@york.ac.uk
  +44 (0)1904 324835