UNIVERSITY OF BIRMINGHAM

© Dr Andy Hodder

ENTERPRISE

Annual review 2018/19

WELCOME TO THE ANNUAL REVIEW OF A VERY SUCCESSFUL 2018–19!

This review highlights how well the innovation ecosystem we have created in Birmingham is making social and economic changes happen. University of Birmingham Enterprise does this through delivering a wide range of knowledge exchange activities while at the same time making profits which we donate to the University.

This year, we've worked with two-thirds of the 'research active' academics across the University and set several new records. The HEBCIS* statistics for 2018–19 put us fifth in the UK for new patent filings and sixth in the UK for the number of new inventions. Beyond these headline figures, we've had a year of success in every area of our operations.

We signed nearly 50 new intellectual property deals, and these have granted licences to global companies, NHS Trusts, start-ups and social enterprises.

Invex Therapeutics plc became our first ever stock market flotation based entirely on Birmingham intellectual property. It, and our other spinout companies, attracted £27 million of investment from third-party investors, more than double that of last year.

Our consultancy service, which gives outside organisations paid access to expert academic advice, also had a record year, breaking the £2 million barrier for the first time.

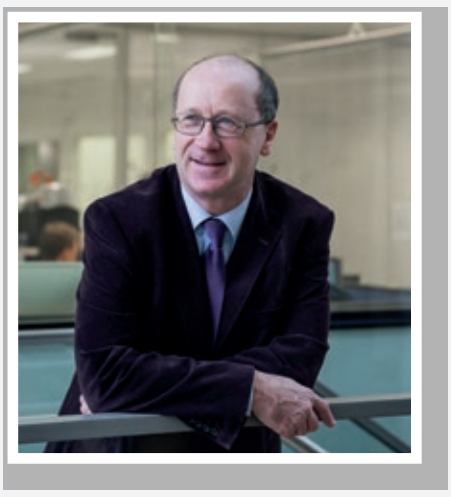
The innovation environment we've created at the Birmingham Research Park now has 600 people working on-site, and attracts more than 20,000 visitors annually. Both the Research Park and the newly developed units at the BioHub are fully let.

We're now leading a successful consortium of eight Midlands universities, sharing best practice with each other and promoting our collective intellectual property and spinout portfolio to investors.

We're looking forward with confidence to an equally successful 2019–20.

DR JAMES WILKIE
CEO, UNIVERSITY OF BIRMINGHAM ENTERPRISE

**Higher Education Business and Community Interaction Survey*



"As researchers, we often want our ideas to change the world in some way – to have an impact. Those who fund our research also want to understand what difference it will make, by adding to knowledge, shaping policy, saving lives, or driving economic growth. This is why the Research Excellence Framework assesses 'impact' as well as academic quality.

By working closely with the team at University of Birmingham Enterprise, researchers across all disciplines can gain insight into how to talk about their research in the context of its eventual impact, and learn how to access new kinds of funding and ways of doing things that support the transition to delivering impact."

PROFESSOR TIM SOFTLEY
PRO-VICE-CHANCELLOR, RESEARCH AND KNOWLEDGE TRANSFER

SHORTENING TIME TO MARKET

The innovative academics we work with are often impatient for success, and we work at a similarly rapid pace to ensure their ideas get to market as quickly as possible. 2018–19 was a record-breaking year for us, in terms of the number of academics we worked with, the consultancy income we generated, the number of patents we filed, and the value of our spinout portfolio. The three case studies below show how swift commercialisation can be.

"University of Birmingham Enterprise helps deliver impact. The team provides clear advice on how to develop academic ideas, make them investible, and bring them to market as products and services."

Professor Heather Widdows
Deputy Pro-Vice-Chancellor
Research (Impact)

FIRST STOCK MARKET FLOTATION

In June 2019, NASA scientists and astronauts visited Birmingham to present a high-profile lecture. They also held discussions on how drug discoveries in Birmingham could reduce brain pressure during space travel to allow them to go beyond the Moon.

Behind the scenes we were already working on agreements to assign patents and rights for a repurposed drug to Australian company Invex Therapeutics. This was the culmination of a decade's research by Professor Alexandra Sinclair into a condition that has similar effects on the body as the brain pressure caused by space travel.

By July, Invex had raised $12 million on the Australian Stock Exchange. The company now has a UK base at the Birmingham Research Park, and clinical studies are underway.

CREATING THRIVING BUSINESS FROM RESEARCH

In 2014, Professor Nick Loman set up MicrobesNG to provide accessible and affordable microbial genome sequencing for University researchers. From the outset, MicrobesNG disrupted the genome sequencing market, and quickly grew in reputation to become a successful and profitable service within the University of Birmingham.

Based on this success, MicrobesNG decided they wanted to evolve into a commercial spinout when the research funding ended in August 2019. University of Birmingham Enterprise supported the complicated process of turning a service offering in the University into a free-standing business, provided funding from the Enterprising Birmingham Fund, and developed a bespoke space in the BioHub Birmingham.

MicrobesNG is now thriving as a commercial business and servicing a global customer base.

LICENSING TO GLOBAL COMPANIES

In 2016, Professor Lee Chapman was testing a prototype – a small white box containing a temperature sensor and a Wi-Fi transmitter. If mounted on a lamp-post with the sensor pointing at the road, the prototype could transmit data on road surface temperature back to Lee's office in the School of Geography, Earth and Environmental Sciences.

Lee worked with University of Birmingham Enterprise to investigate the possibilities for commercialisation, through pilot projects that tested the prototype with local councils and road maintenance organisations.

Fast forward three years, and Wintersense has been licensed to environmental monitoring company Campbell Scientific, who are now marketing it globally as a system that directs gritting lorries to where they are needed most.

Lee continues to work with Campbell Scientific on a consultancy basis.

CREATING 21ST CENTURY ENTERPRISE

Birmingham Research Park is a vibrant community of researchers, entrepreneurs and commercial companies. Founded in 1986, it was one of the first science parks in the UK. Since then it has supported the creation and growth of 106 companies, and is now a key part of the West Midlands innovation system.

The three-acre site is located on the edge of campus and many of its tenants are enterprises that originated from research at the University. It is also the place to go for academics, graduates and other entrepreneurs looking for training, investment and facilities.

The University of Birmingham Enterprise team has more than 168 years' collective experience of designing and managing spaces that foster partnerships and enterprise. This expertise is invaluable to colleagues planning the next phase of development for the University – including the Exchange, the Centre for Excellence for Digital Railways Systems and Birmingham Life Science Park, which will generate investment and grow the local economy.

"We're now firmly established here. We have a strong international customer base and two-thirds of our business is repeat business, coming from scientists we have worked with before. For us, the broader benefits of being at the University are proving key."

Macer Gifford, Managing Director, Gifford Bioscience

INCREASING DEMAND FOR BIO-INCUBATOR SPACE

In 2017, the University invested a further £1.5 million in the £6.8 million BioHub, expanding capacity to meet the growing demand for bio-incubation space in Birmingham. This new development is now full.

Spinouts who are now tenants include Marker Diagnostics, whose novel approach to diagnosing concussion is being evaluated in Premier League football clubs.

As with all BioHub tenants, they wanted to be close to the University's advanced facilities and equipment, which can deliver giant leaps in capability for small companies. The Research Park's partnership with the University's Enabling Technologies Initiative allows external companies access to research facilities and equipment and enhances the University's reputation as a centre of excellence.

FOSTERING RESEARCH PARTNERSHIPS

The vast majority of companies in the BioHub work with researchers based either at universities or in biotechnology or pharmaceutical companies.

One of these is Gifford Bioscience. Originally located in the US, the company chose to move to Birmingham because of the availability of appropriately skilled PhDs, Birmingham's international airport and great transport links to the rest of the UK. They chose the Research Park because of the facilities offered at the BioHub and to be close to the research community at the University.

Gifford Bioscience provides a specialised service to biomedical researchers who need to characterise how a potential new drug binds to its target. The company's highly qualified staff have the expertise to do this work, but not all the costly equipment required. The Enabling Technologies Initiative provided access to equipment at the University, and the company has expanded its offering as a result.

HOW WE HELP ACADEMICS, ENTREPRENEURS AND STUDENTS

THE RIGHT PLACE TO GROW

The 'Enterprise Acceleration' team are business creation experts. They also provide access to a large network of management talent and external advisors including members of the All Party Parliamentary Group for Entrepreneurship and specialists in business and social enterprise.

The team has mentored and trained Midlands-based technology companies and worked with the University Careers Service, to deliver enterprise boot camps for entrepreneurial students.

We provide our own 'Medici' training for academics wishing to develop a new technology, business venture, or service offering. This programme provides a route-map from a blue sky idea to a business plan so academics can contribute effectively to the development of a viable enterprise.

FAST TRACK A NEW SERVICE BUSINESS

If you want to create a specialist service enterprise based on your know-how or expertise, University of Birmingham Enterprise provides a ready to trade 'shop front' so you can quickly seize the moment when you find an appropriate customer, commercial partner or knowledge transfer opportunity.

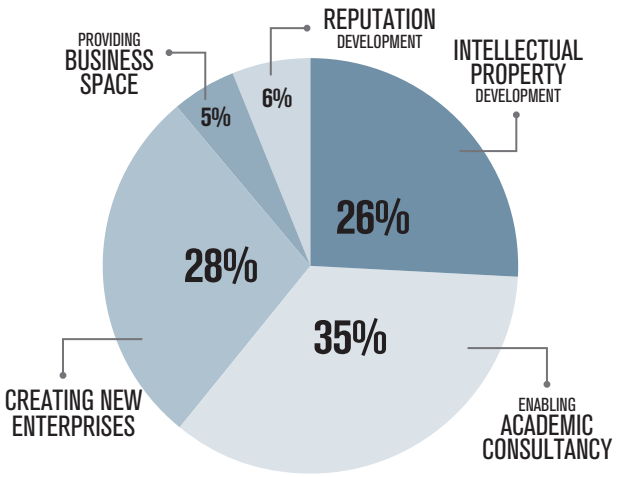
Called 'Operating Divisions', these ventures are housed in the existing legal structure of University of Birmingham Enterprise Ltd, so you don't have to get involved in filing returns, or creating a Board of Directors – this gets you started quickly and frees up valuable time to explore the market or audience, and find the right opportunity for your ideas.

GET FUNDED

Many of the ideas that come from Birmingham's innovators have potential to deliver global impact, but they need careful nurturing to ensure they reach their full potential.

University of Birmingham Enterprise helps entrepreneurs find and apply for the right funding to support their growth. We also have our own specialist funds for enterprising academics, and investment in early-stage spinouts so they can get their ideas off the ground.

WAYS WE HELP ACADEMICS



IN 2018–19, OVER **700 ACADEMICS** BENEFITTED FROM OUR EXPERTISE

ACCELERATING 21ST CENTURY HEALTHCARE

Birmingham's excellence in both medical research and innovation is a cornerstone in the University's reputation, and we have invested heavily in developing both the support and infrastructure for medical innovators.

Understanding how to properly develop intellectual property is essential to attract the investments and partnerships that bring these innovations into routine patient care.

Our professional expertise in medical innovation is driving the international reputation for Birmingham's bio-incubation and medical research facilities.

"University of Birmingham Enterprise is a vital part of the support provided to those academics whose ideas underpin new therapies, medical technologies and devices."

Professor Paul Moss, Director of Research and Knowledge Transfer College of Medical and Dental Sciences

REDUCING EYE DAMAGE

Professor Liam Grover's group were researching use of a fluid gel as a novel eye drop to deliver a wound-healing protein called Decorin when they discovered that the gel had a healing effect in its own right.

University of Birmingham Enterprise had already worked closely with the research group by supporting funding bids, delivering business training, and mentoring in enterprise skills.

Preparing for the first study of the new eye drop involved developing a new method of sterilization using ultraviolet light, and we worked to patent this invention, which has huge potential for food, agriculture and healthcare industries. Once the new discovery was made, we also filed another patent covering the use of the gel with other active ingredients.

We are now helping the research team explore and approach markets for these technologies, while they prepare for clinical trials evaluating the gel with and without Decorin.

"University of Birmingham Enterprise has provided the broadest possible scope of protection for ideas resulting from this research."

Professor Liam Grover, School of Chemical Engineering, Director of the Healthcare Technologies Institute

Our strategic partnership with University of Birmingham Enterprise includes specialist embedded staff in research centres, to identify and capture Intellectual Property resulting from cancer research.

Tony Hickson, Chief Business Officer, Cancer Research UK

KILLING BACTERIA

Dr Felicity de Cogan engineered a new coating for metal and plastic surfaces that kills bacteria on contact, so preventing the transmission of germs from surfaces to people.

University of Birmingham Enterprise patented the process that applies this coating and supported bids for funding from our Enterprising Birmingham Fund. This kick-started a year-long trial involving the Royal Centre for Defence Medicine and the Royal Navy and tested the coating on steel surfaces including door handles, an operating theatre and communal toilets. Results showed the coating could rapidly kill bacteria that cause some of the most common hospital-acquired infections.

We also supported regulatory approval work, so the process would meet the exacting standards required by the healthcare industries, and helped Felicity's successful application for a Royal Academy of Engineering Fellowship.

We then created a spinout company called NitroPep, and delivered global publicity for trial results to attract commercial partners for further development.

PRECISION TESTING

Researchers Professor Mark Viant, Professor John Colbourne and Dr Ben Brown wanted to set up a company that uses the most up-to-date techniques to assess the hazards from chemical exposure.

They came to University of Birmingham Enterprise and we set up an Operating Division called Michabo Health Science, so the academics could start trading quickly.

Michabo now provides its services to a growing client list of companies and regulators who want to understand the root cause of exposure-related harm so toxicity can be prevented.

SAVING LIVES

Standard ways of prioritising patient care can't be applied to pregnant women – and this can mask illness in the mother and the unborn baby.

The Birmingham Symptom Specific Triage System (BSOTS) assesses pregnant women presenting themselves for treatment and then allocates a colour-code, so hospital staff can see at a glance who needs to be prioritised.

BSOTS was developed by Professor Sara Kenyon and Dr Nina Johns from the Birmingham Women's Hospital. They worked with the University of Birmingham Enterprise team from the outset, who advised on validation, copyright and negotiated agreements so the decision-making algorithm could be digitised and integrated into electronic patient records.

Evaluation showed that BSOTS was easy to use, improved decision-making, and increased the number of women seen within 15 minutes of arrival. When Sara Kenyon and colleagues reported these findings in *Midwives* magazine in 2018, they were inundated with enquiries from maternity units around the world.

University of Birmingham Enterprise licensed the system to 34 sites internationally and recommended a sustainable business model for global distribution which ensures that staff using BSOTS are properly trained.

Our unique ecosystem enables the full spectrum of translational medicine: encompassing health data; an established local health system; academic excellence; and an extensive clinical trials capability.

Dr John Williams, Managing Director, Birmingham Health Partners

TACKLING 21ST CENTURY RESOURCE CHALLENGES

The University delivers research that is world-leading and world-changing. But it is not enough to do 'just' research, these ideas need to be translated into products and technologies that will reach global markets.

University of Birmingham Enterprise works with researchers to turn their ideas into intellectual property, find the right funding so researchers can be trained in business skills, produce prototypes, or identify and approach commercial partners, and so help researchers gain impact by meeting real-world needs.

"The help that comes from University of Birmingham Enterprise means that ideas from our researchers are shaping a future that includes greener and cleaner energy."

Professor Costas Constantinou, Director of Research and Knowledge Transfer, College of Engineering and Physical Sciences

Wind energy
Dr Asaad Faramarzi's team from the School of Engineering designed an anchor to secure wind turbines to the seabed in areas with strong winds and currents. We filed a patent for this invention, which will allow larger turbines to be installed in areas with stronger winds, increasing the energy harvest, and extending take-up of wind energy.

Power distribution
Dr Yousif Al-Sagheer from the Centre for Fuel Cell and Hydrogen Research designed an energy control system that manages the power distribution when the energy supply is fluctuating. We filed a patent for this new technology, which will help operators of wind or solar farms, and are now working with the researchers to approach investors.

Greener transport
Professor Yulong Ding, Director of the Centre for Energy Storage, invented a novel charging method that will add miles to the range of electric cars. After patenting the technology, we funded and coached the research team so they could approach and gain interest from global automotive companies.

"In 2018–19, we worked with researchers who are addressing the UN's Global Goals on affordable, clean and renewable energy. The quality and the breadth of their innovations is inspiring."

Dr Jonathan Watkins
Head of Intellectual Property Services, University of Birmingham Enterprise

RECYCLING ALUMINIUM

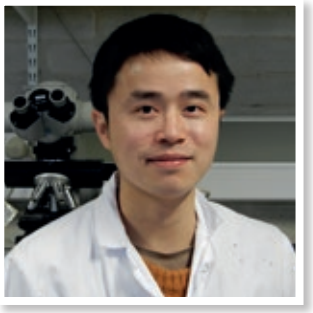
Recycled aluminium needs to be free from impurities – particularly iron – but the existing methods for removing iron during recycling are either expensive or inefficient.

Dr Biao Cai's research demonstrated a way to lower the iron content in molten aluminium using a temperature gradient and magnetic field. He immediately saw the potential for industrial use, and came to University of Birmingham Enterprise for help with commercialisation.

We were impressed by the method, and our patent searches showed the approach was novel and inventive, so we filed a patent to ensure its protection.

We also contacted small- and large-scale companies and industry groups on his behalf, to seek advice on how the technology should be developed. We have since helped Biao apply for a grant from the Midlands Innovation Commercialisation of Research Accelerator (MICRA) so he can build and test a prototype, which will be seen by industry in late 2020.

Biao was commended in the University's Emerging Impact Awards in 2019.



Recycling aluminium uses 10% of the energy, and releases just 5% of the CO_2 compared to primary aluminium production.

Dr Biao Cai, Lecturer in Metallurgy and Materials, School of Metallurgy and Materials

SAVING GROUNDWATER

When Professor Philip Davies came to the School of Engineering, he brought with him a self-written patent for a low-energy device to purify salty groundwater and make it good enough for crop production. His solar-powered system uses a novel combination of off-the-shelf products, and it can be deployed easily and cheaply in locations that are 'off-grid'.

When Philip approached University of Birmingham Enterprise for help, the first step was to find out the scale of the opportunity, so we reviewed the market for water purification technologies. We then worked closely with patent attorneys to improve the patent and provide global protection for the ideas it contained.

We also supported an application to receive support from an Innovate UK-funded programme. This programme helps researchers identify companies who may wish to partner in co-development, and funds the cost of meetings, which can be anywhere in the world. To date, Philip has showcased the technology to 130 companies in Australia, the Middle East, US, Europe and Israel, and has been well-received.

Groundwater resources around the world are becoming increasingly depleted and salinized, and desalination can be energy intensive, and costly. This technology can meet these challenges and also provides opportunities for international collaboration.

Professor Philip Davies, Professor of Water Technology, School of Engineering

FINDING CUSTOMERS AND INVESTORS

'The more experience and investment we can focus on a new idea, the faster we can understand who will benefit from it and what it is we've got to deliver.'
Dr James Wilkie, CEO,
University of Birmingham Enterprise

EXPOSING ACADEMIC IDEAS TO THE MARKET

Universities are great places for blue sky thinking, but it can be challenging to create a commercial enterprise from an academic idea.

University of Birmingham Enterprise supports enterprising early-career researchers to bid for places on the very competitive national Innovation to Commercialisation of University Research (ICURe) programme. If they are accepted, then we also support them through the process. This provides intensive training, coaching, support and funds a rigorous customer discovery journey which enables academic innovators to travel the world, meet an average of 100 potential customers and 'road test' the value of their ideas.

In the last two years we have taken 21 Birmingham academics through ICURe, which starts with a competitive application for funds to pay for the researcher's time and travel expenses and ends with the challenging Options Roundabout, where the research team presents the final business plan for further investment to a panel consisting of industry experts, funders and investors.

Our work on the ICURe programme has helped academic innovations gain entry to fast-moving global markets including medical devices and diagnostics, transport and environmental testing, and research-led social enterprises to get off the ground.

ICURe is funded by Innovate UK.

MIDLANDS INNOVATION COMMERCIALISATION OF RESEARCH ACCELERATOR

Led by University of Birmingham Enterprise, MICRA brings together the innovation expertise of eight Midlands universities – Aston, Birmingham, Cranfield, Keele, Leicester, Loughborough, Nottingham and Warwick.

Between them, these eight universities generate nearly 500 new inventions per year. They hold more than 1,600 patents, have 100 active spinout companies and work with nearly 3,000 small businesses annually.

MICRA provides a single 'gateway' for investors and partners to find these opportunities and has a £1.5 million internal fund to support researchers who want to take their ideas to market.

MICRA is funded by the Connecting Capability Fund from Research England, part of UK Research & Innovation.

WANT TO KNOW MORE?

The next round of ICURe funding is expected in the summer of 2020 and will be announced by Twitter **@UoBAccelerate**.

You can find out more about MICRA events and opportunities by following **@MICRAgateway.**

2018–19 IN NUMBERS

£244 MILLION
VALUE OF SPINOUT COMPANY PORTFOLIO

576 TOTAL PATENTS HELD BY THE UNIVERSITY

£27 MILLION
THIRD-PARTY INVESTMENT IN SPINOUTS

BIRMINGHAM RANKED...

6th
IN UK UNIVERSITIES FOR INVENTIONS
HEBCIs data from 2017–18

10th
MOST INNOVATIVE UNIVERSITY IN THE UK
Reuters Top 100: Europe's Most Innovative Universities

5th
IN UK UNIVERSITIES NEW PATENT APPLICATIONS
HEBCIs data from 2017–18

10th
IN THE UK FOR THE AMOUNT OF INVESTMENT INTO OUR SPINOUTS
Beauhurst research for PraxisAuril

WE WORKED WITH **247 ACADEMIC CONSULTANTS**, GENERATING **MORE THAN £2 MILLION INCOME**

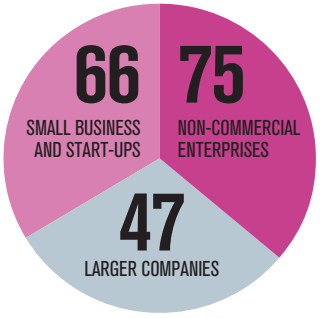
2,288 ACADEMIC TRAINING HOURS DELIVERED

239 RECORDS OF INVENTION

103 NEW PATENT APPLICATIONS

49 NEW LICENCES GRANTED

188 LICENCES



20,795
VISITORS TO BIRMINGHAM RESEARCH PARK

£40 MILLION
VALUE OF RESEARCH CONTRACTS SUPPORTED

16 RESEARCH GROUPS SUPPORTED THROUGH SPECIALIST INNOVATION FUNDS

Our expertise transforms ideas into innovation.

Our specialist staff have many years of practical experience in the smooth running of academic consultancy projects, protecting ideas and finding the best outlet for them.

We deliver enterprise training and coaching and manage spaces where academics, entrepreneurs, students, businesses and investors can spark off each other.

We work with people who want to create new products, services or enterprises from their knowledge and research.

Contact us if you want to know more.

THE BOARD

Chairman: John Powell

CEO: Dr James Wilkie

Directors: Andrew Sleigh, Professor Andy Schofield, Brenda Reynolds, Professor David Adams and Dr David Brown

Company Secretary: Melanie Kaiser

ADDRESS

Birmingham Research Park,
97 Vincent Drive, Birmingham
B15 2SQ, United Kingdom

Email: info@enterprise.bham.ac.uk

Phone: + 44 (0)121 414 9090

Website:
www.birmingham.ac.uk/enterprise

Twitter: @UoBAccelerate

KEY CONTACTS

Director, Enterprise and Innovation
Dr James Wilkie: j.h.wilkie@bham.ac.uk

Academic Consultancy Service
Simon Freeman: s.freeman.1@bham.ac.uk

Birmingham Research Park and BioHub Birmingham
Angie Reynolds: a.reynolds.1@bham.ac.uk

Enterprise training and business incubation
Andrew Cruxton: a.cruxton@bham.ac.uk

Communications
Ruth Ashton: r.c.ashton@bham.ac.uk

Spinouts
David Coleman: d.coleman@bham.ac.uk

Intellectual Property
Dr Jonathan Watkins: j.watkins.1@bham.ac.uk

Midlands Innovation Commercialisation of Research Accelerator
Simon Jones: s.jones.11@bham.ac.uk

The front cover image is reproduced with the kind permission of Dr Andy Hodder from the Department of Management at Birmingham Business School.

UNIVERSITY OF BIRMINGHAM | ENTERPRISE

20638 © University of Birmingham 2020.
Designed and printed by Creative Media.