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EADS is a global leader in aerospace, defence and related services with a workforce of over 133,000, including more than 17,000 employees in the UK.

As part of the group's objectives, EADS is determined to improve eco-efficiency across its products and its industrial processes. With this in mind, EADS Innovation Works partnered with the University of Birmingham, through the Science City Research Alliance (SCRA)* to research and develop the incorporation of a Solid Oxide Fuel Cell (SOFC) stack into an unmanned aerial vehicle.

Researchers at the University of Birmingham, led by the late Dr Waldemar Bujalski investigated the performance of a SOFC by recording steady-state current, voltage and power outputs. The initial results showed

reassuringly strong, fast performance, indicative of a suitable cell for use in vehicles. Future work will seek to adapt the design for optimal performance on hydrocarbon fuels.

A new way of making cathodes which are more environmentally friendly has been established, and a UK patent application is pending.

*The Science City Research Alliance (SCRA) is a strategic union between two of the leading research universities in the Midlands, the University of Birmingham and the University of Warwick. The Alliance was formed under the Birmingham Science City initiative and benefited from a multi-million pound investment by Advantage West Midlands (AWM) and the European Regional Development Fund (ERDF).

Science City Research Alliance (SCRA)

Learn more

www.sciencecityresearchalliance.co.uk

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Current thinking

The conventional method of transmitting power in the UK is through an alternating current (AC) network. This is known to be less efficient and more expensive than transmission through a voltage sourced converter (VSC) based high voltage direct current (HVDC) power transmission grid which revolutionises large scale renewable energy delivery.

However, existing systems for direct current (DC) fault current management in a DC network are costly due to the high price of DC circuit breakers. This contributes significantly to the overall capital cost of developing DC grids. Now research led by Dr Xiao-Ping Zhang, Professor of Electrical Power Systems at the University of Birmingham's School of Electronic, Electrical and Computer Engineering has developed an alternative solution.

This new method provides fast DC fault control and protection from DC fault currents that is much cheaper than using DC circuit breakers. Importantly it reduces the cost and complexity of new HVDC power grids and allows a simple low cost switch to be used instead of using an expensive DC circuit breaker. In addition, this new technology has the ability to force the current to zero overcoming the problem of contact wear due to arcing.

This is just one example of the technologies available to licence through the University's technology transfer company, Alta Innovations.



Technology and IP

Learn more

www.alta.bham.ac.uk
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Stretching the bandwidths

A team from the School of Electronic, Electrical and Computer Engineering at the University of Birmingham recently won an award at the national 'Discovering Start-Ups' competition.

The 'Smart Antenna Technology' team, also known as SAT, pitched to a panel including senior executives from Broadcom, Vodafone Ventures, Qualcomm Ventures, Google, Orange, TTP Ventures, Cambridge Business Angels and Silicon Valley Bank and were praised for their leap forward in compact antenna design.

Behind this aspiring new start-up opportunity are SAT founders, Professor Peter Hall, Dr Peter Gardner, and Dr Zhen Hua Sampson Hu. They have developed a unique compact antenna which has a very low production cost and assumes the role of all existing and anticipated antennas required for current and next generation mobile devices.

Originating from work funded by the Engineering and Physical Sciences Research Council (EPSRC) the concept has been refined and commercial proof of concept work undertaken following further support from EPSRC (through both its Pathways to Impact grant and Institutional Sponsorship

Fund) and through the University's Enterprising Birmingham Fund. Rick Hillum, CEO Designate, has over 25 years experience in the wireless and communications sector including CEO roles with Software Radio Technologies and Securicor Wireless Technologies and is assisting on the commercial proof of concept project.

David Coleman, Head of Spinout Portfolio at the University of Birmingham said,

'We're extremely proud of the team's achievements to-date. This is a great concept, which has the potential not only to save the mobile industry significant costs, but also to free up space in handsets to enable greater functionality for the user.'

(See also Enterprising Birmingham Innovation Competition article on page 7)

University of Birmingham spinout companies

Learn more

www.birmingham.ac.uk/partners
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think health

University Spinout receives £3.5 million investment

University of Birmingham spinout company, Cytox Ltd, developer of a unique blood biomarker, ADpredict™, recently announced a £3.5 million injection from new and existing backers reassured by a new, experienced management team.

ADpredict™, a blood-based test in development for identifying Alzheimer's Disease (AD) in early symptomatic patients, was developed by Cytox's Science Director, Dr Zsuzsanna Nagy, Lead of the Neurodegeneration and Repair team based at the University of Birmingham.

Cytox has also unveiled the completion of a study sponsored by Roche on ADpredict™ and the results further build their confidence that the assay – based on a totally novel paradigm for the disease-causing mechanism for AD – will become an important tool to assist pharma companies in their development of new therapies.

Steered by experienced diagnostics entrepreneur David Evans as Chairman, Cytox has appointed an ex-GE Medical Diagnostics Global Head of Research & Development, Richard Pither, as CEO.

Cytox has a strong intellectual property portfolio of *in vitro* diagnostic products all of which are licensed from the University of Birmingham via its wholly owned subsidiary Alta Innovations Ltd and the University of Oxford via ISIS Innovation, its technology transfer subsidiary.

'We have exceeded our expectations for the first round of funding for Cytox with around 85% of this investment coming from new backers. They are as excited as we are by Cytox's proposition at a time when an early biomarker for Alzheimer's is so keenly needed. We will now push forward with our plans to complete the remaining steps in assay development, deliver near-term revenue opportunities and conduct prospective clinical studies.'

David Evans, Chairman, Cytox Ltd

University of Birmingham spinout companies

Learn more

www.birmingham.ac.uk/partners

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Cell Therapy at Birmingham

The University of Birmingham is home to one of the largest cell therapy research and development centres in the UK, encompassing more than 30 independent research groups working on both fundamental and translational aspects and together holding over £50m in research funding.

At a recent event held at the University's College of Medical and Dental Sciences, more than 80 representatives from the cell therapy community learned about the exciting work being carried out in this area of great potential for transforming healthcare. Delegates included representatives from the pharma/biotech industry, including companies such as Pfizer, Intercytex, Miltenyi Biotec, and Orbsen Therapeutics, as well as the NHSBT and the Technology Strategy Board's Cell Therapy Catapult.

The showcase also presented the new Advanced Therapies Facility (ATF) for GMP preparation of cell therapies and other biologicals for clinical trials, which is a joint initiative with long term translational medicine partner, the University Hospitals Birmingham NHS Foundation Trust.

Andy Mountain, Business Engagement Partner for the University's College of Medical and Dental Sciences said:

'The University is committed to working with industry and publicly funded research organisations to turn the great potential of cell therapies into real benefits for patients and we welcome discussions with potential new partners.'

University of Birmingham Cell Therapy

Learn more

www.birmingham.ac.uk

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think advanced manufacturing

Reinforcing glass

The business engagement team and scientists at the University of Birmingham have been working with precision engineering and equipment manufacturing company, Glassworks Hounsell (GWH), on a number of mutually rewarding projects. Approximately 80% of GWH's manufacturing activity is in the glass industry, either associated with the melting of glass or the supply of the raw materials 'delivery system' (batch charger) to glass furnaces.

With the help of the University, who have provided knowledge and expertise in thermal modelling and advanced materials, GWH have been looking at developing a more

environmentally friendly and cost effective batch charger. Improvements and alternatives to the current designs are being explored, as are the overall concepts of the Charging system. The University was also able to secure the funding for the delivery of this project through a Knowledge Transfer Partnership (KTP)**. Further collaborative work has now been identified that will involve modelling, and evaluating, the existing and any further designs of the batch charger.

GWH have also placed two University of Birmingham students at their premises. One is looking at modernising the technical specifications, operational manuals and

customer documentation and the other has helped to re-design a standard roller bearing that has been exhibiting high failure rates.

Further, the University recognised that the company could benefit from R&D Tax Relief, resulting in GWH receiving a £30k corporation tax refund.

'We are very pleased with the differing ways that the University of Birmingham has been able to support and guide us in areas of our business where we have neither the capacity nor the resources.'

Oliver Brinkman, Technical Director at Glassworks Hounsell

A catalyst for coating success

European Exhaust and Catalyst Ltd (EEC) manufacture stainless steel catalytic converters and recently turned to researchers at the University of Birmingham to help with the evaluation of the coatings they were using in their manufacturing processes.

Catalytic converters use an inside structure called a substrate or monolith that is coated with platinum group metals (PGM) such as platinum, palladium, rhodium and rare earth washcoat. It is these elements that cause the chemical change to pollutants in car exhaust systems, to harmless substances such as carbon dioxide or water. A recent analysis by EEC of their production chain showed that they could gain better value by using substrates originating from China or the USA and applying a coating of the active materials (PGM)

themselves. Initially they encountered variability in the production coatings they were using and so contacted the Business Engagement team at the University of Birmingham for advice.

Working with Dr Jackie Deans from the University's School of Chemistry, and utilising one of the many state-of-the-art pieces of equipment made available through the Science City Research Alliance (SCRA)*, a Bruker S8 tiger X-Ray Fluorescence (XRF) Spectrometer, the Company were able to identify changes that were needed in their processes. Notably they discovered the need to reduce the particle size within their coatings from 10 microns down to 2 microns and based on these findings EEC have now invested around £30k in a new slurry mill (grinder) to produce the smaller particles.



Jim Slade, Product Director for EEC said:

'The expertise of the team at the University of Birmingham has been invaluable and a real benefit to our business. We look forward to continuing this relationship to validate, control and refine current technology and develop catalyst technology for our future projects.'

*These two projects have been supported by the Science City Research Alliance (SCRA) a strategic union between two of the leading research universities in the Midlands, the University of Birmingham and the University of Warwick. The Alliance was formed under the Birmingham Science City initiative and has benefited from a multi-million pound investment by AWM and the European Regional Development Fund (ERDF).

**KTP is funded by the Technology Strategy Board along with other government funding organisations. In addition the project with Glassworks Hounsell also received support from the Birmingham Innovation Voucher scheme.

Science City Research Alliance (SCRA)

Learn more

www.sciencecityresearchalliance.co.uk
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SCIENCE CITY RESEARCH ALLIANCE

UNIVERSITY OF BIRMINGHAM THE UNIVERSITY OF WARWICK



Knowledge Transfer Partnerships (KTP)

Learn more

www.birmingham.ac.uk/ktp
Contact: ktp@contacts.bham.ac.uk

think business

Research Park welcomes entrepreneurs to its new drop-in centre

The University of Birmingham has opened a new drop-in networking and business advice centre. The 'BizzInn' is located at Birmingham Research Park and offers free commercial office space for new and eligible enterprises, as well as meeting and exhibition space, a coffee and break out area and WiFi connected hot desks.

The park is actively targeting more entrepreneurs, start-up companies, SMEs and larger companies to take advantage of the new centre which also provides free guidance and access to a wide range of support and

advice available from the University and it's 3000 innovative academics; other professional advisors and trade/cluster associations such as IP, legal, finance, HR, access to finance, grants, loans, investors and other business support organisations.

Director of Research and Innovation Services at the University, Dr James Wilkie said

'The new centre will be a hub of networking activity between those looking for business ideas or



support and those who can provide it, including individuals, academics and entrepreneurs who are trying to develop commercial ideas or extend their business network.'

BIZZINN

Learn more

www.birminghamresearchpark.co.uk
contact: businessteam@bham.ac.uk

One point three steps closer to Birmingham Business School



a team of consultants from the School's internationally acclaimed MBA programme that really does produce top performers and we also regularly sponsor MBA students to do research as part of their dissertation.'

The research involved interviewing top industry leaders for their views and experience with Birmingham MBA students generating direct access to over 120 CEOs and senior directors collectively responsible for over 5 million employees and the combined revenue of £600bn across their organisations. This has resulted in a fresh, insightful exclusive body of knowledge about how best to gain competitive advantage through people.

Links with the Birmingham Business School MBA Programme were a key factor when management consultants, One Point Three Limited, decided to relocate to Birmingham. One Point Three has an innovative offering that accelerates behaviour change in business organisations.

A public intellectual report has now been released, available on the Birmingham Business School website that is fast gaining momentum. The Sunday Times has covered the findings, and business leaders such as Lord Karan Bilimoria, CEO of The Cobra Beer Partnership, have stated they are sharing it with their Boards as a matter of priority.

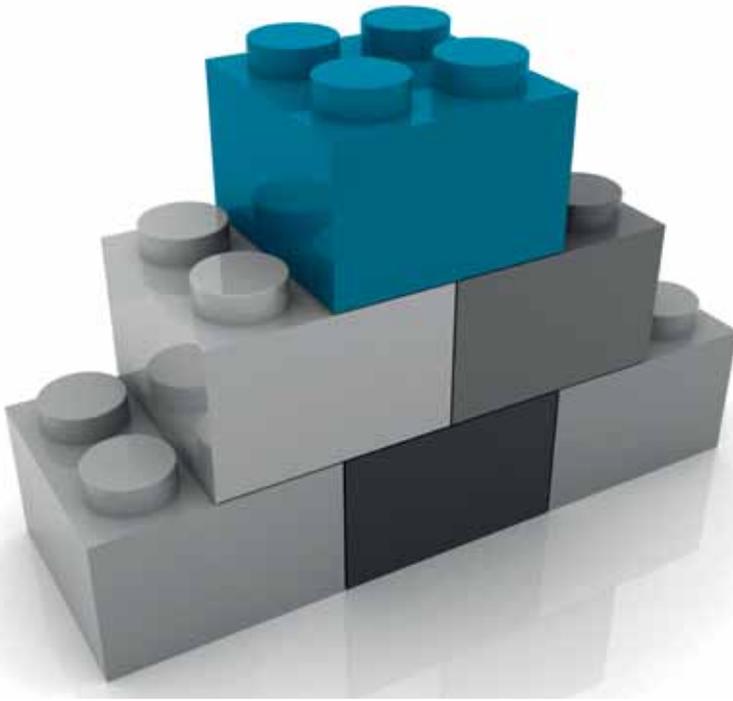
Dr Andrew Wells, Director at One Point Three, said:

'One important factor in moving to Birmingham was the close partnership that we've formed with Birmingham Business School. We've recruited

Birmingham Business School

Learn more

www.birmingham.ac.uk/business
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Building a stronger knowledge base

Prime is a property development and investment company that fund, design, construct and maintain health-service related buildings. They have a diverse set of clients ranging from GPs, community healthcare providers and Local Authority partners.

One of the main challenges that Prime faced was the lack of systematic knowledge management across the organisation and subsequent access to robust, evidence-based data on its performance and its products. This meant that new business was harder to win and there were delays and duplication in progressing existing projects. These issues had a commercial impact on Prime because it was missing out on the income from potential new business and experiencing the additional cost that delay and duplication inevitably incurs.

A Knowledge Transfer Partnership (KTP)* with the University of Birmingham helped the Company to develop the in-house knowledge and the skills it required. The aim was to develop processes for collecting information and a database to store data that would enable easier retrieval and analysis.

Working with Hilary Brown from the University's School of Social Policy, Prime created an effective Prime Facts database and robust knowledge management processes. This in turn has led to a more evaluative culture within the organisation.

'Working with the University of Birmingham on this KTP project has been invaluable in supporting our business strategy and objectives going forward. Having a dedicated University of Birmingham (KTP) associate on site has enabled us to focus on delivering the project on time and on budget.'

Ann Pursey, Group Partnerships Director, Prime plc.

This Partnership received financial support from the Knowledge Transfer Partnerships programme (KTP). KTP is funded by the Technology Strategy Board along with the other government funding organisations.

Knowledge Transfer Partnerships (KTP)

Learn more
www.birmingham.ac.uk/ktp
 contact: ktp@contacts.bham.ac.uk

University of Birmingham awards £24,000 to enterprising academics

Two researchers from the University of Birmingham have each been awarded £10,000 at this year's Enterprising Birmingham Innovation Competition showcase to enable development of their research expertise into viable business opportunities. Four runner-ups were also each awarded a prize of £1,000.

Six finalists were chosen to present in front of a panel of expert 'Dragons' to battle it out for their share of the prize money. The showcase celebrated a wealth of business ideas emerging from research staff and doctoral researchers from across the University.

The winning projects were led by Dr Yanina Sevastyanovich and Dr Sampson Hu who were awarded £10k each to help further develop their research into a commercial product or service.

Dr Yanina Sevastyanovich and Dr Amanda Rossiter, who are working on a project designed to increase the efficiency of biopharmaceutical production, were the winners of the best service based business idea and Dr Sampson Hu won the product based category. Dr Hu is working on a unique compact antenna design which has a very low production cost and assumes the role of all existing and anticipated antennas required for current and next generation mobile devices (see also separate story on page 3).

With thanks to Enterprising Birmingham sponsors Deloitte, Marks and Clerk, MTC, Sandvik and Withers and Rogers



Winners: Dr Yanina Sevastyanovich, Dr Amanda Rossiter and Dr Sampson Hu pictured here with Dr James Wilkie Director of the University's Research and Innovation Services and Professor Adam Tickell Pro-Vice-Chancellor for Research and Knowledge Transfer.

Enterprising Birmingham

Learn more
www.birmingham.ac.uk/partners
 contact: enterprise@contacts.bham.ac.uk



Tailored for business

We use our research expertise to solve tomorrow's problems today

Whether you are a large corporate organisation or a small business, and whether you require a short term solution or have a long term project in mind, you can tap into the world-class expertise at the University of Birmingham. Our five colleges, 3000 academic staff and leading-edge facilities can be accessed in the following ways:

Intellectual property licences

We have a varied portfolio of medical, biomedical, engineering and environmental patents available for licensing. So whether it's a life-changing vaccine or a piece of time-saving technology, our intellectual property could become your company's crowning glory.

Objective expert consultancy

We can send you the brightest minds from a wide range of scientific disciplines to help boost your organisation's knowledge and resources.

Collaborative projects and partnerships

We can work with you to develop strategic, collaborative partnerships involving other universities, businesses, public sector bodies, government and other funders to achieve a common and shared goal.

Contract R&D

Join forces with our researchers to work on your organisation's specific research and development needs.

Access to funding

We can help you navigate your way through the various funding opportunities available and find you a suitable academic partner to work with.

State-of-the-art equipment, testing and analysis

Utilise our state-of-the-art scientific equipment or train members of your team on a particular technique. Our researchers are on hand to offer technical support, problem solving and help with product development.

Conferencing facilities

If you are hosting conferences, meetings or events, our Conference Park has first class facilities. The campus boasts its own art gallery, concert hall and railway station all within minutes of Birmingham City Centre.

Continuing Professional Development (CPD)

We can train your key personnel through one of our Continuing Professional Development courses.

Knowledge Transfer Partnerships (KTP)

Enter a three-way knowledge transfer partnership with the University and a high calibre graduate to work on a project for a period of between 6 months and 3 years.

Student internships, placements and graduate recruitment

We offer a range of opportunities for you to promote your graduate and undergraduate vacancies to our students, from structured part-time work, internships and placements to graduate employment.

Business accommodation

If you are looking for office space to house your organisation Birmingham Research Park on the University campus offers purpose built accommodation for companies seeking to work in research, development and training.

Business engagement

Learn more

www.birmingham.ac.uk/partners
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