

# HEIF case studies 2021: Cluster V

The Research England-funded Higher Education Innovation Funding (HEIF) supports higher education providers to exchange knowledge with business, public and third sector organisations, community bodies and the wider public, increasing economic and societal benefits from their work.

The case studies below demonstrate the ways that English higher education providers have used HEIF to support knowledge exchange activities, and the impact they have achieved. Cluster V includes very large, very high research intensive and broad-discipline universities undertaking significant amounts of research funded by a range of sources, including UKRI, government bodies and charities.

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## **King's College London: GammaDelta Therapeutics Ltd spin out company**

GammaDelta Therapeutics is a spin out biotechnology company founded upon IP deriving from world-class academic research conducted by Professor Adrian Hayday and Dr Oliver Nussbaumer, at King's College London and the Francis Crick Institute and supported by Cancer Research Technology. Investment has been received from Takeda Pharmaceuticals and UK VC Abingworth.

GammaDelta Therapeutics has developed capabilities to generate both blood-and tissue-derived immunotherapies of haematological malignancies and solid tumours.

This rapidly evolving area of biotechnology has the potential to revolutionise the treatment of many cancers, bringing benefits to patients and healthcare providers.

The formation of GammaDelta therapeutics was supported by HEIF through the work of HEIF funded IP & Licensing professionals and protection of IP through patenting.

GammaDelta Therapeutics has since formation grown rapidly in size, employing a significant number of individuals and importantly in May 2021 announced that it has received FDA Clearance of its IND Application for its novel allogeneic gamma-delta T cell cancer therapy GDX012. A First-in-human clinical study for Acute Myeloid Leukaemia expected to begin later in 2021 and the FDA has also granted orphan drug designation to GDX012 for the treatment of Acute Myeloid.

Early HEIF support was critical for the ability of King's to play its role in helping spin out this company in 2017. The company has enabled the creation of highly active and selective non-engineered and genetically engineered allogeneic cell therapies, which demonstrate cellular activity and tumour cell killing capacity and offer potential as "off-the-shelf" cell therapies. Taken together these activities have been central to the government priority areas of (a) increasing investment in research, unlocking new discoveries and applying research to solving our most pressing problems in government, industry and across society, (b) becoming world-class at securing the economic and social benefits from research and (c) support ing entrepreneurs and start-ups and increasing the flow of capital into firms carrying out R&D enabling them to scale up.

## **King's College London: At home in cultural London**

At Home in Cultural London was an online interdisciplinary extracurricular programme which explored cultural London as a living classroom. The programme ran twice in the 20/21 academic year and was participated in by 565 students from 61 countries across the globe, all levels of study and 83 different departments from across the 9 faculties. King's Culture developed the programme with the academic community, artists, and organisations at the forefront of London's vibrant cultural and creative industries, and was made up of bespoke video content, peer-led discussion, and artist-led creative activities. The programme was designed to help students thrive during a difficult and unusual year.

### **Societal, economic or student benefit**

This activity was successful at achieving positive student outcomes related to understanding of arts and culture, their sense of belonging in a university context and their wellbeing. 95% felt more or significantly more connected to King's and London, 87% felt taking part improved their wellbeing and 99% gained more understanding of arts & culture in London. Other outcomes were reported, particularly around peer connection, reflective skills, development of an individual value base and creative thinking. In the context of the 20/21 academic year and the effect of Covid-19 on their university experience, students particularly valued that At Home in Cultural London was an extra-curricular opportunity to interact with other students and topics outside of their courses and disciplines and to connect as part of a global community.

### **Activity supported by HEIF**

This programme was developed and delivered by the HEIF-supported King's Culture, utilising both team resource and budget. The programme capitalised on the team's unique connections to the arts and cultural sector as well as their extensive partnerships across the institution. It built on the ongoing work the team has been engaged in whilst funded by HEIF, such as supporting the development of Thriving in Cultural London - a bespoke mandatory programme for first year dental undergraduates - running a co-curricular experiential module exploring cultural London, and the numerous past collaborative projects which the team has supported over the years, which were showcased in the programme.

### **Supporting a government priority area and RE-UKRI and OfS strategic objective**

Supporting the UK R&D Roadmap priority to 'attract, retain and develop the talented, diverse people and teams that are essential to delivering our vision', the course offered students an opportunity to develop core 21<sup>st</sup> century skills - creativity, communication, collaboration and critical thinking, alongside peer-to-peer learning and knowledge exchange within discussion groups. Knowledge Exchange through initiatives with organisations such as ParaPride, Thrive LDN and Art Night, developed across the university, were showcased through the course to students who otherwise would not know about the diverse research and partnerships between King's and the cultural and creative sectors.

## **University of Birmingham: Spinout development**

A range of tools has now been developed to support the validation and establishment of new spinout companies from the University. In addition to the use of our Enterprising Birmingham Funding to explore commercial proof of concept, once we have identified an opportunity with strong potential for spinning out, we will form a "Spinout Candidate Team". This consists of academics, a member of our UoB Enterprise IP Services team, our Spinout Development Manager, and often an external sector-experienced individual.

That team is further supported through a new "Spinout Basecamp" (managed within our BizzInn incubator). This is more than just space and training: it exists to develop the team, with the help of an Entrepreneur-in-Residence, as they develop a business plan together, attract additional management, and source investment.

One opportunity that has benefited from this support is the new spinout (May 2021) Salinity Solutions Limited, which will commercialise a method for desalinating groundwater. The underpinning technology enables a high recovery rate, ensuring a greater volume of usable water and a more concentrated waste stream.

As a consequence of the support, the team were able to attract both Innovate UK funding plus match funding of investors with considerable relevant expertise.

### **Benefits**

The spinouts formed from the University's research have the potential to make a difference to society: regionally, nationally and globally. The innovations we commercialise typically protect or save lives, or as is the case with Salinity Solutions, the environment (low carbon technology and clean growth). They also generate economic benefit: the investment committed on formation of this spinout has immediately created a new job, and many more are anticipated as the company grows.

### **HEIF contribution**

Development of spinout companies is managed by a dedicated HEIF-Funded Spinout Development Manager. This is under the direction of a HEIF-Funded Head of Enterprise Acceleration, whose team is also responsible for running the HEIF-funded incubation and training resources, as well as the management of the HEIF-funded Enterprising Birmingham Fund.

### **Support of government priorities**

Our spinout development activities support the development of ideas and technologies that will shape the UK's future high-growth, sustainable and secure economy. Furthermore, the incubation and training activities supports "SMEs", "access to finance", and the "place" agendas.

## University of Birmingham: Virtual Consultancy Challenge

In spring 2020 the HEIF-funded PGR Entrepreneurial Development Officer ran a completely online four-month training and work experience programme where postgraduate researchers worked together in small inter-disciplinary virtual teams to solve a real-life challenge being faced by their client, Centre for Mental Health. The challenge focused on how to support the mental health of micro-SME employees, which soon became an extremely topical and more problematic issue due to the pandemic and subsequent lockdowns.

The programme was created and piloted in 2019 as a flexible training opportunity enabling part-time and distance researchers to participate in enterprise activity without needing to travel to campus. The 2020 participants came from all five Colleges and included both full-time and part-time researchers based in the Midlands, elsewhere in the UK and overseas.

Participants completed online interactive training in:

- Teamwork
- Project management
- Creative problem solving
- Video pitching
- Making the most of the experience for their future career

In order to complete the training and access the next module, teams had to hold virtual meetings and complete certain activities, thus ensuring team interaction and collaboration. Participants were invited to a webinar briefing with their client, after which each team was permitted two email exchanges with the client, thus developing both their client management and consultancy skills. At the end of the 4 months each team submitted a video pitch of their solution. After rigorous judging by the client, a health solicitor and an academic from the Institute of Mental Health, the winning team won two prizes provided by the client:

- 1) Having their idea published and promoted by the client.
- 2) A meeting with a business founder for careers advice and tips regarding consultancy.

Feedback from participants was overwhelmingly positive. 100% liked that the training was completely online self-access and 91% felt they learnt new or improved skills such as problem solving, communication, dealing with conflict, negotiation, consulting, ideating, project management, pitching, video creation and teamwork. 100% would recommend it to other PGRs; 'highly recommended for postgraduate researchers interested in career in consultancy or working in the industry rather than academia', 'It's good and fun yet challenging', 'I liked the fact you could work through things at your own pace but there were deadlines too so you couldn't become complacent', 'It was good to learn about consultancy and take part in a research project outside the PhD' and 'getting to meet new researchers'.

The industry partner, Centre for Mental Health, was very impressed with the teams' pitches and enjoyed being involved in the project. They are currently working with the winning team, supporting them as they continue to develop their idea with the intention of trialling it with some SMEs and then making it available to SMEs more widely.

### Support of government priorities

This activity supports 'ideas' through business recovery and growth and 'people' through skill development and improved employability prospects.

## **University of Liverpool: Robotiz3d – radically transforming road maintenance**

The University of Liverpool has formed a new spin-out company, Robotiz3d Ltd, to take forward new technology that has the potential to radically transform road maintenance.

Robotiz3d will commercialise patented research from the University's Engineering Robotics Lab. The technology uses Artificial Intelligence and robotics to significantly improve the way road defects, including potholes and road cracks, are detected and repaired. Currently, no autonomous technology solutions exist to tackle the pothole crisis plaguing many parts of the UK.

The company received significant support and professional expertise from the HEIF funded IP Commercialisation Team, in particular Dr Andrew Spencer, who now acts as Non-Executive Director on the board. The proof of concept activity for this project was supported by the HEIF Enterprise Investment Fund.

### **Economic impact**

Over the last decade, 18 million potholes have been filled in the UK, at a cost exceeding £1 billion. The cost of repairing all of the UK's damaged roads is estimated to exceed £10bn and may take many decades to complete.

The first step towards safer roads is inspection, followed by swift repair. Both tasks are currently carried out using traditional and labour-intensive methods, these methods are slow, unsafe, and costly to both the economy and the environment. Robotiz3d's autonomous solution aims to address these issues sustainably, combining technology and engineering to help extend the life of our road networks.

### **Environmental impact**

Good quality road networks can play a key role in decarbonisation and reducing hazardous chemicals from entering our ecological environment and food chain. Bad road conditions are also a major reason for tyre damage. Tyre dust, whose quantity significantly increases on poor roads, have been recently classified as a major source of microplastic in the ocean. Another environmental issue that arises from poor road surfaces is an increase in the amount of tyres disposed. Although recycling is helping reduce End of Life (EoL) tyre disposal problems, 17% of the EoL tyres continue to end up in landfills.

Robotiz3d's solution can also help reduce the number of visits to sites needed by maintenance crews and their vehicles, as well as the usage of repair materials, directly reducing the carbon footprint of highway asset owners (the public sector) and contractors (business and industry).

Robotiz3D helps to open new opportunities within one of the sub-themes within the UKRI theme of Manufacturing Informatics: the novel physical design and development of robotic systems (for both fundamental and applied purposes), including underpinning control mechanisms. Hence it contributes directly to a key government priority area for EPSRC.

The activity also links to the UK R&D roadmap, specifically driving up innovation and productivity and levelling up R&D across the UK.



## **University of Liverpool: Improving access to psychological therapies for perinatal depression in low- and middle-income countries**

According to the World Health Organization, perinatal depression affects about 16% of women during pregnancy and 20% after childbirth in low- and middle-income countries (LMICs). Between 75-85% of these women do not receive treatment, with devastating consequences including increased disability, suicidality, and poor infant physical and cognitive development.

The University of Liverpool developed the 'Thinking Healthy Programme' (THP), a psychological intervention that can be delivered by lay-therapists to women suffering from post-natal depression. THP is the only intervention for perinatal depression included in the WHO's flagship mental health Gap Action Programme being implemented in 90 countries.

HEIF funding has supported the collaboration with The Human Development Research Foundation (HDRF) in Islamabad, Pakistan to collect data on the implementation of THP and appropriate optimisation of the intervention. On 10 October 2019, Pakistan's President Arif Alvi launched the President's Programme to Promote Mental Health of Pakistanis with THP as a key pillar of the programme. The University of Liverpool provided Scientific and Technical advice to the programme with HEIF funds enabling the momentum to be maintained through activities to enhance knowledge exchange.

### **Outcomes**

- a) Documented evidence of policy change in the entire country of 200 million about the integration of the Thinking Healthy Programme in the primary care system.
- b) Data on numbers of health personnel trained and patients treated from the first 6 months of the programme.
- c) An article for a policy journal detailing the entire impact study – from research to policy and practice.

### **Impact achieved at policy level**

The President's Programme has mandated the Ministry of National Health Services, Regulations and Coordination, to train all 90,000 community health workers in Pakistan in THP by 2024. Writing in the Lancet, the State Minister for Health in Pakistan, outlined the implementation plan for THP and stated that, "the President's programme is likely to provide important lessons to the global mental health field in the years to come."

### **Impact on lives**

Qualitative data indicates how THP has positively impacted the lives of women and their families. An unexpected benefit of the THP was the improvement in self-esteem, confidence and skillset of lay-health workers who are the backbone of primary health systems in many low-income countries.

## **Expanding the reach of the impact**

In June 2020, Rahman and colleagues in Pakistan were awarded a grant of £3,250,000 by the NIHR Research and Innovation for Global Health Transformation Scheme to develop a technology-assisted version of the THP to be integrated with available technology such as mobile phones to improve its reach and effectiveness.

This case study links to the Government's R&D roadmap - tackling societal issues and strengthening our collaborations with overseas governments and international funders through strategic bilateral cooperation.

## University of Nottingham: Developing a Civic approach to corporate partnerships

The University of Nottingham has a strong track record of Industry engagement and in particular strategic collaborations with large firms. Supported by the HEIF funded staff in our corporate partnerships team, in support of government priorities around innovation partnerships with industry and the translation of research into economic benefit, we have developed and grown joint research centres and programmes with Rolls-Royce, GSK, Unilever, Cummins, Boeing and more recently new partnerships with GKN Automotive, TTE Electronics, Nestle, and Airbus. Since 2016/17 we have delivered more than £80m of research projects directly with industry. The 2021 KEF placed us in the top decile for working with business and ranked us highly for work with large firms and Innovate UK funding which supports many of these partnerships.

As part of the 2018/19 Civic University Commission we examined our role in supporting innovation in local firms and found while through a series European funded business engagement programmes such as [Enabling Innovation](#) we provided high quality targeted support to help local SMEs innovate and grow, with the exception of Rolls-Royce very few of our strategic partnerships are with firms within our city and region.

To address this we implemented a [Business Partners Programme](#) targeted at major local corporates to supplement our successful and long running local SME network. Since the launch in 2020 we have developed the network to around a dozen major local firms including Experian, Paul Smith, Capital One, Boots and Biocity. Through the pandemic we have hosted a series of virtual roundtables drawing on university expertise to provide insight on COVID's impacts on mental health in the workforce, office environments and remote working, and leadership in times of challenge. We have also used these sessions to explore topics of interest for recovery and digital skills and data driven discovery, zero carbon and sustainability. These inputs will help shape our response to future levelling up funding opportunities and ensure our projects and programmes address local economic needs.

We also sought to enhance our engagement activity in locally important sectors that were closely aligned with arts and social sciences disciplines and used additional HEIF funds to appoint new corporate partnerships leads in Financial and Business Services and Creative and Digital Sectors. These posts have helped to develop links with the local fintech sector in Nottingham developing our existing links with firms such as Experian, Capital and Blenheim Chalcott. We have developed a new partnership with KPMG focussed around joint research into how new forms of data can generate business insights. As well as benefiting KPMG this work will also support high growth firms in the region through new mechanisms we are creating to share this knowledge and provide access to University resources.

## University of Nottingham: BlueSkeye AI – a spin-out company commercialising intellectual property in artificial intelligence for healthcare applications

The University of Nottingham has established a significant research base in computer vision and machine learning and has applied this expertise to the monitoring of human behaviour. A series of distinct software tools and techniques have been developed since 2015 that have been utilised in research projects ranging from pain estimation, assessment of gestational age of new-borns, emotion recognition and mental health diagnostics. As the research has matured using funding primarily from research councils these software tools have been commercialised with support from HEIF funded staff in the University IP Commercialisation Office. This has led to licensed products generating royalties for the University including tools for use in the market research sector that monitor user engagement with various forms of media. Proactive showcasing of the technology at a range of industry events has continued to create new opportunities in both research and commercialisation.

The highly specialist technical knowledge required to support companies' use of the computer vision tools in bespoke commercial applications limited the ability of the University to fully realise the impact of the technology. To address this, during 2018/19 the principal academic (Prof Michel Valstar) and his research colleague (Dr Anthony Brown) began to receive support from the University's dedicated spin-out company management team, [Nottingham Technology Ventures](#), that included secondment of Dr Brown into a HEIF supported "Enterprise Fellow" role to accelerate the development of an investable business plan.

[BlueSkeye AI](#) was founded in April 2019 as the output of this HEIF funded activity, with Dr Brown transferring to a full time role as Co-CEO. The company focusses on the development of products for use in mental health and wellbeing applications (both regulated and unregulated) including specific business to consumer software products directed at female health. The company now licenses and supports its software tools to a wide range of commercial partners on a revenue generating basis.

The University ring-fences a portion of its HEIF allocation each year into a 'Pathfinder Fund' for supporting spin-out companies. BlueSkeye received a £100k investment at formation in July 2019 from this fund, which secured the early management and technical team prior to a further investment of £50k in June 2020 alongside £85k of Angel investment. BlueSkeye currently employs 10 people (8FTE) from a base on the University Innovation Park, retaining highly skilled technical people in the local area. Revenues are increasing year on year.

The University continues to utilise HEIF to support, accelerate and invest in the transition of research expertise into commercial vehicles where impact can be maximised and new employment created. The University has created more than 40 spin-out companies by embedding specialist support skills inside the University within a fully owned subsidiary, Nottingham Technology Ventures Ltd, to support academic founders in the creation of sustainable companies emerging from all areas of research activity.

## University of Sheffield: Northern Gritstone Ltd – boosting the commercialisation of university spinouts and start-ups in the North of England

HEIF has been instrumental in developing our commercialisation activities, with £200k per year invested to establish our [Intellectual Property Development and Commercialisation \(IPDaC\) fund](#) which is now leveraging a further £800k of university funds to create an annual budget of £1m. This will continue into future academic years, alongside HEIF investment in a number of Commercialisation Manager roles.

IPDaC and our commercialisation team were central to bringing together the Universities of Sheffield, Leeds and Manchester in 2018 to create the Northern Triangle Initiative (NTI) and secure a £5 million award from Research England's Connecting Capabilities Fund (CCF). By 2020 NTI had supported around 20 commercially viable projects, substantially improving commercialisation rates across the three universities, and generating a sustainable pipeline of university spinouts.

This partnership has led to the recent launch of a new investment company to boost the commercialisation of university spinouts and start-ups in the North of England. The company, [Northern Gritstone](#) Ltd, aims to be a key part of the Government's "Build Back Better" plan for growing investment in the North. It will provide significant start-up and follow-on funding to support the Intellectual Property (IP) developed at the Universities of Sheffield, Leeds and Manchester - and fund a diverse range of companies across areas such as advanced materials and manufacturing, health and life sciences, artificial intelligence, and data sciences.

Northern Gritstone Ltd plans to raise up to £500 million from strategic corporate partners, institutional investors, and qualifying individuals. If successful, the financing will make Northern Gritstone one of the largest dedicated investors into the commercialisation of university science and technology related IP in the UK.

A notable success from our recent activities is [Opteran](#), which received close support from a HEIF funded commercialisation manager and pre-incorporation financial support from both our IPDaC fund and the NTI project. The company has now raised seed funding of £2.1m from a range of venture capital investors.

Opteran's underlying technology is based on innovative research into animal intelligence led by Professor James Marshall at the University of Sheffield. The company seeks to understand animal vision to create a modular platform for autonomous vision, decision making and navigation with applications in multiple industries.

## University of Sheffield: Rejuvenating and reinvigorating the High Street

Thanks to investments made by HEIF, the University of Sheffield was able to support Sheffield City Council to develop an ambitious plan to rejuvenate and reinvent Fargate and High Street as social hubs in the city. The University played a vital role, including:

- A kick-off event hosted by the University at the Millennium Galleries where over 200 members of the public attended. The event included visuals of some of the plans and the opportunity to talk to some of the team about plans and next steps, followed by a public exhibition with featured plans in The Moor Market.
- A VR experience devised by the Department of Urban Studies and Planning, showcasing Fargate's potential as a hub for cultural and creative activities.
- Expertise and research from a team of academics who, led by Director of City and Culture Professor Vanessa Toulmin, ran a series of planning workshops gaining insights from over 120 stakeholders on a variety of topics including flood defence and urban space.
- Specialist consultancy help from Dr Julian Dobson, Director of the research consultancy Urban Pollinators, to ensure the proposal aligned to the [Government's priorities for city centre improvement](#).
- School of Architecture students, who produced architectural images for the final proposals.

Sheffield City Council's submission was [successful in receiving funding](#) from the Government's Future High Streets Fund alongside £5m of match funding provided by local partners, enabling the city to deliver on its ambitions and providing a substantial financial boost for the city centre, helping to shape the future of how Sheffield residents and visitors use this space. There are three key areas that this project will support:

### **Fargate will be repurposed as an events and cultural setting**

The five-storey 'Even Central' property, currently used for short-term retailing, will be converted to facilitate a year-round programme of events. Alongside this hub the top of Fargate will be reconfigured to provide outdoor space for major international events, supported by modernised power and utility infrastructure. This scheme is expected to attract 110,680 visitors annually, of which 50% are assumed to be additional.

### **Front Door Access to upper floor retail premises will catalyse investment in residential and live/work accommodation**

A programme of works to enable access to upper floors of retail premises will catalyse their conversion to inner city living. This scheme will provide the building blocks to revitalise key buildings accelerating the viability of creative mixed-use retail premises.

### **Transforming the Public realm works in High Street and its historic side streets will deter crime by creating green sociable spaces and continue the climate resilient greenscaping**

A bespoke lighting scheme throughout the intervention area will improve the public experience of the city centre with derelict public spaces transformed into oasis of tranquillity.

## University of Southampton: Developing strong relationships with our corporate partners

The University of Southampton has an excellent track record of working with industry, attracting corporate research funding in excess of £50m over the past five years. Enabled by HEIF, the Corporate Partnerships team of dedicated knowledge exchange professionals provide relationship management support across a portfolio of partners ranging from aerospace and defence companies to telecommunications, health & pharma and maritime.

These institutional relationships have strengthened significantly in recent years with a number of new collaborative programmes which have been facilitated through the Corporate Partnerships team who continue to manage the overall institutional relationships. Key successes include:

- **EPSRC Prosperity Partnership - [Intelligent Structures for Low Noise Environments](#)**  
 A ground-breaking 5 year partnership, funded in 2019 by the [Engineering and Physical Sciences Research Council](#), that brings the [Institute of Sound and Vibration Research](#) from the [University of Southampton](#) together with [BAE Systems](#), the [Centre for Additive Manufacturing](#) at the [University of Nottingham](#) and [Lloyd's Register](#) to create new materials and intelligent structures that will control underwater noise, reducing its harmful impact on marine wildlife.
- **Integrated Mission Management System (IMMS) collaboration with Thales**  
 The programme is enabling humans to become 'supervisors' rather than 'controllers' of autonomous vessels. [IMMS](#) addresses the current limitation of autonomous vessels – every vehicle, sensor or payload needs a human to control or monitor it. IMMS aims to make this relationship more productive through 'autonomous squads', enabled through a common interface that connects individual vehicles with humans interacting at squad level. The programme is jointly led with Thales through Dr Ben Pritchard who has been awarded an Industrial Fellowship by the Royal Academy of Engineering. This fellowship further strengthens the partnership by enabling Dr Pritchard to be embedded within the University
- **Medical research in a consortium exploring new ways to diagnose lung cancer earlier and save lives**  
 The collaboration spans healthcare, diagnostics and informatics companies to test the best way of detecting cancers at a stage when they can still be cured. The consortium secured approximately £3.5m-worth of funding from UK Research and Innovation's Industrial Strategy Challenge Fund (ISCF) and includes two of the University's strategic partners, the Lung Cancer Initiative Johnson & Johnson, as well as Roche.

The strategic relationships that are nurtured with the University's corporate partners extend beyond research and span the full spectrum of university activities. A new programme is being piloted in 2021, through HEIF funding, to further enhance careers offerings to the student community. The Corporate Partnerships team are working with the Careers & Employability team to deliver a Summer Student Innovation Challenge with a number of the Universities corporate partners. An intensive summer edition of the existing Student Innovation Programme (SIP) scheme will see participating students engage with large national companies and organisations, drawn from across the university's corporate strategic partners. The scheme is designed to help students recognise and develop the many transferable skills they will have learnt during their time at university and apply them in a business context.

## **University of Southampton: Engaging our local communities through networks, seed-funding and activity-based resources**

Public and Community Engagement (PC&E) strands are enabling staff and students at University of Southampton to engage and work with local communities to address societal issues around health inequalities, wellbeing, environment, and educational disadvantage. Our Public Engagement (PE) Community Hubs are connecting people around health & wellbeing and environmental themes, reflecting local and regional research needs to collaborate on activities. Our programme of Public Engagement seed-funding is supporting a range of projects, including the youth-led 'Cultivate!' which focuses on research into crops resilient to climate change, the potential benefits of plant-based sustainable diets, and supports them in developing voices to influence people and policy. Our employability-enhancing Student Intern scheme is collaborating with local government, schools and charities to design and deliver themed Activity Packs to digitally-disadvantaged families. Strategically, all our P&CE activity contributes to Southampton's wider Civic University approach to economic and social impact partners across the region.

HEIF supports Public Engagement with Research unit staff and paid intern roles which are instrumental in the running and development of the Community Hubs (a staff lead plus two interns) and the Activity Packs (Schools-University-Partnership Officer plus three interns). HEIF also enables our annual PE Development (seed) Fund to support emerging projects such as Cultivate!.

P&CE Hubs provide infrastructure to develop and extend local social networks, generating a University-community platform where every participant's voice is heard and valued equally, and stimulating a culture of knowledge exchange and understanding between researchers and external groups and individuals. Evaluation and review methods reflect the informal, networking nature of the Hubs, e.g. the desire to reconnect with and support Hub participants through COVID-19 led to an open forum to share and discuss common issues and collect feedback. Mutually-beneficial collaborations with societal and/or economic potential that emerge from dialogue within the Hubs are then developed via more formal mechanisms including the seed fund programme or grant applications.

The Cultivate! Project, an example of a seed-funded activity, also has long-term student and research benefits. 10 of the original 21 students are now participating in one of the advisory panels for the underpinning health and food sustainability research. Overall, a P&CE project that is seed-funded in one year will typically lead to additional external funding in following years and a significant number have gone on to feature in Impact Case Studies for the University's Research Excellence Framework (REF) submission.

All the work of the Public Engagement with Research team is aligned with the UKRI vision of public engagement, centred on 'involving more people in research' because of the many benefits for researchers and society, and our activity has directly supported aspects of the COVID-19 response and recovery. Our Civic University approach to developing ideas with people for mutual benefit in our locality means that, for instance, all of the P&CE Hub activity is firmly in the spirit of the Industrial Strategy. The connections generated by our Schools-University-Partnership Officer have enabled a significant student contribution to knowledge exchange that is on course to increase in future years.



## University of Warwick: WMG SME Internship Programme

The aim -of the WMG-SME programme is to connect small companies (SMEs) to the University's research resources, and expertise, particularly for the first time, to de-risk and accelerate innovation. HEIF has allowed WMG to play a vital role in helping companies become more innovative so that they can adapt and not only survive today's challenging market but thrive in global future marketplace. HEIF funds were focussed in four key areas:

**The SME Internship Programme** facilitates long-term relationships between SMEs and WMG that develops over time. During the period, it delivered 100 business critical projects, with a further 40-50 due in the summer of 2021. Intern projects are centred on making business strategic change, from taking new products to market, increasing productivity, helping firms make a transition to Net Zero as well as acquiring new knowledge. 25% of the interns were hired by industry.

**Creating business networks** including the Polymer Innovation Network (PIN), Internet of Things (IoT), Ready for Electrification (R4E) and Sustainability Production Innovation Network (SPIN) – collectively over 40 events with 2,000 delegates attended the networks, bringing industry and University research teams together.

Delivering **ten KTPs with local businesses**, and the **COVID-19 business response programme**, under which HEIF was invested in COVID-19 critical projects supporting industry, such as assisting UK manufacturing make PPE for the NHS. Additionally during the 1st lock down helping over 120 manufacturers get access to COVID 19 support, helping companies; source critical equipment, accessing capability and accessing latest information on grants and guidelines. This including work with the MAN Group to create 20,000 life-saving visors and with Ramfoam Ltd to scale up of their contract in supplying 45 million plus face visors.

HEIF specifically supported a dedicated Project Officer, providing continuous and dedicated focus to the programme that has led to improvements in client engagement, job creation and repeat customers as well as higher engagement within the University departments and student groups.

It has created societal, societal, economic and student benefit by: supporting SMEs in the local regions to create innovation journeys, build on projects and access new skills; achieving cost and productivity savings for SMEs, creating new jobs that over the long term will lead to increased turn-over; and providing student job creation, placing innovation in the SME workplace.

The programme has been successful in reaching regional priority areas such as WH Tildesley, based in Walsall (Priority 1) and Rayleigh Coatings (also digital), East Staffordshire (P 1). WMG has also ran innovation events such as R4E (Net Zero) at the Centre for British Metalforming, Wolverhampton (P1) and with NatWest in Worcester (also P1).

Two Net Zero related business networks have also been established, 'Ready for Electrification' (R4E) and 'Sustainability Production Innovation Network' (SPIN). These are focussed on helping UK manufacturers make the transition sustainable production, with R4E supporting transport electrification and SPIN focussed on Net Zero manufacturing.

## **University of Warwick: Warwick Impact Fund – genetic improvement of vegetable crops for industry benefit**

Between 2017 and 2021, the University of Warwick utilised HEIF to fund more than 40 projects via an institutionally managed Warwick Impact Fund (WIF), designed to ensure its world-class research discoveries create economic growth for the UK and positive benefits for wider society.

A project titled ‘Improving plant resistance to viruses’ led by Warwick crop scientist Professor John Walsh is just one example of the 40+ initiatives funded via the WIF. Professor Walsh was awarded £45,643 from the fund, which was spent between 01 August 2017 and 30 July 2019, to further the impact of his research discovery – a potentially durable plant resistance to Turnip mosaic virus (TuMV). Turnip mosaic virus is considered to be one of the most significant viruses affecting field vegetable crops worldwide and also infects oilseed rape. It can reduce weight yields of some vegetables by up to 64%, cause severe problems for vegetable storage and can render crops unmarketable, affecting supply and livelihoods.

Professor Walsh, from the University’s School of Life Sciences, worked in collaboration with agricultural technology company Syngenta, on the development of better varieties of vegetables through genetic improvement. Professor Walsh and collaborators mapped the recessive gene involved in the broad-spectrum resistance to TuMV. Working with Syngenta, his group identified the resistance gene and its novel mechanism, which was patented by Warwick. This facilitated the development of within-gene genetic markers that dramatically accelerated crop improvement.

The WIF award enabled Professor Walsh to travel to Enkhuizen, Holland to finalise details of the exploitation strategy with Syngenta and to travel more widely to meet growers, grower groups, agronomists and consultants in Syngenta’s key markets to publicise the research over the three-year period. HEIF also provided funding for glasshouse space and technician time for the evaluation of Syngenta’s finished F1 hybrid brassica plant varieties, to test the improvement in their resistance to the virus. The evaluation revealed that the F1 hybrid brassicas were resistant to all the virus isolates tested, which were known to be able to overcome other resistance genes. This provided further evidence for the potential durability of the resistance, the Holy Grail of plant pathology.

Operating within a £471 million global market for vegetable Brassica seeds, Syngenta purchased the patent rights in 2012 and has introgressed the gene into elite parent breeding lines. Development of the within-gene marker accelerated the company’s international resistance breeding programme by five years and halved the time necessary for introgression of the resistance gene into commercial plant genotypes, enabling significant cost-savings. Syngenta now has Autumn/Storage type Chinese cabbage varieties for the European market and Spring varieties for the European and Chinese markets in later stage testing that have the resistance. A second patent on recessive broad-spectrum resistance to potyviruses in plants is also being pursued by Syngenta, worldwide.

## Queen Mary University of London: The Festival of Communities

Every year we host a two-day Festival of Communities for over 3,500 local east London residents, bringing together Queen Mary's research and teaching with the local area to explore living and learning in the borough.

The Festival is led by the HEIF-supported Centre for Public Engagement, who co-designed the event with Tower Hamlets community groups. Local conversations and workshops identified a need for "community cohesion", and representatives involved in those initial consultations have continued to advise on the Festival's evolution.

The Festival's aims are:

- to develop public engagement skills of Queen Mary staff and students
- to increase awareness of the value of public engagement and the support offered by the CPE, across Queen Mary
- to increase understanding of the value of the contributions of partner organisations—increasing the likelihood of successful community/university partnerships in the future
- for Queen Mary staff and students to feel part of Tower Hamlets, and local residents to feel part of a wider Queen Mary community
- share learning, generate new knowledge and increase understanding of topics and ideas within and outside of Queen Mary.

Each year Queen Mary works with more than 30 local partners alongside staff and students to display the best of health, medical, science, engineering, humanities and social science research. Activities are designed to enable learning and inspiration for local families and provide an opportunity to meet and interact with new people.

The Festival takes place in Stepney Green Park in the heart of Tower Hamlets, an area surrounded by local housing and therefore familiar for many local residents. The second day on campus provides visitors with a chance to explore our university in a welcoming way.

Activities included:

- explore inside a giant tooth on the Virtual Tooth Tour (Institute of Dentistry)
- explore how city design impacts air pollution and discover new research on air pollution (Blizard Institute)
- learn about cutting-edge bee research and bee conservation (School of Biological and Chemical Sciences)
- use virtual reality to swim with star turtles (School of Biological and Chemical Sciences)
- try out the robotic wheelchair we have developed (School of Electronic Engineering and Computer Science)
- create a community map of Tower Hamlets now and in future (School of Geography).

The Festival offers a unique opportunity for staff and students to manage an engagement project, a small budget, designed an activity and delivered this to thousands of local residents – therefore developing vital skills and confidence in public engagement.

Feedback from participants has shown that the Festival has acted as a significant personal development opportunity. For local organisations and community groups, the Festival is recognised and valued as the only large-scale event in the borough where they can engage with residents and make new connections.

## Queen Mary University of London: Queen Mary Innovations

The Technology Transfer Team is responsible for the commercialisation, protection and management of QMUL's intellectual property and portfolio of spinout companies and performs an essential role in ensuring academic research achieve its commercial and social impact. It also manages the Proof of Concept (PoC) fund that plays a key role in the commercialisation process.

HEIF supports these technology transfer activities by funding the staff positions that are dedicated towards meeting these objectives and the PoC fund.

The range of activities carried out by technology transfer managers (TTMs) in any year can lead to long term recurring benefits, with instances of HEIF funded activities carried out over a decade ago continuing to generate economic benefit in the present day.

The TTMs work with academics to identify any potential IP and complete a commercial evaluation to identify the best way to protect the IP and its route of commercialisation. During 2019/20, 116 new disclosures were reported by the team and 55 new patent applications were filed, protecting future economic benefit.

The TTMs assist the inventors with obtaining external funding and applying to the internal HEIF funded Proof of Concept fund to progress the technology. The PoC fund plays a key role in the commercialisation process as it bridges the gaps in external funding and provides commercial validation of the technology.

Where the best route of commercialisation is via licensing, the TTMs identify the best and most suitable partners. The TTMs are responsibly for negotiating the commercial terms and obtaining the best value for QMUL. At the end of 2019/20 QMUL had 129 licence agreements that generate nearly £1m of IP Income.

The creation of a spinout company is an alternative route to commercialisation and is more intensive for the TTM. The TTM undertake the incorporation of the spinout, acting as a Director to provide commercial expertise, protect QMUL's interest and, in many cases, working with the team in the early stages to develop the business. This includes finding management teams and identifying suitable investors for the company. The spinout companies that have benefited from the support of HEIF funded positions and the PoC Fund, range from a dental materials company, software (include machine learning and Artificial Intelligence), to a spinout that carried out the world's first human challenge trials in COVID-19.

The spinouts that had some HEIF funded TTM involvement during important moments of their development now employ nearly 400 individuals and generate £25m of income annually. The HEIF funded PoC fund is a key resource to support projects that arise from academic research to achieve commercially relevant milestones. Overall, the QMUL PoC Fund has enabled:

- over £4m from third party investments or funding to future the commercialisation process
- in excess of £6 million in externally-funded translational grants and contract research at QMUL
- over 17 technology licences to industry
- £250k of IP income
- the creation of 9 QMUL spinout companies.

The activities carried out support the key Knowledge Exchange principle of getting academic research into the wider world.

## **UCL: Transforming coal waste into vibrant paints**

UCL artist Dr Onya McCausland developed a range of paints from waste generated by de-commissioned coal mines, with the support of HEIF funding.

The UK Government's Coal Authority oversees water treatment at former coal mines across the country. This prevents iron solids from entering and polluting local water courses and drinking water aquifers. But the process also leaves behind 4,000 tonnes of ochre waste a year.

While studying for a PhD at the UCL Slade School of Fine Art, Dr McCausland saw the possibility of transforming this waste into ochre pigments for use in paint.

With HEIF funding, managed by UCL Innovation & Enterprise, Dr McCausland was able to develop a feasibility study and a business case for developing the paints. HEIF funding covered a variety of expenses, including equipment (instruments and tools), professional fees, chemicals and reagents. In addition, UCL Innovation & Enterprise provided guidance and advice throughout the project. The project has produced impact on several levels. In addition to addressing issues of sustainability and waste management, it has engaged local communities. It has also generated economic impact via commercialisation of the paint.

The partnership between UCL, the Coal Authority and artist materials supplier Michael Harding resulted in a unique line of wall paint and artists' oil paints being brought to market.

The first paint colour in the range is called 'Six Bells Red', after the Six Bells Mine Water Treatment Scheme in Wales. A hundred one-litre tins of wall paint and 1,000 tubes of artists' oil paint were made available to buy via community interest company Turning Landscape, which was set-up as a result of the project. It ensures that profit from paint sales is reinvested back into the local Welsh community. Elsewhere, UCL and the Coal Authority have developed a public engagement project at the National Coal Mining Museum for England in Wakefield and the nearby Yorkshire Sculpture Park. The intention is to positively alter public perceptions of coal mining waste, so it's seen as something with artistic and historic value.

The project also equipped artist Dr McCausland with entrepreneurial skills, which in turn has inspired her UCL colleagues to look at the possibility of commercialising their research.

Dr McCausland has also frequently used ochre pigment from former coal mines in her own work, which has been displayed around the UK at exhibitions.

The project is an example of supporting the government's Build Back Better priority of levelling up, maximising the benefits of innovation for local economies and building local strengths. It also demonstrates the benefits of providing support for early career researchers and innovators to progress careers inside or outside academia, highlighted in the R&D Roadmap, and supports the OfS strategic outcome that graduates and postgraduates leave higher education with the knowledge and skills that will contribute to their national and local economies and communities, and drive productivity.

## **UCL: EcoNomad: UCL entrepreneur scales down eco-tech for small farms**

Converting farm waste into renewable fuel and fertiliser is usually done on a large scale for agricultural operations. With the assistance of HEIF funding, plus other forms of support, a UCL entrepreneur has scaled down the technology to make it accessible to all.

Dr Ilan Adler (UCL Civil, Environmental and Geomatic Engineering) has worked with environmental engineering students on sustainable solutions for UK smallholdings. At Surrey Docks Farm, Dr Adler installed two prototype biodigesters which turn waste into heat, biogas and liquid nutrients for the soil. EcoNomad is a start-up founded by Dr Adler. As part of the AgRIA project funded by the European Regional Development Fund, EcoNomad has been further developing its BioNomad biodigester. The startup is also expanding its product range with a passive solar pump which can supply micro-irrigation systems or drinking water.

Over several years, Dr Adler has received advice, support and grants from UCL Innovation & Enterprise. One project, supported by HEIF funding, involved working with an industrial partner on an online product design process. HEIF funding covered staff costs to help with the project, equipment, consumables and travel.

The project had societal impact. Anaerobic digestion, solutions for sustainable resource management and recycling agricultural waste tend to be expensive and developed for large scale operations. EcoNomad Solutions has redesigned the technology so it is affordable and easy to use for small farms. This allows smallholdings and rural communities to be more sustainable, by recycling their waste and manure, and enables them to stay self-sufficient.

“We have now managed to install biogas systems in farms across the UK, expanding the sustainability and economic benefits of such systems to other smallholders, as well as having increased UCL engagement and outreach,” said Dr Adler. “New student projects are already being set up which will have excellent test sites for their research, in 'real-life' conditions.”

The HEIF-funded project also helped lead to the securing of an Innovate UK award for a consortium of five partners, including UCL (Dr Adler is project lead). The total amount of the project is £280,000, with UCL claiming around £85,000. The project involves work in Ethiopia, with a local academic partner.

The now-trademarked BioNomad biodigester is being commercialised with an award from the SHAKE Programme. SHAKE is a fund available to entrepreneurs who are combating climate change in agriculture and food production.

The project supports the transition to Net Zero within the Build Back Better plan for growth by supporting increased agricultural sustainability through access to finance to unleash innovation.

## University of Bristol: Priorities for suicide prevention – balancing the risks and opportunities of internet use

PolicyBristol work with academics to increase policy impact from research, providing expert advice and brokering relationships. HEIF funding supports associates in the team with extensive expertise and experience of policy engagement across different areas.

Since 2016, PolicyBristol have worked with academic colleagues to inform internet safety measures and improve online help. Minimising internet risks while harnessing its positive potential is one of the most significant suicide prevention challenges. Children and young people’s mental health is a major priority for the Departments of Health and Education, with mental health research also a UKRI priority. In 2012, Dr Lucy Biddle started the first ever research project on internet use by people with suicidal feelings, and its impact on their behaviour. In 2014, Bristol researchers found an increase in online information and accessibility about suicide methods, indicating more action on online safety, and help resources, were needed.

Activity	PolicyBristol involvement
Written submission to Health Select Committee inquiry into suicide prevention, 2016.	Co-wrote parliamentary submission and policy briefing to present research findings and policy implications in a clear, compelling way to non-experts.
Policy briefing based on published research, " <a href="#">Priorities for suicide prevention: balancing the risks and opportunities of internet use</a> ", 2016.	
Briefing launch at Twitter HQ, with Samaritans and Papyrus suicide prevention charities; press releases and media, 2016.	Communications and stakeholder strategy for policy briefing, launch event and response to parliamentary report; identifying key contacts, top lines, and social media/press messaging.
ESRC Impact Accelerator project awarded - Dr Biddle/Samaritans (2017-2018)	Horizon scanning of suicide prevention policy updates/changes in key personnel; identified and facilitated engagement opportunities.
Response to Health Select Committee media recommendations issued, 2017.	Co-wrote response and led communications strategy, identifying policy implications, and raising profile with policy stakeholders.
Roundtable event and leaflet for clinicians, "Creating an internet safer for individuals feeling suicidal: exploring a role for clinicians" 2018.	Co-wrote clinician leaflet to present research clearly to non-experts.
Written and oral evidence to All Party Parliamentary Group on Social Media inquiry into impact on young people’s mental health, 2018.	Preparing Dr Biddle to give oral evidence at the parliamentary inquiry; mock interview and feedback, questioning and MP interest analysis.

This work fed directly into government recommendations on moderating harmful online content and supporting users. The Health Select Committee Report on Suicide Prevention (2017) highlighted the University’s research, and the 2018 All-Party Parliamentary Group on Social Media and Young People’s Mental Health and Wellbeing inquiry report, acknowledging Biddle’s contribution, recommended a statutory code of conduct for social media providers to protect mental health of users. The UK Government White Paper on Online Harms (2019) proposed a new online safety regulatory framework that specifically addressed suicide. Bristol’s research on suicidal individuals’ preferences for live and immediate online help informed Samaritans’ digital strategy, and the establishment of an ‘online chat’ service now running three evenings a week. This policy impact builds on HEIF investment across the research value chain, from contracts with external service providers, and co-developed research with the public, to expert advice on impact funding.



## University of Bristol: Working across sectors to achieve research impact through commercialisation

Commercialisation of research outputs has societal and economic benefit, and the University's Commercialisation Team works across all sectors to achieve the best possible impact from research. HEIF funding supports commercialisation staff, the patent budget and an internal "Commercialisation Development Fund" to drive projects forward.

Two different examples show the variation in project type, the breadth of impact of commercialisation, and how agile teams collaborate to deliver impact: the first is a social enterprise spun out of Bristol Medical School with no patented intellectual property and no financial return to the University, and the second is a for-profit company based on patents from Computer Science in which the University has shares which may generate a return.

IRISi was established to promote and improve the healthcare response to gender-based violence (GBV) through evidence-based interventions. The lead product, IRIS (Identification & Referral to Improve Safety), is a specialist training, support and referral programme for practice teams that has been positively evaluated in a randomised controlled trial. Using IRIS, GPs can identify signs of GBV, and link to local specialist providers for referral.

A HEIF-funded Commercialisation Manager was instrumental in the company creation, working closely with academics and the company CEO to transition the service into a successful social enterprise, through accessing internal and external funding alongside other RED teams, and supporting colleagues through business and financial planning, IP and legal agreements.

The company has been transformational for the delivery of the IRIS intervention: it employs 12 staff and has recently received a £1M investment from London's Violence Reduction Unit to enable expansion, with potential to support more than two million Londoners. Work to adapt this model within sexual health clinics has been supported across multiple teams including Programme Management and Impact Development. IRISi's establishment has saved and improved many lives, demonstrating that research commercialisation can deliver real societal impact.

Ultraleap is a for-profit company created to commercialise mid-air haptic feedback technology. Ultraleap licensed intellectual property from the University including three patent applications, algorithms, methods for integrating the haptic feedback mechanism into products, and software developed to control and simulate an array of ultrasound transducers.

A HEIF-funded Commercialisation Manager worked closely with the academic team to protect the technology through patent applications and access internal proof-of-concept HEIF funding to develop prototypes and determine the commercialisation pathway.

Ultraleap employs 170 people, has raised £65 million investment, and acquired a US company to expand their technology portfolio. Sales of over 1,000 development kits have led to the incorporation of haptic technology into products in the home, automotive, industrial and digital fields. Commercially available products include a vehicle, digital signage and VR gaming technology. The establishment of Ultraleap demonstrates the potential for economic benefit and job creation through research commercialisation.

These examples demonstrate the effectiveness of RED's support across the pathway from research to impact. They exemplify the importance of HEIF funding in enabling the university to meet government priorities in capturing economic and social benefit from research, whether these benefits are for good or for profit.

## University of Cambridge: Cambridge Enterprise

Funding from the Higher Education Innovation Fund has been a vital component of support for [Cambridge Enterprise](#), the commercialisation arm of the University of Cambridge. Cambridge Enterprise was founded in 2006, prompted in part by the success of Solexa. Cambridge Enterprise's support for the spin-out company, which was ultimately acquired by US-based Illumina, was pivotal. Today some 40 percent of the genome sequencing done worldwide happens on machines using technology conceived and perfected in Cambridge.

Cracking the rapid whole genome sequencing problem and helping Solexa mature into a successful business did much to make Cambridge a global leader in genomics. That strength and the depth of expertise in the region proved to be invaluable when the pandemic struck.

The COVID-19 Genomics UK (COG-UK) consortium was created in April 2020 to deliver large scale and rapid whole genome virus sequencing and analysis to NHS centres and to the UK government. COG-UK has led the way in tracking the virus and spotting variants, a critical element of ending the pandemic globally. Forty percent of all the virus genetic sequencing globally has been done by COG-UK.

The success of companies spun out of the University with the aid of Cambridge Enterprise has strengthened the economy, locally and regionally. For instance, the success of spin-out company VocallQ, which was acquired by Apple, led the computer giant to open offices in Cambridge. Amazon, Astra Zeneca, Illumina, and others have similarly established offices here to access Cambridge expertise.

Cambridge Enterprise's Consultancy Services provision helps University academics share their advanced knowledge externally. Last year, for instance, Cambridge Enterprise supported Dr Sander van der Linden, Director of the Cambridge Social Decision-Making Lab, work with the UK Cabinet Office as part of government efforts against fake news during the pandemic. He came up with a novel approach: an online game, called Go Viral!, that puts players in the shoes of the purveyor of fake pandemic news. The game builds on research from Cambridge psychologists which found that giving people a taste of the techniques used to spread fake news on social media increased their ability to identify and disregard misinformation in the future. The latest findings show that a single session of playing a similar game that the research team developed pre-COVID-19, called Bad News, can reduce susceptibility to false information for at least three months.

Cambridge Enterprise, along with others in the University, identified a pressing need for patient capital to help spin-outs to scale up in order to compete with large incumbents. In 2013 Cambridge Enterprise established Cambridge Innovation Capital (CIC), which currently manages over £300 million and has invested in over 30 disruptive, deep tech companies in sectors including artificial intelligence, internet of things, quantum technologies, autonomous systems, therapeutics, medtech/diagnostics, digital health, and genomics/proteomics.

Over its 15-year history Cambridge Enterprise has been approached by universities and government entities from around the world to advise on creation of technology clusters. Based on this demand and on shared experiences among other university tech transfer offices, Cambridge Enterprise created TenU, a collaborative group composed of the technology transfer offices of the University of Cambridge, Columbia University, University of Edinburgh, Imperial College London, KU Leuven, University of Manchester, MIT, University of Oxford, Stanford University, and UCL) of that meets regularly to share effective practices in research commercialisation and runs a series of events to discuss topical issues and share best practice. This has now evolved to be funded separately under the TenU-RE project.

## University of Cambridge: Centre for Science and Policy

The [Centre for Science and Policy \(CSaP\)](#) at the University of Cambridge has been supported by HEIF alongside donations and increasing fee income, since its establishment in 2008. HEIF funding has provided critical support for the Knowledge Exchange posts within the Centre and has enabled delivery of its programme.

CSaP's mission is to improve public policy through the more effective use of evidence and expertise. CSaP has created a unique knowledge brokerage and networking programme linking policy makers and researchers, the Policy Fellowships Programme, as well as a range of other knowledge exchange activities.

The Policy Fellowships programme starts with foundational questions from policy professionals and connects these questions with researchers able to address them, setting up around 1,000 1:1 meetings each year and fostering networks between policy and research, based on growing mutual understanding, respect and trust. Evidence-based insights from research are drawn upon from across the range of expertise in humanities, social sciences, technology and sciences.

Number of Policy Fellows since inception	445
Number of new Fellows per year	~36
Number of meetings	>10000
Researchers/experts involved	>1700
Conferences and seminars	280
Newsletter subscribers	>6000
Twitter followers	7000
Podcast listens since March 2020	>20000

### Societal benefit

The Centre's Policy Fellows are drawn from a wide range of civil service departments and other organisations, hence the societal challenges impacted are incredibly diverse.

As a result of participation, they report improved insights and networks, with 85% recommending the programme to others, 79% reporting an improved network of contacts, 60% increasing their understanding of academia and 20% reporting direct impact on the policy making process within 6 months of completing their Fellowship.

A couple of examples of societal benefit are:

- **Climate change**

Since its beginning, the Centre has connected policy makers tackling the climate crisis with researchers. CSaP co-runs the Cambridge Zero Policy Forum with the Cambridge Zero network, bringing together ideas from 80 academics across the University, presenting recommendations for policymakers and industry in an ambitious report in 2020 titled A Blueprint for a Green Future, which has been well-received by policy officials.<sup>1</sup>

The Centre has also liaised with Cambridge City Council to provide expertise to support their 2021-2026 net zero strategy, and researching/comparing net zero strategies at city councils throughout the UK & Europe. Research has extended into future regional climate risk to 2099 for the Cambridgeshire & Peterborough Independent Climate Commission including providing

<sup>1</sup> <https://www.zero.cam.ac.uk/green-recovery-report>

spatial commentary on risks including future flooding, overheating, impacts on quality of agricultural land, and threats & opportunities to biodiversity across the county.<sup>2</sup>

- **National Security and Technology**

Alex Churchill began his Policy Fellowship in 2012 while he was Deputy Head of Science and Technology Strategy at the Ministry of Defence. He began with “a clear focus on how to take forward a recent White Paper on *National Security through Technology*.” Over the course of initial meetings it became apparent that his approach needed modification.<sup>3</sup> As a result, Alex co-produced “The Defence and Security Technology Competency Report: collaboration and leverage towards the UK 2035 landscape” with the Institute for Manufacturing and RAND<sup>4</sup>.

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<sup>2</sup> <https://cambridgeshirepeterborough-ca.gov.uk-6985942.hs-sites.com/cpicc-initial-report>

<sup>3</sup> <http://www.csap.cam.ac.uk/network/alex-churchill-case-study/>

<sup>4</sup>

<https://www.ifm.eng.cam.ac.uk/insights/national-innovation-policies/the-defence-and-security-technology-competency-report/>

## University of Leeds: LUNAC Therapeutics Ltd – next generation anticoagulant therapy

Globally, a large number of people benefit from anticoagulant treatment to prevent blood clots. These treatments are given to people at a high risk of thrombosis, reducing their chances of developing serious conditions like strokes and heart attacks. There is a need for new and improved anticoagulant treatments that reduce adverse outcome risks (i.e. bleeding risk) and lack of efficacy events (e.g. life-threatening thrombosis) associated with current anticoagulants.

LUNAC Therapeutics Ltd is a UK-based drug discovery company spun out from the University of Leeds developing next generation oral anticoagulants that possess a significantly reduced risk of causing bleeding compared to current treatments.

Blood clots are made up from many different types of protein in the blood becoming 'activated' and sticking together to prevent bleeding. LUNAC is founded on IP around Factor XII, a clotting factor protein. Building on a decade of academic research and development, Professor Helen Philippou and Dr Richard Foster have generated a series of novel therapeutic compounds that target Factor XII.

HEIF has been critical in the translational development from basic research to an investor-backed spinout company. HEIF supported key members of the Commercialisation Team who worked alongside the academic founders, and latterly the investors. Over the 7-year period HEIF funding has enabled fundamental research to be developed into an investable proposition; enabled key market data to be generated; contributed to the costs associated with a robust IP strategy and early patent filings; and has provided proof of concept funds to generate the evidence to successfully attract research and translational funds (~£7m pre-spinout).

The University has worked closely with lead investor Epidarex Capital to build the opportunity and secure investment. LUNAC has established a high-profile Board and Management team, the supporting Scientific and Medical advisors, and has raised £9.75m Series A since 2019, alongside securing an Innovate UK award of ~£2.3m, to advance pre-clinical and manufacturing development programmes and prepare for clinical studies.

LUNAC has been rated 55th in J.P. Morgan's Top 200 Female Powered business (out of over 6,000 high-growth companies). LUNAC's outstanding progress and potential has been recognised by the Industry with the Company awarded 'Bionow Start Up of the Year' in 2020 and shortlisted as a finalist for 'Best Biotech Start Up' Award 2020 at the upcoming OBN awards.

The therapeutic potential of the underpinning research was recognised at an early stage and, as a direct result of the University's strategic HEIF investments and support over time, LUNAC has been able to progress into an award-winning start-up. Over the coming years, it is anticipated that LUNAC's products will deliver improved health outcomes and generate economic returns for the UK. LUNAC is a clear demonstration of the University's contribution to the UK's aspiration to 'become world-class at securing the economic and social benefits from research', and aligns with the Government's aim to support 'development of the creative ideas and technologies that will shape the UK's future high-growth, sustainable and secure economy', as stated in Build Back Better.

## University of Leeds: Business Engagement – novel anti-counterfeiting inks

Business engagement is a core strand of the University of Leeds Knowledge Exchange activities. Eluceda is an SME specialising in DNA-based detection of pathogens and anti-counterfeiting inks for labels using phosphors; fluorescent substances that emit light when exposed to radiant energy. Developed by the University of Leeds, Upconversion nanoparticles (UCNPs) have been identified as offering a better solution than the technology currently employed by Eluceda. This is due to their unique ability to produce visible light under infrared laser/LED excitation and compatibility with inkjet printing. As such, UCNPs presented a compelling commercial opportunity.

The University leveraged both HEIF and EPSRC Impact Acceleration Account (IAA) funding to pump-prime this project, supporting project management, technical development and consumables to demonstrate the potential of the UCNP technology. By combining HEIF with EPSRC IAA, we were able to support the project from synthesis of novel UCNPs, through lab-scale manufacturing, and ultimately to evaluation by the commercial partner. Our ability to support development through all stages was a key factor in Eluceda committing a significant in-kind contribution to the project. The 12-month project successfully demonstrated a scalable process for synthesising UCNPs and producing inks suitable for ink-jet printing of barcodes. As a further step, the UCNPs were functionalised to detect DNA of specific pathogens. In partnership with Eluceda, the Leeds team has produced a commercial exploitation plan and, to undertake the work, secured a further £1.3m of R&D funding. The collaboration has been broadened to include Avacta Group plc, an AIM listed spinout company from the University. Over a 12 to 18-month period, the team is working to commercialise the system for a range of anti-counterfeiting applications.

Initial deployment will be in brand protection, targeting markets such as beverages, pharmaceuticals, water treatment, food, and healthcare. During the project the team participated in the University's 'Be Curious' public engagement event – which aims to increase public engagement through the demonstration of cutting-edge University research – with an interactive display on 'Visible colour generation in nanomaterials using invisible laser for medical imaging'.

The University's work with Eluceda is well-aligned with the Innovation pillar of Build Back Better, the Government's plan for growth, supporting the development of the creative ideas and technologies that will shape the UK's future high-growth, sustainable and secure economy. The introduction to the market of advanced technologies for anti-counterfeiting will benefit business in the food & drink and pharmaceuticals sectors that are vital to the growth of the UK economy. Furthermore, these technologies will help to reduce the availability of counterfeit food, beverage and medical products in the marketplace, which in turn will lead to societal benefits. Build Back Better sets out the Government's ambition to help businesses to translate new ideas into new products and services. The University's collaboration with Eluceda directly supports this ambition, enabling an SME with high-growth potential to access world-class facilities and academic expertise to develop new products and open access to new markets.

## University of Manchester: KTP with British Salt/Tata Chemicals

HEIF supports our Knowledge Exchange team who manage KTP projects and the EPSRC IAA funding. The team works with a range of SMEs and large companies, based regionally and nationally. Within the portfolio are projects based in all of our Faculties, supported by an excellent service that has resulted in our maintaining our ranking as number 2 in the UK for number of KTP awards. The portfolio includes award winning projects, an example of which is given below.

In 2018, we commenced a KTP with Tata Chemicals/British Salt with the Associate Elle Perschke, a former student at the University of Manchester. In 2019, British Salt (a subsidiary of Tata Chemicals) called on academics at Alliance MBS to help launch a salt product, fortified with iodine in the UK, an important nutrient for health and wellbeing. The academics then contacted the KE team, who liaised with the company and managed the KTP application and submission process.

Elle led the KTP from the industry side and worked closely with the AMBS academics. The KTP completed in April 2020 and has successfully laid the groundwork for British Salt's ambitions to transition into the B2C market in the UK. The academic team carried out market research including focus groups, to understand consumer attitudes and identify the opportunities and challenges associated with bringing the product to market.

### Impact

The KTP contributed to the skills agenda and achieved economic impact by allowing British Salt to operate in new UK markets, and societal impact through the health benefits of iodine in the salt. The project is also supporting government priorities of addressing big challenges in society and exploiting competitive advantage where the UK can lead the world in key industries, technologies and ideas.

### Award-winning activity

The KTP was shortlisted at the Annual KTP Awards 2020 and eventually won in that category

- [KTP Best of the Best Awards 2020 Winners](#)
- [KTP shortlisted at national awards | Alliance MBS](#)

Elle also went on to share her experience at a KTN event - [Women in KTP on International Women's Day - Knowledge Transfer Partnerships \(ktp-uk.org\)](#).

More recently the KTP won the Business Collaboration and Partnerships Award at the recent Educate North Awards.

Following the project, Elle was offered full-time employment with Tata Chemicals Europe. She recently provided an update on the product launch, "although there were promising commercial meetings with retailers, due to Covid supermarkets in the UK postponed new product launches until autumn 2021. As an alternative, Tata Chemicals Europe launched the product on Amazon Marketplace, where it has repeatedly sold out and received five star reviews. The company will be looking forward to restarting commercial meeting with the retailers once it is safe to do so. The product was sold to customers in Taiwan, with interest in UAE and South Korea as well."

## University of Manchester: Specscart – a graduate start-up company

Specscart is a company set up by University of Manchester graduate, Sid Sethi in 2017. The company has been supported from inception by the HEIF-funded Masood Entrepreneurship Centre.

MEC develops entrepreneurial skills in students, staff and graduates across The University of Manchester through a comprehensive package of support. One of the services is the Start Up Visa scheme for graduates who want to stay in the UK to set up a business. You can read more about the service [here](#). MEC has allocated over 25 visas to international entrepreneurs including Sid, to allow them to remain in the UK and build businesses that will benefit the UK economy.

Specscart's journey started with winning £10,000 in the Business of the Year category at the Venture Further awards. HEIF was used via the MEC to support the Venture Further awards, to partially fund a KE staff post and to run events that supported Specscart.

Sid invested the £10,000 cash prize back into the business, which at the time of winning the award was trialling a 24 hour delivery service for prescription glasses. Specscart sold 800 pairs of glasses and achieved a £200,000 turnover in its first year.

Specscart now has two branches in Manchester and has featured in the [local business press](#).

### Award-winning activity

Sid is no stranger to winning awards, having been one of two winners of the Albert Gubay Enterprise Award last year. Sid's commercial acumen and creative ambition were praised and rewarded with free retail space for a year on Walkden Town Centre's new-look Edgerton Walk – part of the old town centre building that has been refurbished to appeal to independent retailers. Specscart also received a complimentary shop refit and marketing and business support.

Julian Dowe, Centre Manager for Walkden Town Centre said: "We are very proud of all that Siddharth has achieved, particularly in such a small amount of time, and are delighted that Walkden Town Centre is an integral part of his success story.

"Siddharth first came to our attention when he entered the Albert Gubay Enterprise Award and we were quick to recognise his ambition, creativity and commitment. We felt he was the perfect recipient of the first prize in honour of our late founder and we're thrilled it has Siddharth a platform on which to keep growing his business."

### Impact

HEIF supporting MEC is providing economic and graduate benefits by helping to establish a new company that is contributing to the Manchester economy and retaining international talent in the UK. Helping Specscart via the comprehensive service at MEC is contributing to government priorities of innovation and skills by attracting the brightest and best people, boosting growth and driving the international competitiveness of the UK's high-growth, innovative businesses. Finally Specscart choosing to establish in Greater Manchester is supporting the role of place in supporting innovation and increasing productivity.



## Newcastle University: Accelerating the growth of our regional economy

The North East of England has an ambition to create more and better jobs. Newcastle University is supporting this through our company creation and business support initiatives ... and they're delivering significant and sustained social and economic impact in our region.

The challenge of company creation is twofold. First, spotting instances where the business opportunity warrants the intensive effort to create a company. Second, having the expertise to nurture the company and provide the best possible chances of becoming established and growing. To meet this challenge, we have formed 'Northern Accelerator' along with the universities of Durham, Northumbria and Sunderland.

Enabled by the Connecting Capabilities Fund and the European Regional Development Fund programme, Northern Accelerator has delivered a step change in Newcastle University spin-out activity: from an average of one per year in the three years to 2016 to an average of 4 per year in the five years to 2021. In the Covid lockdown period, we created eight new spin outs and raised £12m of venture capital funding. We currently have 31 active spin out companies employing over 200 people. In parallel, our Careers Service 'START UP' programme provides support and guidance to student entrepreneurs looking to form their own company.

Most recent (July 2020) figures show START UP supporting 191 actively trading student and graduate start-ups and social enterprises, with a combined turnover of £99m, employing 672 FTE staff and attracting £35m in total external investment.

We have developed several schemes to support innovation by local business. Since 2018, our 'Arrow' programme has supported businesses to develop new and improved products, services and processes, by providing access to our University's expertise and assets. As a result of working with the Arrow scheme, businesses expect to create 62 new FTE jobs in the next 12-36 months.

Our Business School delivers 'Captured', which works on the principle that the best advice for businesses comes from experienced people. It is delivered free of charge and enables owners of small and micro enterprises to develop their management and leadership skills by working with experienced managers from the region's larger private sector organisations.

We also offer longer, deeper innovation support to North East SMEs through the Intensive Industrial Innovation Programme scheme, working in partnership with three of our region's universities, Durham, Northumbria, and Teesside. The IIP offers part-funded industrial PhD placements to support local firms' R&D needs.

The latest addition to our innovation support amplifies the work of the central government-backed National Innovation Centre for Data (NICD). NICD was created to help organisations to develop in house capability that will unlock the economic and innovation potential held in data. A £1.63M investment from the North of Tyne Combined Authority will enable more than 200 companies in Newcastle, North Tyneside and Northumberland to grow over the next three years by gaining insight from their data.

Our work to support innovation in the region complements many regional and national initiatives and enhances the Government's 'levelling up' agenda.

## Newcastle University: Collaborative Newcastle Universities' Agreement

[Collaborative Newcastle](#) is an innovative partnership which aims to improve the health, wealth and wellbeing of everyone in Newcastle through new ways of joint working between the City's anchor organisations, which is being supported through HEIF.

The Collaborative Newcastle Universities' Agreement is our Civic University Agreement and sets out the contribution that Newcastle and Northumbria Universities will make. We are using our collective strengths in research and education to make a positive impact for the place and the communities we serve.

The agreement is shaped by our understanding of local need. We have undertaken an analysis of our city using the [United Nations Sustainable Development Goals](#) (UNSDGs), with a view to developing a set of local indicators against which we can measure progress. We are also developing a Policy and Evidence Hub which will bring our collective expertise and co-create knowledge to position Newcastle and the region as the UK exemplar for evidence-based policy making. Priority projects include:

### Prosperity – Supporting jobs, growth and reducing poverty

1. Maximising the **impact of research and innovation** on the future NE economy to support sustainable economic growth linked to our areas of strengths, including data, energy, health and culture.
2. Supporting a culture of **enterprise and entrepreneurialism** amongst our students, graduates and academics.
3. Supporting the **revitalisation of the city** as a place to live, work, study, do business and invest,

### People – Fostering inclusion and social justice

1. **Growing the rate of participation in higher education and the lifelong development of high-level skills, by improving access for people of all backgrounds.** Opening an Into University Centre in September 2021 to improve access to higher education for children from under-represented groups in Newcastle.
2. **Students as Partners** programme to enable students to have a positive experience whilst living, studying and working in the city and wider region, and for the city and region to benefit from the skills, knowledge, experience and diversity that students bring.
3. Developing **future leaders** through Newcastle 150, addressing the question: "How do we make Newcastle a greener city by 2032"
4. **Engaging citizens** through Centre for Digital Citizens – a collaborative project addressing the challenges of digital citizenship.

### One Planet – Engaging in climate action

1. Reducing our own organisations' collective greenhouse gas emissions to achieve **Net Zero by 2030**, jointly improving the sustainability of our operations and supporting the delivery of the Newcastle Net Zero Action Plan
2. Supporting Newcastle and the North East to be a leading location for a **green economy**, including Green Growth Summit in 2021 in partnership with NTCA
3. Supporting and engaging with the forthcoming **COP26**, and the North East England Climate Change Coalition
4. Learning from experiences on Helix and optimising data collection and analysis through the Urban Observatory and National Innovation Centre for Data and using our world-leading **electrification research** to accelerate the move towards Net Zero in multiple industrial sectors via our NE [Driving the Electric Revolution \(DER\)](#) Innovation Centre.