
UNIVERSITY OF
CAMBRIDGE
enterprise
Annual Review
2022

Contents

Cambridge is the UK's most successful entrepreneurial ecosystem and one of the world's leading innovation clusters. Cambridge Enterprise is an important engine in delivering economic impact for the University of Cambridge, with knowledge transfer and commercialisation activities forming a significant proportion of the University's contribution to the UK economy.

Dr Diarmuid O'Brien
Chief Executive, Cambridge Enterprise

Foreword

This past fiscal year encompassed the 15th anniversary of Cambridge Enterprise. It has been a privilege to lead the organisation beyond this milestone and to work with its staff and the University to map out its future.

Cambridge Enterprise has had a very successful year, with 304 patent applications filed, 144 licences executed, a record 441 consultancy contracts signed, and a seed fund portfolio valuation at an all-time high of £124 million. I am pleased to report that at the close of the fiscal year we returned over £20 million to the University and its departments, against the £2.7 million we received in core funding at the year's start.

In this same financial year, the University of Cambridge contributed almost £30 billion to the UK economy, of which over 77% was from commercialisation and knowledge transfer activities. The report by London Economics demonstrates the enormous value and potential of the University's research commercialisation activities to the local, regional and national economy, alongside the benefits to global society from the translation of this research.

Among the highlights was the news that portfolio company Gyroscope Therapeutics was acquired by Novartis Pharmaceuticals, for up to $1.5 billion. It is an excellent outcome for intellectual property that Cambridge Enterprise had supported since 2009. In July, our portfolio company Nyobolt took a huge step in its mission to lead the future of sustainable energy storage with a £50 million Series B funding round which has enabled the company to move into its next phase of scaling up manufacturing.

Cambridge Enterprise has much to be proud of. We play a pivotal role in activating the University at the centre of a globally competitive innovation ecosystem. Within a seven mile radius of the University there are over 5,000 knowledge intensive businesses generating a combined turnover in excess of £50 billion.

While it is an enviable position, it is not one that we take for granted. We work in close co-ordination with the rest of the ecosystem, including businesses, government representatives, investors and University leadership to be ambitious for the future.

Over the past year Cambridge Enterprise, in partnership with Cambridge Innovation Capital and the University of Cambridge, established Innovate Cambridge. This is an initiative to develop an inclusive, forward looking and ambitious vision for the future of Cambridge and its innovation ecosystem.

Through all our consultation on this initiative, the theme that I have heard time and again is that Cambridge holds many of the keys to achieving economic growth for the region and for the country—but also for unlocking solutions to global challenges from climate change to health innovation and the digital transition.

Over one hundred organisations have signed the Innovate Cambridge Charter, in which they pledged to come together to support, promote and enhance the Cambridge ecosystem, and to develop a set of ecosystem-wide initiatives to enable the delivery of the Innovate Cambridge vision.

Universities are optimistic places. We are continuously researching and finding solutions to the most significant global challenges. Cambridge Enterprise is deeply committed to its role of translating these solutions to achieve benefit for the economy and the world.

Dr Diarmuid O'Brien
Chief Executive, Cambridge Enterprise

From the Chair

What could be truly new at an 800-year-old university? More than you could ever imagine. Cambridge labs and lecture halls are full of the brightest minds, pushing out the borders of human knowledge and enabling extraordinary innovations.

Oddly enough, one of my favourite thinkers on innovation is one who died 500 years ago: Niccolò Machiavelli. He warned that the innovator "has enemies in all those who are doing well under the old order…and only lukewarm defenders in all those who would do well under the new order".

Fear of change is nothing new, but we must resist it. The world urgently needs the technologies being developed in universities. The coming decade will be more disruptive than the last. A new wave of disruption in artificial intelligence (AI) will increasingly bring together the physical and digital worlds. Novel technologies will allow us to collaborate with intelligent digital entities and help us all tackle the sustainability challenge.

A Cambrian explosion of new algorithms and architectures is opening up the possibility to deploy machine intelligence to execute existing problems with unprecedented speed and tackle previously intractable problems.

Emerging technologies are unlocking the ability to work with materials at nanoscales, combined with new manufacturing techniques that allow for mimicry of biological and evolutionary processes that dovetail into new machine intelligence capabilities.

Cambridge Enterprise is tasked with guiding the best deep tech innovations out of the University's labs and helping them toward market. Our people understand the science, the commercial opportunities, the hidden risks, and the tremendous potential of innovation.

Time and time again, Cambridge Enterprise has advanced the earliest stage technologies and therapeutics through proof of concept, IP protection, licensing, partnerships, de-risking and spinning out companies. The path can be a long one; we are proud to be working side by side with extraordinary academics along its length.

Ajay Chowdhury

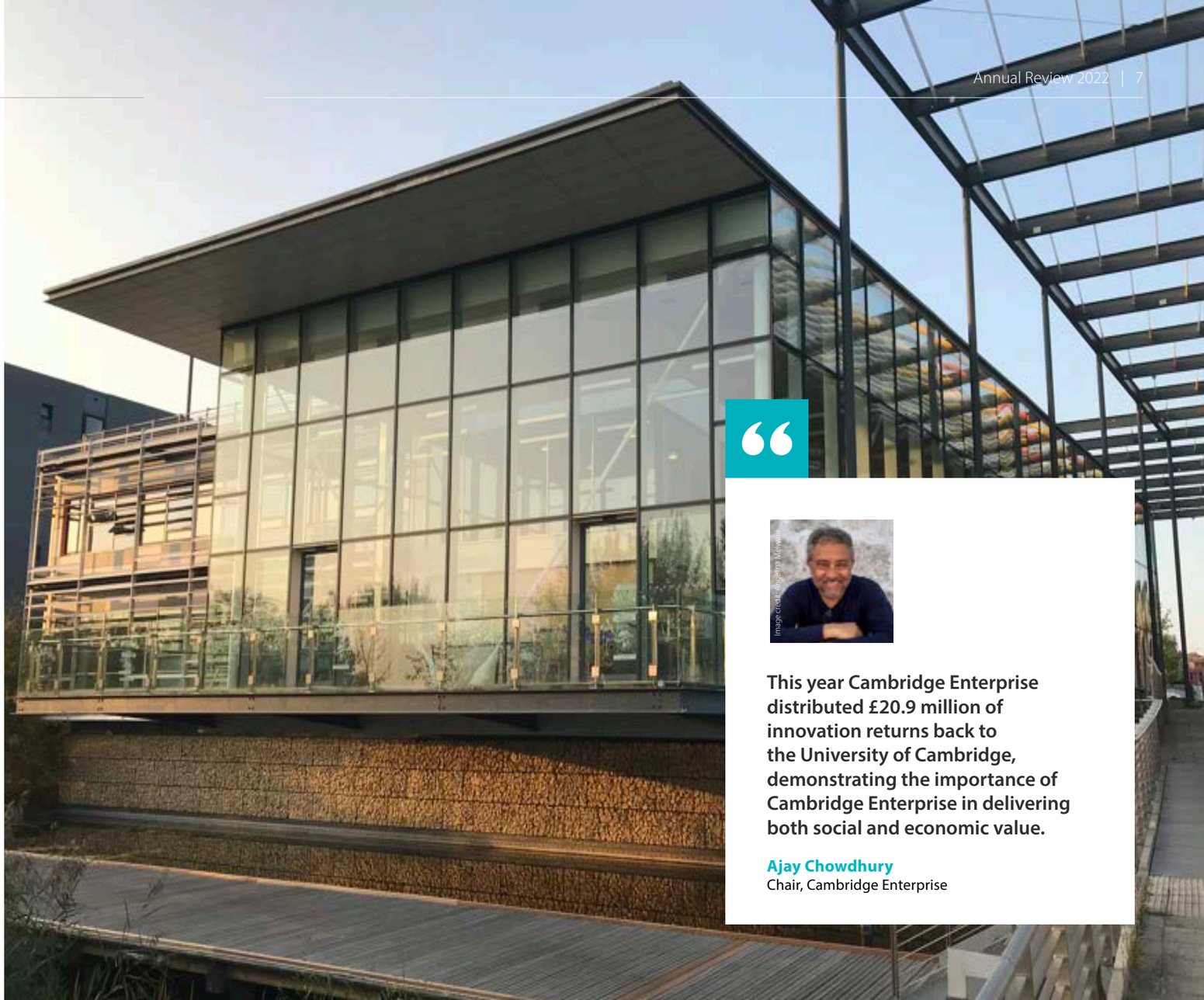


Image credit: Andrew Matthews

This year Cambridge Enterprise distributed £20.9 million of innovation returns back to the University of Cambridge, demonstrating the importance of Cambridge Enterprise in delivering both social and economic value.

Ajay Chowdhury
Chair, Cambridge Enterprise

In the recent Knowledge Exchange Framework 2 results published by Research England, Cambridge secured top marks for IP commercialisation, research partnerships and work with business. Sitting at the heart of a thriving and dynamic ecosystem, Cambridge Enterprise has been central to this success. It helps turn University research into high-impact new ventures which make a positive change to people's lives, create new jobs and support economic growth locally, nationally and globally.

Professor Andy Neely OBE
Senior Pro-Vice-Chancellor, Enterprise and Business Relations, University of Cambridge

The University of Cambridge has been delivering impact from research for centuries. Cambridge Enterprise continues to build on this commitment and this year has supported 34 new companies transforming the world through sustainable solutions, healthcare, imaging technologies and AI.

Professor Deborah Prentice
Vice-Chancellor, University of Cambridge

Investment in numbers

19
Pre-seed investments

£11.8m
Equity realisation returned to Cambridge Enterprise and University of Cambridge

£10.6m
Invested in 34 spin-outs

10
Seed companies formed

£553.8m
Total amount raised by portfolio companies across all holdings

£37.8m
Invested over our fund lifetime

£3.1bn
In follow-on funding raised by our portfolio companies since 1995

Impact
Notable spin-outs: Gyroscope, Bluegnome, Vocaliq, Solexa and Centessa

4.27x
Multiple across realised investments

289
Total investments made in 158 companies

£124m
Current portfolio value

Technology and knowledge transfer in numbers

304
Patent applications filed

144
Commercial and research licences signed

£1.1m
Invested in patents and proof of concept

£5.6m
In translational funding won with our support

441
Consultancy contracts signed, including extensions

351
Consultancy clients

£13.1m
In operating income generated from licensing and consulting

2,535
Researchers supported

Cambridge spin-out companies delivering climate solutions

In 2021, Cambridge Enterprise launched a Sustainability Initiative as part of the University's leadership on and commitment to Net Zero. As part of this drive, Cambridge Enterprise will invest up to £10 million in 15 new businesses addressing a key subset of the United Nations Sustainable Development Goals. Since 2020, Cambridge Enterprise has invested over £3.5 million into our Sustainability portfolio from our University Venture Fund, and these investments have been matched by the University of Cambridge Enterprise Fund managed by Parkwalk Advisors. In the past year, we made significant investments in Sustainability companies at several different stages of their fundraising journey.

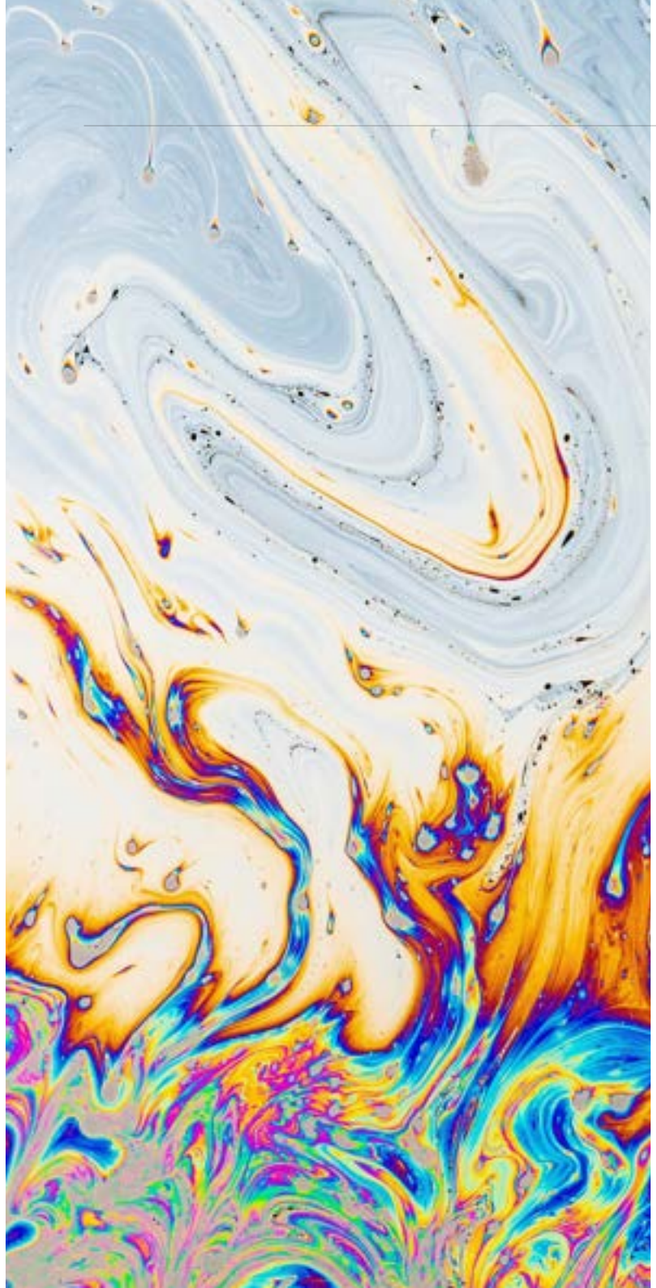
We started the year with our continued support for battery material company, Echion Technologies. Its patented electrode material will enable faster recharging and longer-lasting lithium-ion batteries. In August we co-invested, alongside the BGF and the Brazilian multi-national, CBMM, in Echion's £9.5 million Series A round, having previously invested in its pre-seed and seed rounds.

In October, Cambridge Enterprise joined in a £1 million first investment into Carbon Re, a joint spin-out with UCL (University College London) with co-investors the Clean Growth Fund and the UCL Technology Fund. Carbon Re uses a deep reinforcement learning AI platform to reduce carbon emissions in energy intensive industries like cement, steel and glass. The company has deployed its Delta Zero platform in cement plants on three continents and their pilots have already prevented over 10,000 tonnes of CO_2 equivalents, demonstrating the platform's value to its customers.

Barocal, a spin-out from the laboratories of Professor Xavier Moya in Materials Science and Metallurgy, also raised its first investment round. Barocal has developed a solid material with the potential to replace all the powerful greenhouse gases used in refrigeration and heating. This patented barocaloric material which releases and absorbs heat at different pressures is more efficient, easier to recycle and does not risk the fugitive emissions from the industry that contribute significantly to the current greenhouse effect. In February, Cambridge Enterprise joined in a £1.3 million first investment into the company led by IP Group (now Kiko Ventures).

Cambridge Enterprise also participated with a great investor syndicate into a later stage round for Colorifix, the first company to use a biological process to produce, deposit and fix pigments onto textiles. Colorifix replaces all the industrial chemistry involved in the dyeing process with a natural, biological process. Cambridge Enterprise made earlier investments in Colorifix in 2020 and 2021, and in the summer of 2022 the company successfully raised an £18 million Series B round - including £400,000 from Cambridge Enterprise - to expand its operations in Europe and Asia.

The Cambridge Enterprise team is very proud of the follow-on funding, and the total value of the companies within the Sustainability portfolio has grown to over £500 million. Two notable growth-stage investments include Nyobolt and Cambridge GaN Devices. Between them, these companies raised almost $80 million in later-stage investment rounds, and feature two of our female founders and CEOs, Professor Dame Clare Grey and Dr Giorgia Longobardi. We continue to build, support and follow our Sustainability portfolio with up to £10 million in equity investments, helping to create and fund the new businesses tackling the innovation gap needed to achieve Net Zero 2050.



> **Heating and cooling accounts for 38% of the UK's CO_2 emissions and represents one of the most difficult sectors to decarbonise.**
>
> **Professor Xavier Moya**
> Co-founder, Barocal

Nyobolt

Realising the promise of ultra-fast charging battery technology

Ian Olsson Photography

Professor Dame Clare Grey

In July 2022 portfolio company Nyobolt took a huge step in its mission to lead the future of sustainable energy storage with a £50 million Series B funding round. The round enabled the company to move into its next phase, scaling its operations.

Nyobolt, which spun out of the Yusuf Hamied Department of Chemistry in 2019, was co-founded by Professor Dame Clare Grey and Dr Sai Shivareddy, the company's CEO. From the start, Nyobolt's goal has been high-performance battery and charging technologies to create a world where lengthy charge times no longer exist.

Nyobolt has unlocked the potential of battery performance with a unique technology that is manufacturable and scalable right now, giving batteries both ultra-fast charging time and longer life, opening up the possibility of the electrification of new products and services that are currently impossible to develop.

The July funding round was led by H.C. Starck Tungsten Powders, a subsidiary of Masan High-Tech Materials and one of the world's largest suppliers of tungsten, a key component of Nyobolt's technology. In addition to funding, the deal includes collaboration on the supply of materials, scale up of manufacturing and recycling.

The goal is to provide a sustainable solution supporting the transition to net zero in multiple sectors. Nyobolt benefits from the established recycling capabilities of H.C. Starck, allowing the efficient use of resources to minimise the environmental impact of Nyobolt's batteries. In 2023, Nyobolt will launch its first materials manufacturing plant in the UK and also expand its cell engineering facility in the USA, cell making activities in Asia and the teams growth across the globe.

Nyobolt announced a partnership with design and engineering business CALLUM in May 2023 that sees the companies collaborating on projects that incorporate Nyobolt's patented technology, including an automotive concept for passenger vehicles. Nyobolt's ultra-fast charging battery solutions drastically decrease charge time from hours to minutes, maximising uptime and productivity. The technology will lead the world towards transport decarbonisation through the use of smaller, longer-lasting, fast-charge batteries. Nyobolt's batteries can make recharging a car as convenient as filling it with petrol – which will remove a significant barrier to electric vehicle adoption. Moreover, smaller batteries can produce lightweight, charge-efficient cars that require less electricity to run them, and can also reduce the precious battery materials and carbon footprint required to make them. The technology is also applicable to devices ranging from home appliances to heavy vehicles, improving performance and revolutionising energy storage markets.

Nyobolt's technology builds on a decade of battery research led by University of Cambridge battery scientist Professor Grey, who was appointed as Dame Commander of the Order of the British Empire in The Queen's Platinum Jubilee Honours list for her services to science, marking her extensive contributions to the battery industry and its pivotal role for a more sustainable world.

Image credit: Nyobolt

Image credit: Nyobolt

Ian Olsson Photography

Dr Sai Shivareddy

Watch our Ideas to Reality video to find out more

Gyroscope Therapeutics

Acquisition by Novartis accelerates gene therapy for ocular diseases towards the clinic

In December 2021, portfolio company Gyroscope Therapeutics announced that it had agreed to be acquired by Novartis Pharmaceuticals, a global medicines company, for up to $1.5 billion. It was an excellent outcome for intellectual property that Cambridge Enterprise had supported since 2009, when it was first disclosed to us by Professor Sir Peter Lachmann. This IP was developed, licensed and invested in by Cambridge Enterprise. In September 2019 sister organisation Cambridge Innovation Capital (CIC) joined in the £50.4 million Series B funding for Gyroscope.

Gyroscope, which was co-founded with Syncona Investment Management in 2016, a London-listed company, had the mission to develop therapeutics against a set of eye diseases for which no meaningful treatment options existed. Gyroscope developed the world's first treatment for geographic atrophy, an advanced form of dry age-related macular degeneration that leads to blindness.

Gyroscope grew into a global leader in ocular gene therapies, combining discovery, research, drug development and proprietary surgical and manufacturing platforms. Its team of nearly 200 employees were executing on its Phase II clinical trials for the treatment of geographic atrophy secondary to age-related macular degeneration, having generated positive clinical data in its Phase I/II FOCUS trial.

> **"I'm incredibly proud of the progress the Gyroscope team made in developing what we hope may be the first gene therapy for a leading cause of blindness. Joining forces with Novartis will greatly enhance our ability to deliver on our promise by providing additional expertise and resources to expand our development programme for GT005 and realise the potential of our exciting pipeline.**
>
> **Khurem Farooq**
> CEO, Gyroscope Therapeutics

Novartis, the acquiring company, has a strong gene therapy expertise and is committed to treating and preventing blindness. The next phase of Gyroscope's development will be with Novartis, which is ideally placed to support this Cambridge technology to complete its journey to transform the lives of patients.

> **This latest funding will accelerate our work to ensure that PoroGaN drives the commercialisation of XR glasses and the new wave of user interface innovation. It will help us to continue our expansion plans to meet demand and to continue to provide world-class service and products to our rapidly expanding customer and partner base.**
>
> **Dr Tongtong Zhu**
> CEO, Porotech

image credit: Porotech

Porotech's co-founders: Dr Tongtong Zhu (CEO), Dr Yingjun Liu (CTO) and Professor Rachel Oliver (CSO)

Porotech

Rapid progress towards brighter, sharper and more vivid micro-LED displays for everyone

In November 2018 Porotech's pitch nailed first prize in the yearly Postdoc Business Plan Competition that Cambridge Enterprise runs with Entrepreneurial Postdocs of Cambridge. Co-founded by Dr Tongtong Zhu (CEO), Dr Yingjun Liu (CTO) and Professor Rachel Oliver (CSO), Porotech had hit upon and developed a new class of porous gallium nitride (GaN) semiconductor material with the potential to transform micro-LED displays.

Porotech has not slowed its pace since that win four years ago.

The company formally spun out of the University's Department of Materials Science & Metallurgy in January 2020. In April, Porotech announced a £1.5 million seed investment, led by Cambridge Enterprise. The investment enabled Porotech to develop a pilot plant and produce its first major products. In November 2020, the company launched the world's first commercial native red indium gallium nitride (InGaN) LED epiwafer for micro-LED applications.

In June 2021 Porotech announced its next milestone, a £3 million investment round to fund the delivery of monochrome and full-colour displays on a single InGaN material system. The goal was to achieve the bright, efficient and sharp resolution necessary for high-quality image projection against bright backgrounds.

Porotech reached its technical goal, creating 'smart' pixels that could be controlled independently for superior responsiveness and accuracy for use in augmented reality applications.

In February 2022 it announced a $20 million Series A round.

Porotech's technical breakthroughs literally redefined what was possible. Micro-LED displays will play a vital role in the next generation of televisions, wearables, and smartphones. And GaN-based material technology is widely seen as the only one that can deliver displays that are sufficiently bright and efficient for extended reality displays involving virtual reality, augmented reality and/or mixed reality.

Until now, the requirement to mix multiple material systems has complicated the manufacture of full-colour micro-LED displays, making the final products far too expensive for mass-market applications. Porotech's use of a single material system is a leap forward that opens the door to mass manufacturing of micro-LED displays.

Less than five years after its Postdoc Business Plan Competition win, Porotech has industry leaders among its clients and partners and is poised to transform the global display market as it accelerates mass production of its revolutionary micro-LED products.

DigiVis

A self-administered eye test, in the form of an app, to aid ophthalmic phone consultations

Necessity is often the mother of invention. In this case, necessity took the form of COVID-19 lockdowns. The invention is an ingenious app called DigiVis.

During the lockdowns and when strict social distancing was required, routine eye testing became difficult. Cambridge University Hospitals (CUH) NHS Foundation Trust eye clinics regularly see over 2,000 patients a month. COVID-19 caused half of these consultations to be switched to remote appointments by phone or video, giving doctors few clinical clues to inform their decision-making.

Dr Louise Allen, Consultant Paediatric Ophthalmologist at CUH, devised a solution based on her previous research: a web-based app that enables accurate self-testing of distance vision, which can be carried out remotely by patients.

A fundamental measure of vision needed for all ophthalmic assessment is visual acuity, or 'VA'. Health professionals test a person's VA using vision charts, with the patient physically present for the test. DigiVis enables VA testing to be done remotely using two digital devices connected through the internet.

The patient just needs two smart devices, typically a handheld smartphone and a distant display on a laptop or tablet, connected through the DigiVis website. After a few initial set up steps, the patient starts the test, selecting the letters on their handheld device that match those shown on the distant device. The test uses a staircasing algorithm to decide how and when to scale the letter size down or up as the test progresses, until the VA can be determined.

Cambridge Enterprise has licensed the copyright in the DigiVis app and related know-how to Cambridge Medical Innovation Limited and also enabled it to be licensed for free during the pandemic. Dr Allen has championed its use at CUH, which was recognised by the Discovery and Advances in Healthcare award from the Trust.

Although the COVID-19 crisis has peaked, other problems persist. Limited capacity in eye clinics causes long delays for patients, which means some sight problems remain undiagnosed and untreated, causing preventable vision loss. Community vision screening, particularly in schools, has a high rate of false positives (40%). Other eye problems like macular degeneration and amblyopia (lazy eye) require regular monitoring to prevent permanent visual impairment.

DigiVis has been well received both by patients and staff at CUH. We aim to rapidly scale-up its use across NHS Trusts in response to the current crisis in the delivery of ophthalmic care.

Dr Louise Allen
Cambridge University Hospitals
NHS Foundation Trust

DigiVis gives patients the reassurance of being able to monitor their vision at home, seeking medical support as needed. DigiVis can also be used in schools, for community screening, in GP surgeries, as well as NHS clinics. DigiVis is accurate for children as young as four. In early testing, 96% of children and parents rated the app as good or excellent, and said they preferred DigiVis to regular testing.

Thiscovery

Improving health and care through online research and engagement

The Healthcare Improvement Studies Institute, known as THIS Institute, is based at the University of Cambridge and is funded by the Health Foundation. THIS Institute works closely with NHS patients and staff, and diverse stakeholders including policymakers, regulators, and academics to improve the evidence base for improving quality and safety in healthcare.

THIS Institute is based on the principle that improving quality and safety in healthcare requires the expertise and views of people who use and work in services. The Institute has identified a pressing need for participatory, engaging, accessible and inclusive ways of designing and testing solutions at scale from the start, and with rigour. But setting up such projects from scratch every time can be expensive, burdensome and time-consuming. It can also be hard for those seeking to innovate in services to find the right expertise to learn from, whether that's the lived experience of patients or the professional expertise and experience of staff. And it can be hard for people who would like to contribute to healthcare improvement and innovation to find opportunities and get involved.

One solution to these problems is Thiscovery, an online platform developed by THIS Institute, where people who have questions about health and care can connect with people who can help with the answers. Thiscovery provides the capability to understand problems, gather evidence, build shared visions, co-design solutions, and evaluate them at scale. It provides a mechanism to engage large, diverse crowds of people across geographies, at speed, and with rigour to deliver actionable insights for real world change.

Thiscovery offers questionnaires, interviews, consensus-building and other tools, alongside real time access to project data. For participants, Thiscovery makes contributing their experiences and views to research projects easy and convenient, with short, engaging tasks. Importantly, it promotes inclusion and diversity by enabling consultation and engagement without having to bring people together in one physical location.

By expanding how patients, staff, and other stakeholders can help to improve and innovate in health and care, Thiscovery enables actionable and relevant findings based on real-life experience and expertise, ultimately strengthening the evidence base for implementing positive changes in health and care settings.

Following support from Cambridge Enterprise, Thiscovery has been used in numerous consultancy projects, including the co-design of new approaches for improving the safety of maternity care. It is hoped that, as a result of these activities, all children born in the UK within the next few years will have a safer passage into the world. The potential for making real differences to people's lives is right there in Thiscovery.

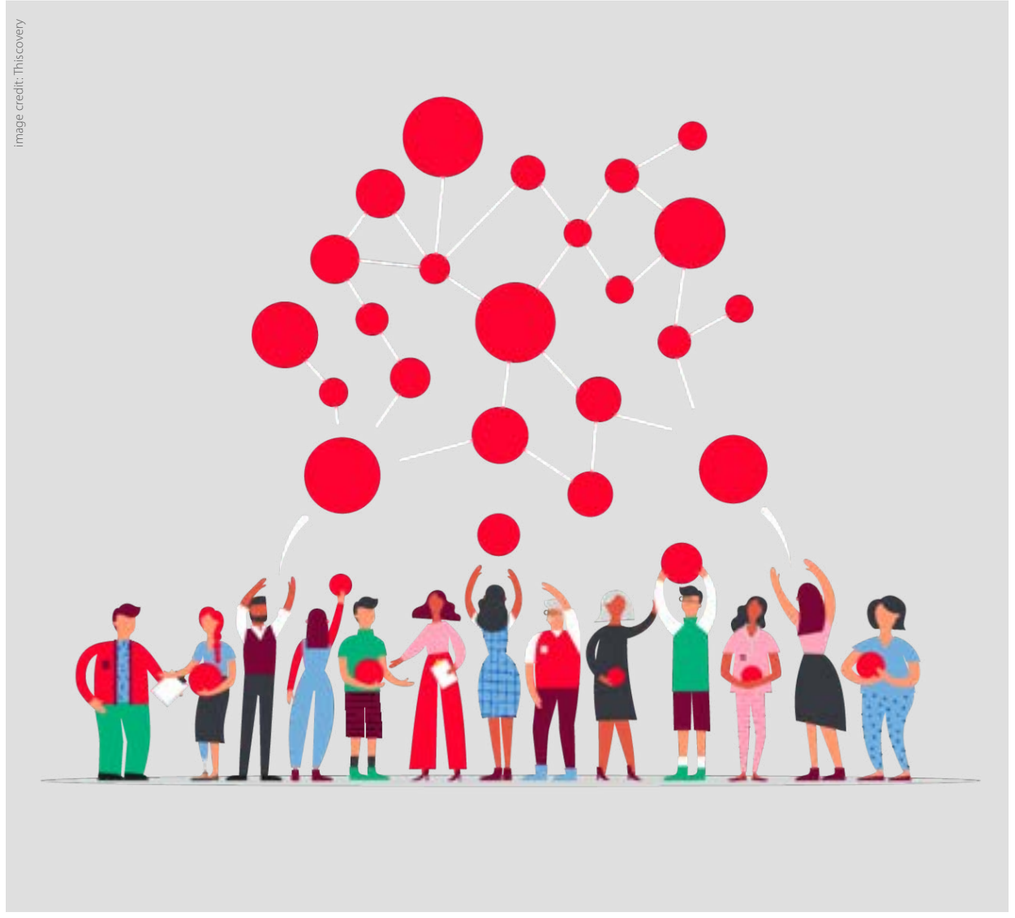


image credit: Thiscovery

What Thiscovery enables is really good solutions. By bringing together people who are working in services and people who are using services, Thiscovery brings together ingenuity, creativity and activates co-design principles. Because of this it's much more likely to arrive at a solution that everybody finds satisfying, that they feel ownership of, and that they feel because they've had a hand in creating it, it fits with what they need and want and is much more likely to solve the problem.

Professor Mary Dixon-Woods
THIS Institute

Watch our Ideas to Reality video to find out more

Habitat for Humanity

Protecting communities against flood risk

In Ethiopia, rapid urbanisation and climate change have led to a significant increase in severe flooding events over the past two decades, especially in dense urban slums where access to critical water and sanitation facilities is limited. Addis Ababa, the capital, is home to a quarter of Ethiopia's urban population and the city is expected to double in size within 15 years. This explosive growth has stretched public services to breaking point. Regular crises such as floods, fires, and earthquakes compound the city's troubles.

Recognising the need to understand risk and to build resilience globally, Habitat for Humanity has been working with the University of Cambridge since March 2022 on the implementation of a project to build community resilience against flood hazards in urban areas of Addis Ababa, Ethiopia. A key pre-requisite to the work has been understanding exactly which parts of the city are most at risk when the waters rise.

Habitat for Humanity has worked with Dr Ronita Bardhan, Associate Professor of Sustainable Built Environment at the University's Department of Architecture. She describes herself as someone who "believes that data-driven intelligence of built environments can effectively address sustainability goals and policies". This belief has driven her to share her expertise outside the University, providing guidance to NGOs and government agencies.

Dr Bardhan turned to Cambridge Enterprise for support for her project with Habitat for Humanity.

Dr Bardhan leads the Sustainable Design Group at the University and is working on building resilience into Addis Ababa's urban fabric. Working for Habitat for Humanity, Dr Bardhan developed a flood risk map showing the hazardous areas of the city to protect communities as part of the 'Urban Resilience Building Assistance Network (URBAN) to help mitigate the risks.

Her work uses data-driven methods that bring architectural engineering, AI and machine learning together with social sciences to provide built-environment solutions for health in resource-constrained societies.

Now that Habitat for Humanity is in possession of a multi-dimensional participatory flood risk hotspot map, it can propose targeted solutions for those areas most at risk. The project has already benefited over 1,500 individuals through improved drainage, and 4,000 households have been trained in hygiene and sanitation measures. The next phase of work will build on these successes and propose targeted solutions to mitigate risks in the areas highlighted by Dr Bardhan.

> **Support from Cambridge Enterprise's Consultancy Services team allowed me to focus my time and attention where it is needed the most.**
>
> **Dr Ronita Bardhan**
> Department of Architecture, University of Cambridge

Clari-Fi

Simulating the challenge of viewing small icons, images and text on mobile screens

To perform advanced research, academics sometimes need to create new tools, including reagents, software and questionnaires. Cambridge Enterprise works in partnership with such academics to extend the reach and impact of their new tools by commercialising them, typically via non-exclusive licence agreements.

In 2019, Cambridge Enterprise commercialised a software tool called Clari-Fi. Clari-Fi applies a level of blurring to images and text, which simulates the challenges of viewing these graphical features on mobile devices. The level of blurring that is applied has been calibrated to population data, such that graphical features that appear 'easy to see' despite the blurring will remain 'easy to see' for most people, and particularly for those with age-related long-sightedness.

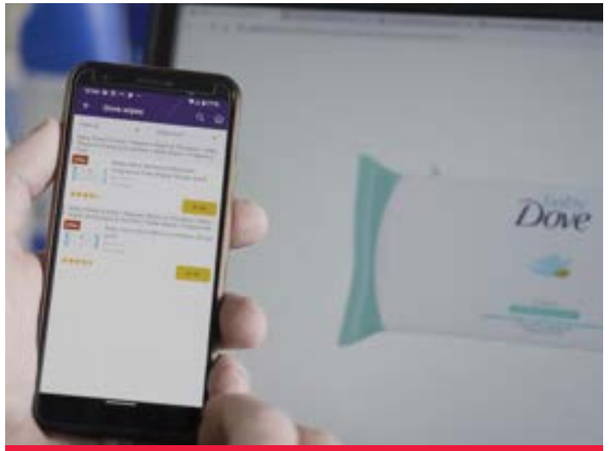
> **I appreciate Cambridge Enterprise's can-do approach to commercialisation. Even when new, bespoke licensing agreements are required, Cambridge Enterprise makes it happen.**
>
> **Dr Sam Waller**
> Department of Engineering, University of Cambridge

Created by Dr Sam Waller in the Department of Engineering's Inclusive Design Group, Clari-Fi was first used as part of a consultancy project with Unilever. Clari-Fi helped the company understand how well its e-commerce images would perform, when displayed at a thumbnail size within search results listings on mobile screens.

Before any new or updated e-commerce images are sent to retailers, Unilever now requires that they pass the Clari-Fi visual clarity test. In the past three years, over 30,000 Unilever product images have been tested using Clari-Fi. E-commerce images that pass the clarity test help shoppers to recognise the critical details more quickly, which encourages sales uplift. After enhancing its e-commerce images to pass the test, one of Unilever's brands (Magnum) experienced a sales uplift of 24%.

Dr Waller recently extended the tool so that it can be used to test apps and websites on both desktops and mobile screens. Cambridge Enterprise has seen increasing demand for Clari-Fi licences, from individual licences for graphic designers to site licences for multinational companies. Additionally, our Research Tools team has licensed the data underpinning the software to an online graphical design platform.

Dr Waller hopes other companies will use Clari-Fi to assess different kinds of graphical features on more devices, leading to e-commerce images, apps and websites that are easier to see for everyone.



When viewed on a large monitor, a pack shot clearly shows the essential product details. However, when the same image is viewed within a search results listing on a mobile, it is no longer possible to tell what the product is.

Watch our Ideas to Reality video to find out more

Commercialisation at a crossroads

How social innovators need technology transfer to change

The innovation potential of research in the arts, humanities and social sciences (AHSS) is having its moment in conversations around the impact of UK universities.

At Cambridge Enterprise, our strategic investment in the AHSS since 2018 has already produced outstanding results – a large and growing portfolio of technologies, interventions, tools and expertise, which are now beginning to prove their value as they come to market. The University has deep strengths in its AHSS research base, however, these subject areas have several special characteristics that challenge our traditional models and approaches.

Research commercialisation in the AHSS requires things to be done differently. Challenges remain in bridging the gaps between STEM (science, technology, engineering and mathematics) and AHSS disciplines and between changemakers within and outside the University. Our wide-open approach to supporting innovation at its very earliest stages of inception recognises that AHSS innovators may have fewer role models and mentors, and therefore face a relatively untrodden pathway to commercialisation.

Opportunities linked to the AHSS are often not based on formal IP licensing but are enabled by innovative and fast-moving business propositions, including data and software services, social enterprise, commercial R&D partnerships and franchising.

> **We are creating a culture that celebrates the drive for societal impact and the alternative entrepreneurial approaches which AHSS researchers bring to the table as innovators. This can only be achieved by listening to and collaborating with researchers in their departments, and designing creative programmes of support that respond directly to their needs.**
>
> **Dr Emma Salgård Cunha**
> Commercialisation Manager (AHSS), Cambridge Enterprise

While STEM disciplines may sometimes appear to have a monopoly on inventiveness, AHSS disciplines have an equally strong claim in the realm of creativity – crucial to true innovation. Through the Creative Cambridge initiative we showcase the strength and depth of Cambridge's creative ecosystem, which helps to connect academia with creative industries and foster collaboration.

The appetite for conversation in the space is significant. Creative Cambridge has engaged more than a hundred local stakeholders from Cambridge's arts and heritage organisations, the gaming, fashion and creative technology sectors, social entrepreneurship platforms, local government and policymakers, and AHSS researchers each year. 2022 saw the creation of three new companies within the creative industries, including the generative AI architectural design spin-out Planarific. We see a promising future building on Cambridge's pedigree in technology innovation, directed by the curiosity and passion of its AHSS researchers.

Through the new CRoSS (Commercialisation of Research Out of Social Sciences) initiative, funded by the UKRI Economic and Social Research Council, we work in partnership with the University's Social Science Impact Team, leading novel approaches in social sciences commercialisation.

CRoSS delivered an Impact Ideation Day and the Ideas Incubator, both of which prioritise science research as a starting point to develop commercial value propositions and pathways to impact. Our first cohort of CRoSS Fellows completed the Ideas Incubator to launch their projects at our Pitch-In Finale, where they presented their solutions in health innovation, AI safety, heritage preservation, education, the prevention of domestic violence and more to a community of supporters who were asked how they might support our fledgling projects to deliver real-world impact.

It takes more than a village to combine industry insight and research evidence into innovation – it takes an ecosystem.

Sharing for success, connecting for growth

Cambridge Enterprise is committed to ensuring we share our best practice in research commercialisation with partners globally. In September 2021 we launched a new Research Commercialisation and Technology Transfer course, via the University's new online learning platform, Cambridge Advance Online – and in so doing were one of the first groups to use it. Bringing together international best practice models with Cambridge Enterprise's experience and expertise, the course offers early career technology transfer professionals a high quality learning experience covering consultancy, tech transfer and venture creation. Rather than being designed as a playbook, the course takes participants through the steps of understanding their own institution, its position within the local entrepreneurial ecosystem and how best to structure their activities to meet their needs. We are delighted with the excellent feedback we have received for both the course content and also our tutors and support.

As well as developing our online training offer, we were delighted to run our first residential training programme for three years. Impact from Research: Consultancy, licensing and new venture creation is a week-long programme offering international visitors an opportunity to have masterclass sessions with Cambridge Enterprise staff as well as learn about the Cambridge Cluster and hear from leading figures in investment, science park management and venture support.

In addition to these more formal courses, we continue to host international delegations who are interested in learning about our work in technology licensing, consultancy and venture creation, and also offer capacity-strengthening consultancy training. Across all of these activities we have worked with more than 70 different countries over the past five years including Chile, Poland, South Africa, Romania, Australia, Thailand, Pakistan, Sweden and Taiwan.

We don't just focus on building international networks. This year we welcomed ideaSpace to the Cambridge Enterprise family. ideaSpace provides co-working space and community across three sites (West, City and South) in Cambridge; including within our home the Hauser Forum. As a part of Cambridge Enterprise, ideaSpace enhances our offering to entrepreneurs by providing co-working space in addition to our technology development and venture support. This is an important step forward in transitioning the Hauser Forum into an innovation hub for the West Cambridge campus.

We have also taken a lead role in convening the University's community of innovation support providers by co-ordinating the University Enterprise Network (UEN), sharing best practice and encouraging collaboration among the broad offering available in the University. Through the UEN, we have driven the creation of an entry point and navigation to all innovation and entrepreneurship activities under the newly launched IE Cambridge initiative, helping those who are interested in Cambridge innovation to engage easily and meaningfully.

Find out more about IE Cambridge

Innovate Cambridge

Creating an inclusive, ambitious and broad-ranging innovation vision for a globally leading future

Cambridge is the home of the UK's most successful innovation ecosystem, Europe's largest technology cluster and the birthplace of 23 unicorns, three of which were formed during the last three years.

Central to this ecosystem is the University of Cambridge, whose contribution to the UK economy in 2021-22 alone was four times that of the Premier League, at almost £30 billion. Among all of the regions around the country, Cambridge is the best-placed and has the greatest potential to be the UK's globally leading innovation ecosystem.

But there is work to be done. Globally, significant planning and investment are being made in university innovation ecosystems to ensure their future success, and there is danger that Cambridge and the UK may fall behind without a clear plan of action and proactive intervention.

Cambridge Enterprise, along with Cambridge Innovation Capital and the University of Cambridge, is leading an initiative to create an innovation vision for the Greater Cambridge area.

Launched at the first Innovate Cambridge Summit in September 2022, Innovate Cambridge is creating an inclusive vision for the future of Greater Cambridge and its innovation ecosystem that will be implemented over the next decade. To date, over 150 organisations, including corporate leaders such as ARM, Microsoft and AstraZeneca, local government, start-ups, universities, science parks and investors, have backed an innovation charter, pledging their commitment to support, promote and enhance innovation in the Greater Cambridge ecosystem.

Innovate Cambridge is both forward-looking and ambitious. It is challenging the ecosystem to reflect on where we are and where we need to be to remain leading. It has built a coalition of organisations that share a similar innovation ambition for Cambridge, both social and economic, and are prepared to act to support the development of the area. Innovate Cambridge has the potential to both influence and inform innovation policy at a local and a national level. It will build a forward-looking proposition that will attract talent, funding – both research and investment capital – and globally leading innovation actors to Cambridge.

Innovate Cambridge is chaired by the Rt. Hon. Lord David Willetts, former Minister for Universities and Science and former Treasury official, has a Steering Committee that brings together innovation leaders from across the ecosystem. A second Innovation Summit is organised for October 2023 at which the vision for the next period of Cambridge's innovation growth will be launched.

Cambridge Enterprise is committed to leading the discussion on how to ensure the long term future competitiveness of our ecosystem.

Find out more about Innovate Cambridge

Developing policy structures to help the UK maximise impact from research

Commercialising research from UK universities is a significant part of the UK's innovation and economic story.

The evidence is clear. The University of Cambridge has an annual economic impact in excess of £24 billion from associated research and innovation activity. More broadly, according to Beauhurst Data, during the past decade the number of annual spin-out deals has doubled to approximately 400 and investment has increased more than fivefold, to a total of £2.54 billion in 2021. This is not the data of an underperforming sector.

Despite such data there has been much public debate about university spin-outs this year and how more can be achieved.

The finger of blame is frequently pointed at university technology transfer offices and particularly at the equity share taken in new businesses, together with the licensing policies and royalties, when a new company that is built around university research is formed.

We are told that if universities were to ask for a lower equity stake, it would transform how spin-outs are created and unlock a wave of research commercialisation. On this basis, the Chancellor recently announced a review of how UK universities translate research into commercial success.

To contribute to the shaping of this policy debate Cambridge Enterprise, in partnership with the UK's six leading technology transfer offices and a group of prominent venture capitalists including Abingworth, Advent Life Sciences, Amadeus Capital Partners, Cambridge Innovation Capital, Octopus Ventures, Oxford Science Enterprises and Sofinnova, under the stewardship of TenU, have created a new University Spin-out Investment Template (USIT Guide). We believe it could be profoundly important and a critical tool in transforming research commercialisation in the UK.

The USIT Guide will facilitate faster negotiations, make it easier to attract more investment and enable the creation of more spin-outs. It demonstrates the shared commitment across both the university and the venture capital communities to work together to build businesses that can change the world.

Although the USIT Guide clearly recommends that all deals should be considered on their own merits, we proposed a landing zone for most spin-out deals. An equity stake in the range of 10-25% and a royalty in the range of 0-5% based on the maturity and market readiness of the technology. We know these deals are acceptable to founders, inventors, universities and critically investors.

This is a major breakthrough. It will differentiate the UK from other countries and attract international capital. Experienced investors and universities now agree on how to accelerate the creation of spin-outs with deals that are fair to all stakeholders.

We know from experience that creating spin-outs is daunting. It is challenging to take a new and sometimes-unproven technology with no customers, no revenue and potentially no market, and turn it into a high growth business. Academic founders can't and shouldn't be expected to do this alone – they need the support of experienced investors, including from outside the UK, if they are to mature, to flourish and to drive our economy forward.

The USIT initiative goes a long way to overcoming these challenges and making the vision of a UK science superpower a reality. Cambridge is proud to have played an important role in its delivery.

The USIT Guide has come out of the deep professionalism and commitment of UK tech transfer offices to collaboration: sharing approaches internationally, and working with others – particularly investors – to make our ecosystem more effective.

Professor Dame Jessica Corner
Executive Chair, Research England

Financial summary 2021-22

In 2021-2022 Cambridge Enterprise distributed £20.9 million to the University, Principal Investigators (PIs) and its departments.

Consultancy Services had an exceptional year supporting PIs. It achieved record results across a number of areas: revenues of £9.4 million, 88 new consultants who had never used our services previously and 416 new disclosures.

Cambridge Enterprise Seed Funds had record investments and approvals in 2021-2022 and the second biggest year for realisations. Investments totalling £10.85 million were approved in 21 businesses: 10 new and 11 follow-on. In addition, 13 companies at the very earliest stage received pathfinder awards. Seed Funds generated £5.6 million through equity realisations.

Technology Transfer activities generated revenues of £9.8 million comprising £3.6 million in royalty revenue and a further £6.2 million generated from equity realisations in spin-out companies. During the year a further £1.1 million was invested in patents and proof of concept, which resulted in an additional 304 patent applications being filed.

*All figures in £'000s

Cambridge Enterprise income

Year to 31 July

Income generated by consultancy and non-equity licensing	£13,745
University and Higher Education Innovation Fund (HEIF) funding	£2,199
Income from services and other income	£1,555
Income before returns from equity realisation	**£17,499**
Equity realisation: income to Cambridge Enterprise and University Seed Funds	£11,826

Total income **£29,325**

Group Accounts

The Group income and expenditure summary comprises consolidated results for Cambridge Enterprise Limited and its wholly owned subsidiary company, Cambridge University Technical Services Limited, presented in a management accounts format. The financials exclude the effect of the estimated charitable donation for the year and the effects of FRS 102 accounting adjustments.

*All figures in £'000s

Cambridge Enterprise IP investment, distributions and operating costs

Year to 31 July

Investment in IP assets (patent and proof of concept)	£1,134
Distributions to academics and external parties	£11,252
Distributions to University (departments' share of IP income and Gift Aid from academics)	£4,088
Returns to University of Cambridge Seed Funds	£5,606
Operating costs (staff and other costs)	£6,623

Total expenditure **£28,703**

*All figures in £'000s

Where our income goes

Year to 31 July

Returns to University of Cambridge Seed Funds	£5,606
Distributions to academics and external parties	£10,549
Distribution to University departments	£4,088
Payments to external parties for equity realisation distributions	£0
Investment in patent assets and proof of concept	£1,134
Charitable donation to the University	£1,101
Support for Cambridge Enterprise	£914

Total **£23,392**

Net operating surplus for the year **£622k**

Equity portfolio

In 2021-22, the Cambridge Enterprise portfolio included 138 companies. Those spin-outs that grow and succeed often exit the portfolio through acquisition, and occasionally via a public listing. Over the lifetime of the University of Cambridge Seed Funds, such successful spin-out companies have generated billions of pounds in value. Below are a few examples of the current holdings.

52North

BAROCAL

BKWAI

CPT
CAMBRIDGE PHOTON TECHNOLOGY

FocalPoint

DIOS VAX

PRETZEL THERAPEUTICS

REG. GENOME

CarbonRe

ColoriFix

nu QUANTUM

ECHION TECHNOLOGIES

Sano

semarion

SPIREA

TRANSITION BIO

Governance and Structure

Chair

Ajay Chowdhury
Regional Lead, Western Europe,
South America & Africa, Managing Director
and Senior Partner, BCG Digital Ventures

Executive Directors

Dr Diarmuid O'Brien
Chief Executive

Dr Paul Seabright
Deputy Director

Company Secretary

Emma Rampton
Registrary, University of Cambridge

Nominated Officer of the Shareholder

David Hughes
Director of Finance, University of Cambridge

Non-Executive Directors and Advisors

Professor Andy Neely OBE
Senior Pro-Vice-Chancellor,
Enterprise and Business Relations

Professor Anne Ferguson-Smith
Pro-Vice-Chancellor for Research

Anthony Odgers
Chief Financial Officer,
University of Cambridge

Professor Laura Diaz Anadon
Climate Change Policy and Director,
Cambridge Centre for Environment,
Energy and Natural Resource Governance

Professor Russell Cowburn
Professor of Experimental Physics

Professor Patrick Maxwell
Regius Professor of Physic

Annalisa Gigante
Board Member, Henry Royce Institute

Jane Osbourn (until June 2022)
Chair, BioIndustry Association

Debu Purkayastha
Managing Partner, 3rd Eye

Tony Hickson*
Chief Business Officer, Cancer Research UK

Lesley Millar-Nicholson*
Director, Technology Licensing Office,
Massachusetts Institute of Technology

* Advisor to the Board

Investment Committee

John Lee
Chair of the Investment Committee

Dr Keith Blundy
Biotechnology consultant

Charles Cotton

Dr Barbara Domayne-Hayman
Biotechnology entrepreneur

Pam Garside
Fellow, Cambridge Judge Business
School and Chairman, Cambridge Angels

Dr Iris Good
MedTech entrepreneur

John Halfpenny
Technology entrepreneur

Andrew Herbert
Computer technology entrepreneur

Dr Richard Jennings
Technology transfer consultant

Derek Jones
CEO, Babraham Research Campus

Professor Patrick Maxwell
Regius Professor of Physic

Dr Diarmuid O'Brien
Chief Executive, Cambridge Enterprise

Heather Richards
Technology executive

Andy Sandham
Deputy Chair of the Investment Committee

Dr Paul Seabright
Deputy Director, Cambridge Enterprise

Professor Steve Young
Emeritus Professor of
Information Engineering

Image credit: Sir Cam

WORLD LAND TRUST™

Cambridge Enterprise
University of Cambridge
Hauser Forum
3 Charles Babbage Road
Cambridge CB3 0GT

+44 (0)1223 760339
www.enterprise.cam.ac.uk

@UCamEnterprise
Cambridge Enterprise

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