Results of Competition: Innovation to Commercialisation of University Research (ICURe) Follow on Funding: FY20 Round 3

Competition Code: 2011_CRD_CO_ICURE_FY20_R3

Total available funding is £3,000,000

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
PhenUTest	PhenUtest: Rapid diagnostic kit for antimicrobial susceptibility detection in Urinary tract infections (UTIs)	£257,322	£257,322

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Every year, over 100 million people are diagnosed with Urinary Tract Infections (UTIs). 1 in 2 women encounters it at some point in their life, making it a major problem worldwide. UTIs are the main reason for 22.7% of the UK's community antibiotic prescriptions (source: NHS England). Mis-prescribing of antibiotics, especially in urinary tract infections, leads to antimicrobial resistance (AMR). Annually, more than 50,000 people die from antimicrobial-resistant infections in Europe and the US. By 2050, AMR is estimated to cost the global economy $100 trillion (O'Neill '14). In the UK alone, hospital-acquired UTIs amount to a cost of over £400M/year (Source: Unplanned Admissions Consensus Committee -- 2016 Updated Guide). The current UTI testing procedure involves the samples being sent to a centralized pathological lab, and it takes some 48-72 hours for the results to come back. The results include a description of the specific antibiotics that the patient should be prescribed. You as a patient, initially receive the first line of antibiotics, which is often wrong. As highlighted by NHS England in the Horizon report (Horizon Scan Report 0045, 2016) there is a serious lack of reliable, fast and cheap UTI diagnostic tests. PhenUtest brings a state-of-art technology, enabling a 30-minute (sample to diagnosis) antimicrobial susceptibility test for UTI-suspected samples which ensures that the patient gets the correct antibiotic at their first GP visit. These tests will be performed in a benchtop instrument in a primary care setting. This instrument will be highly precise, fast, cheap and easy to operate. This will reduce the risk of hospital admissions due to wrong antibiotic prescriptions. Our technology will provide an in-house rapid, accurate and cost-effective way to diagnose UTIs in the first GP visit. This will not only save health services like the NHS millions of pounds but will also reduce the growth of antibiotic resistance.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
SENTECH ANALYTICS LTD	Internet of intelligent railway pantographs	£299,457	£299,457

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
In order to meet important 'net zero' carbon emission targets and deliver convenient, on-time high speed rail services for passengers, electrified railway systems are now the viable option for the future (with potential hybrid versions with battery power for rural and non-electrified areas of the country). The electrified railway market is growing rapidly across the world, through the increasing demand for improved efficiency and reliability in the rail industry: this feature, seen globally, drives the market for advanced, more regular and near real-time inspection and diagnostics of key railway assets that are offering better value for money to the rail stakeholders. In addition, through the innovation in monitoring of the creation of the 'Internet of Intelligent Railway Pantographs (IIoP)', both safety _and_ operational reliability will be improved, while reducing a reputational risk and enhancing passenger convenience. While some measurement systems are available for pantograph monitoring (camera-based, conventional approaches and combination of both), their nature (difficult operation at the 25,000 volts environment), complexity of installation and high cost (high CAPEX) do not easily allow for scaling or retrofitting to existing pantographs, leaving railways in a difficult position to meet demands for more intelligent infrastructure and more regular monitoring imposed by regulatory bodies, which as well increase maintenance costs. The limitations of the above technologies could lead to extreme scenarios, such are de-wirements causing widespread traffic disruption and affecting passenger safety. This project addresses the above challenges by drawing on innovation created in the UK, exploiting a new, innovative and customer-centric solution, building on advanced UK research and previous experience allowing development of the project to TRL7 and field evaluation by Network Rail. The data collected during train operation allows real-time reporting to the end user, addressing any potential infrastructure issues, allowing timely actions to be taken. The team will demonstrate the value of condition-based maintenance showing its advantages over traditional maintenance approaches, through deploying state-of-the-art machine learning algorithms for incident prevention built on real data, collected during the research phase of the project. The project will create new 'high-tech' employment in the UK and address the global market in this area, through successful development of both hardware and software, through exploiting the IIoP approach. In all, major UK benefits are seen: employment, creation and use of 'high-tech' and export potential realized: thus improved rail reliability and efficiency shown, while lowering the cost of operation and maintenance to bring widespread benefits.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
GeoScape	COP26 Installation - 3D Printed Geopolymer Concrete Modular Landscaping Components	£299,979	£299,979

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Concrete is the second most commonly used material in the world after water, and second biggest producer of carbon dioxide (CO2) after fossil fuels. The global constuction industry currently consume 40% of all raw materials, producing 39% of global CO2 emissions and 40% of solid waste in a linear take, make and dispose model of production. Through the use of advanced digital technologies, industrial symbiosis and circular economic models of production we can protect our finite natural resources, reduce emissions and waste and produce stronger, more durable construction materials. Geopolymer is an inorganic polymer binder which can be synthesised through the alkali activation of by-product and waste materials with high aluminosilicate content, widely available elements which make-up more than 75% of the earth's crust. These materials are easily sourced as by-products and waste from a wide range of industrial, agricultural and power generation activities. When combined with by-product and waste aggregate materials it can be used to produce rapid-setting concrete with exceptional strength, durability and chemical resistance. In November 2021 Glasgow will host the biggest event in it's history, The 26th United Nations Climate Change Conference (COP26). The climate talks will bring together heads of state, climate experts and campaigners to agree coordinated action to tackle climate change. Action such as the decarbonsiation of our construction and foundation industries - cement, paper, glass, ceramics, metals and chemicals. Our project will demonstrate a technology which can deliver on those objectives in addition to nine of the sixteen UN Sustainable Development Goals. It involves the development of a novel, high-performance, low-carbon geopolymer concrete using local by-product and waste materials to 3D print modular concrete components for land-based and floating landscape installations at the Glasgow Science Centre, co-hosts of COP26\. These components, inspired by the hexagonal basalt columns that link Northern Ireland's Giant's Causeway with Scotland's Fingal's Cave will serve as seating, planters and shelter as part of the upcoming landscaping works to the Centre's public spaces. They will serve as an iconic backdrop to COP26 demonstrating the use of advanced digital technologies such as material characterisation, inorganic polymer synthesis, parametric modelling and 3D printing to produce high-performance, low-impact building components and as a model for the decarbonsiation of the construction and foundation industries.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
AMPLY Ltd.	Using a machine learning software platform (AMPLY) to solve the global animal health problem of Bovine Mastitis through use of novel, patentable, antimicrobial peptides	£295,550	£295,550

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
AMPLY is an antimicrobial product discovery spin-out from the Queen's University of Belfast which employs innovative machine learning and AI methods to mine huge biological datasets searching for novel bioactive peptides. AMPLY focuses on the animal health market searching for answers to complex diseases which affect the livestock industry and the global food chain. This project validates candidate antimicrobial peptides, mined using AMPLY's technology, which have the potential to solve the global problem of Bovine Mastitis (BM), a persistent, inflammatory reaction of a cow's udder tissue due to bacterial infection. According to the Agriculture and Horticulture Development Board, UK "_Mastitis treatment and control is one of the largest costs to the GB dairy industry and is a significant factor in dairy cow welfare_". BM impacts milk production and quality. The market is predicted to reach $1.44 billion by 2023\. Estimates show healthcare burden globally of BM may be $30 billion annually. A corollary issue arising from current treatments for BM is the impact of antimicrobial resistance, a top 10 global public health threat. AMPLY is using AI to produce new drug candidates more quickly, de-risking drug development, and creating solutions for the livestock industry while safeguarding humanity's food chain.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MicroBritt	MicroBriTT	£295,308	£295,308

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
We aim to create a service company called MicroBriTT which will address the rapidly increasing need for high-speed, high-value bespoke manufacturing with micro-scale precision. We will specifically manufacture microsystem-prototypes and replication tools for a range of target industries such as biosensors (microfluidics) and medical technology to optoelectronic waveguides and MEMS (Micro Electro-Mechanical Systems) microphones. The key advantage of our Hy-MEMBS (the hybrid mechanical micromanufacturing of brittle substrates) system is that it can be utilised for hard, brittle materials like silicon and sapphire. This expands the range of delivery compared to competitors and allows for compatibility with the existing microelectronics and optoelectronics manufacturing processes. It can operate independently of a clean room and does not require special tooling services such as photomasks. As such, it can act as a low-volume high-value manufacturing tool. Although our service is underpinned by patented technology, it will be our customer focus which will rapidly grow our market base. We will create an attractive state of the art web-portal where customers can upload CAD designs, or make designs directly on the site. The site will provide feedback on design errors (if they exist), quotation and delivery time. Then once an order is processed, it will provide continuous monitoring of the product manufacture. We believe this manufacturing service philosophy will set us apart from other providers and allow us entry to markets where we do not have unique capabilities.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
CRYOLOGYX LTD	Next Generation Cell Cryopreservation: Developing Products for the Research Sector	£299,089	£299,089

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
The market for innovative cell-based therapeutics and diagnostics, tissue engineering and stem cell banking is rapidly growing. Cells cannot be cultured indefinitely so must be cryopreserved for long term storage and distribution. The current gold standard for cryopreservation uses toxic organic solvents at high concentrations -- a 50 year old technology which needs updating for 21st century medicine and industry. The current solvent based approach does not give full cell recovery, is cytotoxic, and many cell lines simply cannot be stored frozen at present. This has led to the use of engineered hardy cells which can be regrown after thawing. These so-called immortalised cell lines dominate the research space due to their robustness, in preference to higher-quality, but more fragile, primary cells. Furthermore, emerging cell based therapies (such as CAR-T, a revolutionary treatment for cancer; the 2nd largest cause of death in the UK) involve the direct injection of toxic cryopreservatives into the patient alongside the cells. This leads to clinical side effects, such as the cancer patient becoming incredibly sick, and in some cases weakens them to the point where chemotherapy or other treatments have to be suspended, putting the patient in extreme danger. To address this challenge, we have taken inspiration from Nature. Extremophiles (frogs to scorpions to arctic fish) survive extreme cold by producing 'antifreeze proteins' which mitigate the damage caused by growing ice crystals, allowing them to live in sub-zero environments. Our research team at CryoLogyx have developed Award-winning (RSC-Emerging-Tech-2014) Synthetic Macromolecular Cryoprotectants -- polymers which dramatically improve cell cryopreservation by mimicking some functions of natural antifreeze proteins. The polymers are low cost, synthetically scalable and have been proven to dramatically increase post-thaw cell recovery for a range of cells, from blood, cell monolayers to stem cells. We have also used these polymers for the solvent-free storage of high-value antibodies and enzymes. This is a platform technology with huge potential across all areas of drug discovery, high throughput screening, biologics and fundamental research. It will support British Biotech, a UK industry that is one of the best in the world, and will create high-skilled jobs and support high tech manufacturing, transport and logistics jobs in the Midlands and across the UK.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
HEALOME THERAPEUTICS LTD	Ocular surface bandage in eyedrop form – safer and more effective use of therapies to restore sight	£263,375	£263,375

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
The 'fluid-gel' eyedrop that can deliver and _retain_ incorporated therapeutics on the surface of the eye for 6-8 hours. The material flows upon extrusion from an eyedropper before thickening, as a therapeutic, protective and resorbable layer over the eye, which is cleared away by blinking over several hours. The technology tackles the issue of rapid (1-15 mins) clearance of conventional eyedrops where maintaining effective doses, especially for conditions of the front of the eye, can require very frequent dosing or use with specialist, but very uncomfortable, contact lenses. Very frequent dosing can risk toxicity effects, is generally poorly tolerated by patients, and can diminish the perceived cost-benefit to payors. These factors threaten wide adoption of therapies. Lack of good products to even help _manage_ long-term eye conditions often means the working and social lives of otherwise healthy people are impacted. The commercial opportunity is in partnering with pharma/biotech companies to embed fluid-gel into their drug pipelines, enabling more effective use of each dose to maximise therapeutic effect. The technology is unique in that it has the protective advantage of a contact lens but is as easy to apply as any other eyedrop. The mechanical properties of the eyedrop can be tailored without complex chemical changes, enabling new drug products take the shortest regulatory pathway possible to the clinic. The fluid-gel is safe, can soon be made to clinical grade in a scalable manner and will enter human trials. The overall offer is in a unique and timely position for commercialisation.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Quanterra Systems Ltd	Economic Carbon Sequestration Monitoring	£297,872	£297,872

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
Reducing our carbon emissions is essential if we are to achieve Net Zero, address climate change and protect our futures. However, mitigation of unavoidable carbon-emissions will also require offsetting through large scale carbon sequestration. Nature Based Solutions (NBS) are emissions offsetting methods which capture atmospheric carbon in vegetation and soils through improved land management. NBS approaches such as tree planting are well known climate mitigation solutions, but restoration of soils also has potential to sequester significant volumes of carbon and are less well established. NBS also bring wider environmental benefit and are less expesive to implement than man-made carbon capture technologies. However, there is currently no efficient and robust way of monitoring and verifying NBS carbon storage, particularly within carbon stored below the ground. This lack of a robust measurement solution is inhibiting the generation of carbon credits and is preventing the financing of large scale NBS implementation. Existing carbon monitoring solutions use expensive sampling with delayed results (e.g. soil coring), or high uncertainty (e.g. remote sensing and modelling). Eddy covariance monitoring can provide continuous, accurate measurements of carbon sequestration, but is prohibitively expensive for these types of project and requires significant expertise to operate and interpret. We have developed a low-cost implementation of eddy covariance to allow timely and accurate carbon-credit verification. Using lower-cost instrumentation supported by novel software algorithms we will provide affordable and robust carbon credit verification for NBS. Unlocking the potential for carbon-credits to incentivise better land management will have substantial societal benefits of improved ecosystem and soil quality, food security, and more resilient water systems in addition to contributing to UK climate mitigation targets. Our commercial approach will also bring wider benefits, including new knowledge-intensive jobs and generation of economic benefit through inward investment and global export of our services.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
EXRT INTELLIGENT HEALTHCARE LIMITED	A connect-health Virtual Reality(VR) stroke physiotherapy technology to improve care delivery and save healthcare costs	£296,287	£296,287

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
The rehabilitation of stroke patients is one of the biggest healthcare challenges faced in modern times. Globally Stroke is the 2nd leading cause of disability, with 15 million new strokes per year and a further 80 million people currently living with a stroke. Healthcare organisations struggle financially to provide the optimum level of care to stroke patients when they are discharged home. This lack of rehabilitation care at home leads to stroke patients performing little or no physiotherapy, which thus negatively affects recovery. Upper limb motor dysfunction is the leading cause of disability affecting 75% in stroke patients globally. Stroke is a huge economic burden on healthcare organisations worldwide and we believe that our solution can help ease that burden by providing a technology-enabled cost-effective solution that can reduce physiotherapy costs, reduce hospital stay cost and readmission costs and return patients to work sooner. Our solution to this growing problem as an innovative connected-health physiotherapy device that provides personalised upper limb stroke physiotherapy within Virtual Reality (VR) for home-based physiotherapy. A web-based patient management dashboard supplements the VR system, so physiotherapists can remotely monitor and manage their patients. Built-in communication tools between the VR and the Web-based dashboard provide a higher level of communication and support between stroke patients and physiotherapists. This unique innovation provides enhanced care to patients at home and helps physiotherapists operate more efficiently than what has been possible before.