

think

Business with Birmingham
issue nine



*Birmingham on the **fast track** to HS2 College*

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B Business *with*
Birmingham



foreword



For more than 100 years research at the University of Birmingham has had a major impact on the world. Our researchers have advanced transplant surgery, developed the use of microwaves, and created artificial Vitamin C. Finding innovative solutions that address big issues and benefit both society and business is a key priority and we continue to break new ground.

The recent Research Excellence Framework (REF), which measures the quality and impact of research conducted in UK universities against international standards of excellence, showed that 87% of our research activity has a global impact. This confirms our position among the world's top research universities across our broad range of subjects. From History and Education to Chemical Engineering, Philosophy, and Psychology, we lead the world and apply our research to real problems.

Examples of how this research directly helps businesses are featured in this edition of *think*. From the Robotics and Artificial Intelligence team (page 3) to the new Quantum Technology Hub (page 5), and our work in Global Ethics (page 8), you can read how Birmingham is helping companies like yours to find solutions to their business challenges.

Why not contact our Business Engagement team today to find out how they can help?

Professor Sir David Eastwood
Vice-Chancellor

think advanced engineering

HS2

College coming to Birmingham

The University will play a key role in the training of engineers working on the HS2 rail link, following the announcement that the National College for High Speed Rail will have its headquarters in the city.

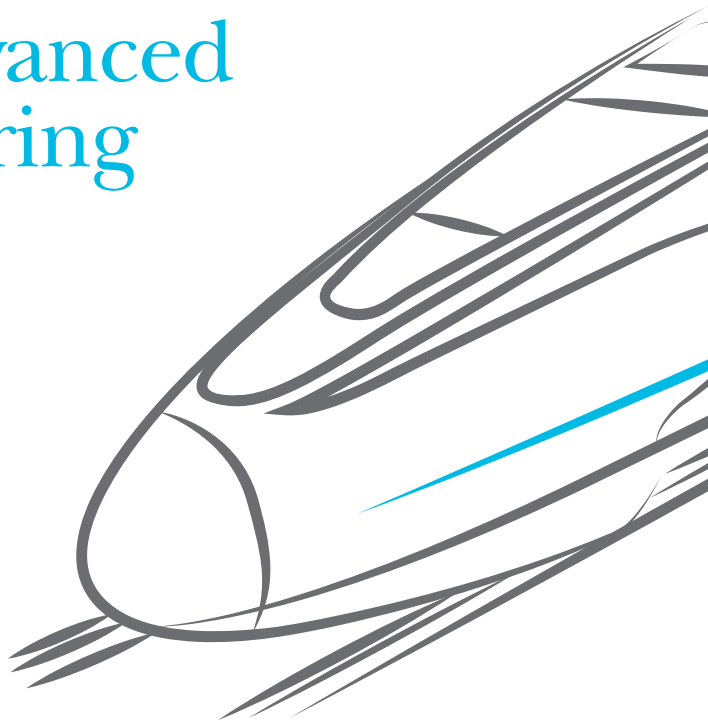
The College will make use of the internationally leading expertise at the University's Birmingham Centre for Railway Research and Education (BCRRE) – the largest railway research group in Europe and a unique resource for helping train the next generation of engineers.

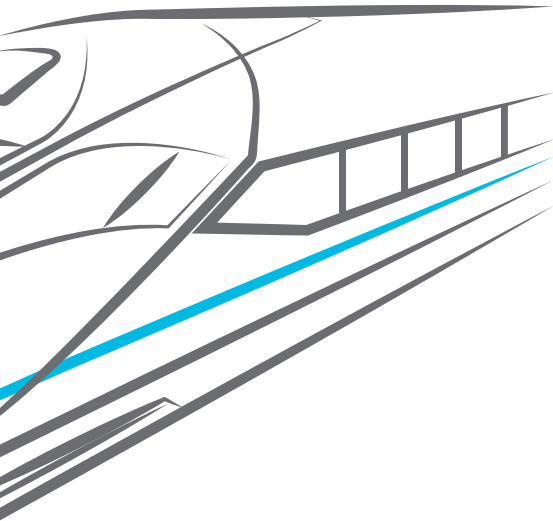
The recent Government announcement followed the news that Birmingham will also be the location of the new headquarters for HS2 construction.

The bid for the College was led by Greater Birmingham and Solihull Local Enterprise

Partnership (GBSLEP), with partners including the University of Birmingham and Birmingham City Council. Central to the submission was the involvement of BCRRE and its multidisciplinary team of over 100 people whose work is at the heart of plans to transform the UK's railway network over the next 30 years.

As well as having a hand in the training and continuing development of the College's teachers, BCRRE will advise the College on best practice from similar overseas projects and offer access to a wide range of high-quality facilities. BCRRE will also





'We are delighted that the city has been chosen as a location for the new, elite National College focusing on HS2 and the rail industry. Through our internationally leading Birmingham Centre for Railway Research and Education, as well as other parts of the University, we will support the new College strongly and are sure that it will be a tremendous success.'

Professor Jon Binner, Deputy head of the College of Engineering and Physical Sciences, University of Birmingham

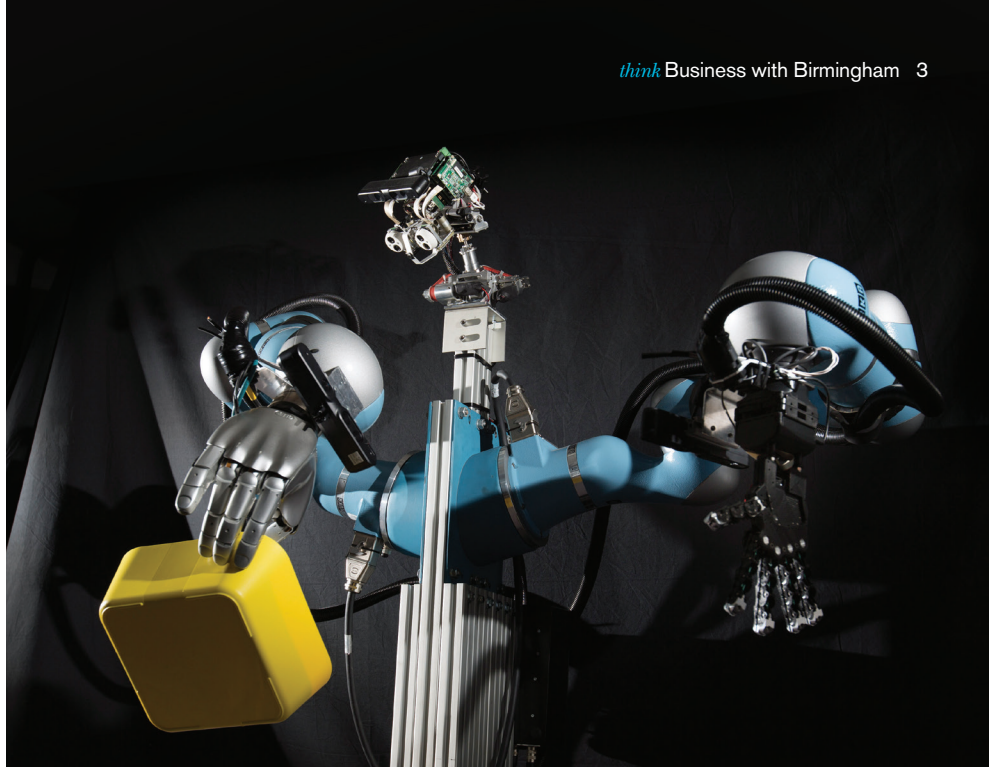
contribute to the governance of the College and provide pathways into higher education for the College's students at both undergraduate and postgraduate level.

If you would like to find out more about the HS2 College or the work of the University of Birmingham Centre for Railway Research and Education, please contact Richard Fox using the details below.

HS2 College and BCRRE

Learn more

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Robots *grasp* technology

A way of 'teaching' robots to pick up unfamiliar objects without dropping or breaking them has been developed by researchers at the University of Birmingham. The research paves the way for robots to be used in more flexible ways and in more complex environments. These could include manufacturing and packaging industries where a wide variety of different tasks have to be undertaken, and especially where humans and robots need to be able to work together.

It is already fairly commonplace to programme robots to pick up and move particular objects – factory production lines are a good example of this. But when those objects vary in size or shape, robots tend to get clumsy. Researchers have designed a way of programming a robotic hand to be able to pick up an object and then use information learned in that first grip to grasp and move a whole range of similar objects.

The research was carried out within the PACMAN (Probabilistic and Compositional Representations for Object Manipulation) Consortium, funded by the European Union. The consortium is led by Birmingham and includes the Università di Pisa, in Italy, and the Universität Innsbruck, in Austria.

If your company would like to explore the opportunity of licensing this technology please contact Alta Innovations, the University of Birmingham's technology transfer company, for more information.

'Current robot manipulation relies on the robot knowing the exact shape of the object. The programming we have developed allows the robot to assess the object and generate around 1,000 different grasp options in about five seconds. That means the robot is able to make choices in real time about the best grasp for the object it has been told to pick up and it doesn't need to be continually retrained each time the object changes.'

Jeremy Wyatt, Professor of Robotics and Artificial Intelligence at the University of Birmingham

Technology and IP

Learn more

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think advanced engineering

A *fresh* approach

P&G is one of the world's leading consumer products companies, serving 4.8 billion people around the globe. The company has many brands, amongst which are some of the world's best known household names including *Always*, *Ariel*, *Ambi Pur*, *Braun*, *Fairy*, *Febreze*, *Gillette*, *Head & Shoulders*, *Jams*, *Lenor*, *Olay*, *Oral-B*, *Pampers*, *Pantene*, *SK-II*, *Venus* and *Wella*.

Research and development forms a major part of P&G's culture. It employs a team of 8,000 R&D staff worldwide and its philosophy is one of 'Connect and Develop (Open Innovation)'. The company works with world-class universities to undertake large scale and fundamental research and its University Partnership mission is to '*Do world-class, game changing research to fuel innovation*'.

This vision led P&G to seek out expertise at the University of Birmingham, and the scope and scale of the strategic relationship between the two organisations has grown considerably over the years. The company has funded more

than 50 PhD studentships in the University's School of Chemical Engineering to investigate more economical and environmentally friendly methods of water use, effective cleaning methods and the stability of consumer products.

From this starting point the relationship has since diversified with collaborative projects now also taking place in the Schools of Psychology and Chemistry. Projects here have looked at a range of aspects from how consumers grip their detergent bottles to the characteristics of soap.

The next phase of the relationship will seek to explore the potential in building and leveraging world-class capabilities and technologies through a wider innovation group. P&G is working to connect and develop with other world-class universities and non-competing companies, both within the UK and worldwide. Such a group would seek to combine resources to tackle common, and shared, grand challenges by working on real problems with applicable research.

Its collective power could also be invaluable for leveraging funding from government, and other funding bodies, for innovative research that will in turn strengthen the UK research base and its impact.

If you would like to find out more about developing a strategic research partnership with the University of Birmingham, or about the open innovation model adopted by P&G, please get in touch with Gurmit Kler for more information.



P&G Director David Jakubovic, talking at the University of Birmingham's annual business networking event

Discussing the company's strategic partnership with the University of Birmingham, David Jakubovic, P&G's Director R&D, C+D (Open Innovation) for Europe, Middle East, and Africa, said:

'It is a meeting of minds, where mutual interests drive outcomes and suggestions flow back and forth between our research team and the students and academics at the University. Both parties benefit from the partnership, as we pool our resources, capabilities and technologies. It is a pleasure to work with some of the top minds in the field who are as excited and enthused about achieving successful outcomes as we are.'

Strategic research partnerships

Learn more

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think business

Scholarships keep students on the ball

Premier League football club Aston Villa and the University have formed a unique partnership that offers a scholarship scheme to students with little experience of higher education.

The Aston Villa Scholarships (awarded on academic achievement and extracurricular engagement rather than sporting ability) will help 28 local high achievers to study at Birmingham. Villa goalkeeper Brad Guzan says: 'The scheme gives its students an unbelievable opportunity. When I was 17, I was given a scholarship to go to university and continue my education and play football. Without that I don't know if my career would be where it is today.'

Part of the University's sector-leading Access to Birmingham (A2B) initiative, the scholarships give students financial support to help meet the cost of their education combined with the chance to volunteer on local community programmes through the club's charity Villa in the Community. Aston Villa fan and scholarship recipient Mathew Wilkes says: 'I've supported Villa since the day I was born. To be one of the first scholars on this scheme is brilliant. Words can't describe how appreciative I am and how it is going to help me in my university career. Money is a bit tight and I don't want to financially burden my parents, I want to do it on my own. The chance that Villa has given me is phenomenal.'



Find out more about the opportunities for Corporate Social Responsibility (CSR) programmes with the University of Birmingham.

CSR programmes and Scholarships

Learn more

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think quantum

Solving industry challenges at an atomic level

Physicists at the University of Birmingham are leading on a new EPSRC UK Quantum Hub in Sensors and Metrology.

By exploiting the extreme sensitivity of quantum sensors, and working with industry, physicists will be able to bring to the market place technology that enables accurate, non-destructive analysis. Applications include mapping pipework and cabling under the road surface before digging takes place, reducing disruption and traffic delays; monitoring water levels in aquifers in drought prone areas; and

providing a non-invasive way of measuring brain activity to further research into dementia.

These sensors are not just sensitive, but will be very quick: the 'optical lattice' clocks that could be built as a result of this technology will also be found in the increasingly fast high-frequency trading in financial markets where time measurement to ascertain who bids first needs to be accurate.

If your company is interested in developing capabilities in this area, contact Richard Fox.

'The hub has already drawn engagement from over 70 industrial partners, and will nurture many more. Once we have developed these new prototype sensor devices in the lab, we will then be in a position to demonstrate them to our industry partners, thereby developing new business potential, and a new market pool.'

Professor Malcolm Press,
Pro-Vice-Chancellor for Research
and Knowledge Transfer,
University of Birmingham

Quantum Hub

Learn more

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think health

Bringing science to life

Birmingham's thriving health economy is set to get an added boost as The BioHub Birmingham and the Institute of Translational Medicine (ITM) open their doors to industry partners. These exciting new developments will add to the thriving cluster of medical and biomedical activity that is growing around the new Queen Elizabeth Hospital Birmingham and the University of Birmingham's College of Medical and Dental Sciences.

The first to open is the BioHub Birmingham*, located at Birmingham Research Park. This is a fully serviced biomedical laboratory, specifically designed to provide entrepreneurs and innovative start-ups with access to affordable laboratory facilities, equipment and a base at which to locate their business. The 4,500 square foot biomedical laboratory is fully managed, providing users with on-going support and training through the BizzInn, a unique business incubation facility. The open plan innovation office provides hot-desking and high speed internet. Flexible price plans enable tenants to easily control their finances and focus on core activities.

Just over the road from the new BioHub, Birmingham Health Partners** is also leading the development of an Institute of Translational Medicine (ITM), a new world-class clinical research facility. Working with community and industry partners, the ITM will help progress the very latest scientific research findings from the University into enhanced treatments

for patients across a range of major health issues including cancer and liver disease.

The ITM will accelerate the translation of scientific discovery into methods for improving public health. It will respond to national unmet need, unlock growth potential in the NHS and develop a portal to create a resource for SMEs and international pharmaceutical companies. Its work will accelerate discoveries from the laboratory bench to the patient's bedside enabling effective products to be tested and brought to market faster, yielding major health and economic benefits. Co-locating pharmaceutical firms with clinicians and academics will provide opportunities for export-rich growth and employment and deliver major clinical benefits for patients.

'The ground floor of The BioHub Birmingham is the first phase to open and offers a large area of bench space, with 24 lab stations. In addition, there are high-specification laboratories for performing tissue cell culture, microbiology and microscopy, and it will enable entrepreneurs with a low budget or looking for funding to come and share facilities.'

Helen Miller-Viney, Business Development Manager, The BioHub Birmingham

In addition, the ITM, will provide opportunities to develop a post-graduate training programme in translational medicine alongside joint NHS/private sector scientific and professional development courses. It will also offer serviced office space, meeting and conferencing facilities for SMEs.

If you would like to find out more about renting space at The BioHub Birmingham, or if you are interested in discussing the collaboration opportunities that will be available at the ITM, please get in touch.



The BioHub Birmingham

Learn more

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Institute of Translational Medicine (ITM)

Learn more

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www.birminghamhealthpartners.co.uk/institute-of-translational-medicine.htm

* The BioHub Birmingham is part funded by the European Development Fund.

** The ITM is delivered by Birmingham Health Partners, which brings together the clinical, scientific and academic excellence of University Hospitals Birmingham NHS Foundation Trust (UHB), the University of Birmingham (UoB) and Birmingham Children's Hospital NHS Foundation Trust (BCH) as well as the Department for Business Innovation and Skills.

Healthy bottom line

A project between Health Exchange and the University has been kick started with funding from the 'Accelerating Business-Knowledge Base Innovation Activity' (ABIA)*. ABIA is uniquely operated by the University of Birmingham to underpin growth amongst SMEs operating in certain sectors within the West Midlands region.

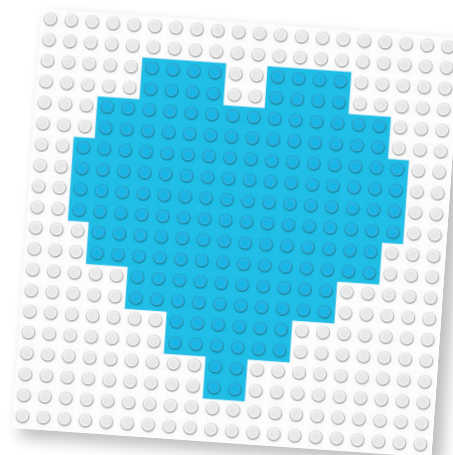
Health Exchange is a leading health and wellbeing organisation based in Birmingham. It focuses on two key aspects of health – promoting healthier lifestyles and managing long-term conditions more effectively.

This project will tap into the expertise of Professor Fiona Carmichael from the Birmingham Business School and Dr Steven Sadhra from the University's School of Health and Population Sciences. They will be supervising a group of PhD students, to undertake a review of the effectiveness of integrating workplace wellbeing activities into organisations.

'The University of Birmingham and Health Exchange are working in partnership, combining cutting edge research and leading practice, to ensure health and wellbeing interventions are as effective as possible. This will start what we hope to be a programme of future activities that draw on the strengths of the University and of Health Exchange, to enhance solutions for clients.'

Elayne Pugh, Business Development and Work Style Lead at Health Exchange

If you are an SME based in the West Midlands, and would like to find out about funding available through the ABIA project, or other funding opportunities that may be available, please contact Kate Jermey.



ABIA

Learn more

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* The ABIA Project is an ERDF funded initiative established to underpin growth amongst SMEs operating in the science and technology sectors in the West Midlands.

Structured solution

The average member of the public is unlikely to have heard of protein therapeutics. Yet human insulin, the first native recombinant protein therapeutic, has become a household name over the past 25 years. Cobra Biologics, an internationally trusted contract process developer and manufacturing organisation, have been involved in the production of protein therapeutics for over two decades. It provides advanced production solutions for clinical investigations and in-market supply.

While insulin is a native recombinant protein therapeutic (meaning that the instructions to make the protein come from humans, but that it is made in bacteria), Cobra's customers are demanding increasingly complex synthetic protein products. Current manufacturing processes are not adequate to meet market demand and the development of new processes is challenging, with no guarantee of success.

To improve its response to customer needs, Cobra needed to create new manufacturing solutions with significantly higher success rates and simplified processes. In addition, it also wanted to develop a systematic approach to selecting the most promising new processes, and to focus on these for development. These aims required an in-depth knowledge of protein production systems and microbial fermentations and the University of Birmingham is recognised as a centre of excellence in these fields.

The University and Cobra Biologics have embarked on a Knowledge Transfer Partnership (KTP)* that will explore these challenges further. Led by Dr Tim Overton, in the University's School of Chemical Engineering, the KTP is seeking to design a knowledge based approach that will lead to accelerated development times, improved success rates and simplified manufacturing processes.

'We are pleased to be working with Dr Tim Overton and Prof Jeff Cole on this KTP project and to be developing our long term collaboration with the University of Birmingham in the field of microbial protein production.'

Peter Coleman, CEO of Cobra Biologics

Knowledge Transfer Partnerships (KTP)

Learn more

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* Knowledge Transfer Partnerships (KTP) support UK businesses wanting to improve their competitiveness, productivity and performance by accessing the knowledge and expertise available within UK Universities and Colleges. The scheme is sponsored by Innovate UK (formerly the Technology Strategy Board); research councils and a number of other bodies.

think business with Birmingham

'The University of Birmingham is determined to partner and engage with your business to find transformational ways of solving the challenges you are facing. Please let us know what we can do to help or simply let us know what your most pressing needs are and let's discover a way forward together.'

Gurmit Kler, Head of Business Engagement

Business ethics in the 21st century

The University's Centre for the Study of Global Ethics tackles a wide range of contemporary issues covering genetic ethics, women's rights, bodily perfection, international trade, trafficking, development and indigenous knowledge. The Centre incorporates cross-disciplinary members, including academics within Management, Law, International Development and Social Policy.

This provides scope for research projects with business in industries such as pharmaceuticals, defence, fuel and energy, banking and finance, cyber security or retail, where ethical practices are paramount.

The recent Research Excellence Framework (REF) highlighted the University's work in the field of global ethics as some of the best in the country. The REF measures the quality and impact of research conducted in universities in the UK against international standards of excellence and noted that our work in this area, for example on the governance of the UK Biobank and in genetic research practices, was of the highest standard.

A number of the academics involved in the Centre are also part of the department of Strategy and International Business, which undertakes further ethics-related business research and has expertise in the broadly defined areas of Corporate Social Responsibility, Internationalisation and China, Knowledge and Innovation, and Resilience and Extreme Events.

Contact our business team today to discuss how the Centre can help your company with ethical considerations.

Business Engagement at the University of Birmingham

Learn more

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The University of Birmingham...

Generates over
£1 billion

of regional economic activity
each year and supports over

11,830 jobs



RUNS A
BUSINESS
CLUB
THAT HAS
ATTRACTED
OVER

300

BUSINESS MEMBERS

Has a portfolio of over **335**
patents, having generated **157**
records of invention and **89 new**
patent filings in 2013/14 alone

Has partnered over
80 BUSINESSES
in various KTPs

OVER 600 HIGH GROWTH
SMES HAVE BEEN ENGAGED
IN MORE
THAN 1,000
PROJECTS

