

# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
NUM TECHNOLOGY LTD	NUM Protocol: Innovative use of DNS	£417,829	£292,480

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

Funders Panel Date: 08/08/2018

### Project description - provided by applicants

The Domain Name System (DNS) is primarily used to convert human friendly domain names (e.g. tesco.com) into IP addresses (e.g. 156.154.166.223) to connect users to websites.

Our protocol: Namespace Uniform Media (NUM) extends this functionality, to enable the conversion of domain names into telephone numbers, GPS store locations, social media identifiers and more. The protocol opens up vast possibilities for a new type of search, which returns contact information using one efficient process rather than through a frustrating, data-hungry search. Users could effectively dial a domain rather than a telephone number or enter a domain into a satnav for an exact GPS location, instead of using an oft-inaccurate postcode. For domains that have not adopted the protocol, a NUM Server service will answer the query by returning public contact information collected from the company website.

The project will conduct challenging neural network research to collect and label contact data and push the boundaries of DNS technology to structure and serve it to users.

Any internet connected device could use NUM, there is no requirement for new hardware or changes to DNS infrastructure. Search engines like Google, Bing and others could augment their results with NUM. Finding contact information is currently unstructured, inconsistent and inefficient. Our vision is to organise the world's contact information.

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ALCOVE LIMITED	TECS: Technology Enabled CONCIERGE Service Powered by Alcove	£98,468	£68,928

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Funders Panel Date: 08/08/2018

Project description - provided by applicants

"I cannot use a smartphone. Why should i be forced to miss out on cheaper and more efficient and higher quality services provided by apps? Why do I pay more for outdated support solutions while my able bodies friends can access on demand? It just isn't fair.

If I want to order a cheap nutritious meal for lunch, a smartphone user can Deliveroo or Ubereat and for £5-8 have a delicious meal delivered. If I am an older adult I pay the same for Meals on Wheels or Farm foods to deliver me a ready meal in a carton. Similarly with laundry, food shopping, transport I am left behind and have to buy the most expensive services because I cannot use a smartphone."

Following the success of Alcove's Innovate UK project 'Voice Controlled empowerment' project in which we brought the power of Alexa en masse to disadvantaged older adults and which was commercialised even before the end of the project, we feel it totally necessary to continue this proven work with the next evolution of at home concierge services using Alcove's current technology video carephone platform.

Older adults are just not ready for virtual avatar style assistants. It's 5 years away. If ever. So what do they get now? Poor, expensive, burdensome 'municipality flavoured' services.

Really, very unfair.

Alcove intends to provide a super easy friendly and clear video calling screen that at a single touch - connects directly with a REAL HUMAN to take the order and place it for them on their behalf. No fancy API integrations needed OR wanted - just a lovely human friendly face to take my order and cheaper and faster and I don't need to know anything about technology.

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DESIGN LED PRODUCTS LIMITED	SoliS : Solid Surface Backlighting	£75,910	£53,137

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Project description - provided by applicants

Design LED Products have developed an thin, efficient, mechanically flexible LED lighting technology which enables large area lighting. Driven by innovations in surface optics, this project will deliver a positive leap performance, from which DLED will demonstrate large area, flexible LED lighting panels for integration with Solid Surface materials such as Corian.

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INNGOT LIMITED	Enabling IP-rich SMEs to obtain finance via new methods of scoring intangible assets as security	£248,288	£173,802

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## Project description - provided by applicants

The stock of intangible assets owned by UK businesses has an estimated value of £497 billion. Each year, around £130 billion is invested in new knowledge-based assets, of which over 50% are thought to be protectable using intellectual property (IP) rights (\_source: Imperial College/UK IPO\_).

If this investment were being made in tangible assets, it would strengthen company balance sheets and provide collateral value that could be leveraged for debt finance. However, lenders traditionally attribute no value to IP and intangibles, or view them as a liability, because they do not know what the assets are, or which ones may ultimately prove to have any realisable value.

Inngot has been working for some years to overcome the barriers to unlocking IP and intangible value. It has worked with a number of large and specialist lenders and international government agencies to facilitate unsecured lending by deploying and refining its award-winning digital platform to help businesses identify, value and communicate their intellectual assets, revealing over £500m of previously hidden value for SMEs.

Inngot has also developed a position of thought leadership: since the 2013 \_Banking on IP?\_ report delivered for the UK IPO, CEO Martin Brassell has been responsible for a string of influential publications, including two studies on accounting practices for ACCA, co-authorship of the OUP book \_Economic Approaches to Intellectual Property\_, an authoritative investigation of UK IP valuation practice (\_Hidden Value\_, 2017) and an investigation of international IP finance policy initiatives for OECD (publication pending).

Inngot is now focused on addressing the problem of using IP as collateral for lending. The importance of this development has been underlined by a 2017 Autumn Budget statement that "the government will also work with businesses, lenders, insurers, the British Business Bank and the Intellectual Property Office to overcome the barriers to high growth, intellectual property-rich firms, such as those in the creative and digital sector, using their intellectual property to access growth funding".

Insurance is an important element in underpinning collateral value, but this needs scale in order to be viable. As OECD research has identified, there are two key challenges in determining which assets could have recoverable value: high assessment costs, and valuation uncertainties.

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This InnovateUK application addresses significant, clearly identified gaps in the current provision of IP information services which need to be 'plugged' in order to make selected IP a viable class of collateral.

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PARCELVISION LIMITED	ParcelVision cross-border e-commerce	£499,980	£349,986

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Project description - provided by applicants

ParcelVision is a cloud based shipping platform that helps retailers and e-commerce providers reduce transportation costs by up to 80% and manage their logistics from the point of collection through to delivery. ParcelVision is now seeking to develop cross-border e-commerce-as-a-service technology to enable exporters to sell more to more markets, and create new exporters. This disruptive technology will enable retailers to remove all of the risk and complexity of exporting and help government achieve it's aims of increasing both the number of exporters and value of exports.

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DRUMROLL HQ LIMITED	E.A.K. - Equipping Girls With Digital Skills	£119,939	£79,160
PLAYERTHREE LIMITED		£154,991	£102,294

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Project description - provided by applicants

We are designing and building Erase All Kittens to deliver essential skills and capabilities to girls to prepare them for 21st Century degrees and careers, so that they can participate in the economy and society. Our goal is to allow girls to acquire the skills to enable them to become tomorrow's innovators and creative problem-solvers. By inspiring and empowering girls at a young age, E.A.K. could help build a more diverse UK tech workforce which will drive the UK economy in the 21st century.

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ZETA SPECIALIST LIGHTING LIMITED	ELECTRA EV	£513,014	£359,110
Oxfordshire County Council		£79,890	£79,890
URBAN INTEGRATED LTD		£406,020	£284,214

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### Project description - provided by applicants

The enclosed project is presented by a team of experienced developers and producers of hardware and software solutions used in the built environment and electric vehicle infrastructure sector. This team, including owners of electric vehicles, is frustrated with the difficulties associated electric vehicle usage and journey planning. Their vision is to create a smart infrastructure system that provides electric vehicle users with a "Tinder or Airbnb style" system for charging their car. This system, called ELECTRA, seeks to bring together the charging hardware technologies and software that provides a complete end to end charging solution for electric vehicle owners. The solution would deal with all aspects of the vehicle charging challenge (real-time choice of charging sites, charge bay parking, live pricing, booking/billing from their car). The goal is to promote electric vehicle ownership and integrate electric vehicles into the wider transport and energy infrastructure.

The project is presented by two commercial providers of electric vehicle charging related hardware (Zeta) and software solutions (UI-UK) in collaboration with local government representatives (Oxfordshire County Council). The project will focus on establishing a living laboratory electric vehicle charging pilot in Oxfordshire and provide a crucial platform for the streamlining of the energy, urban and transport related challenges. The system will provide a solution that directly aids modal transport shift in one of the countries most challenging transport related regions.

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CAMBRIDGE POLYMER TECHNOLOGIES LIMITED	Mapping the convergence of novel plastic recycling technologies with emerging applications for innovative Thermoplastic Elastomer materials	£71,126	£49,788
Cardiff University		£29,334	£29,334

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## Project description - provided by applicants

Current UK value of the Additive Manufacturing (AM) market is ~£300 million, employing ~35,000 people, but adoption is low (17% of UK companies employing AM against 37% in Germany). Government considers AM "one of the key enablers of the Fourth Industrial Revolution", with potential contributions of £72.1bn to UK manufacturing by 2030. Lack of material selection and availability is limiting full exploitation. Polyamides represent 90% of AM powders, providing a very narrow performance specification. Predominant AM powder suppliers are based in Germany, increasing costs and limiting knowledge transfer.

TPEs (thermoplastic elastomers - co/mixed polymers with both thermoplastic and elastomeric properties) are the fastest growing sector of the polymer markets, with their high versatility enabling hugely diverse applications. However, TPE manufacture currently accounts for only 6% of the AM market. TPE AM powders are prohibitively expensive for all but very high-end, high-margin applications. The high cost is due to 40% virgin powder derived from oil-rich materials and 60% from rubber (synthetic and natural), currently in global shortage.

CPT has established a novel process to produce 100% re-manufactured TPE materials from waste rubber and plastic with 30% lower cost than competition (helping to address this increasingly visible problem). CPT is now planning to expand into higher-margin, technically challenging markets and is developing with Cardiff University, a process to produce a range of TPE AM powders.

To capitalize on this opportunity, CPT has three challenges:

- 1- Understanding the full scope of the market opportunity, value proposition, existing/emerging competitors, their costs and margins.
- 2 - Evaluating emerging AM technologies to ensure products meet markets' technical needs
- 3 - Confirming technical feasibility of powderising TPE material to the high specifications required of AM powders.

Successful market / technical assessment outcomes of this project will enable commencement of full product development and Go-to-Market programmes: support raising of £6M from directors, private family offices and green investment funds (plus £3M credit line from HSBC and £1.3M funding from Welsh Government: and leasing of a South Wales site for manufacture.

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First TPE-AM sales are forecast in 2021/2 at 4kt/annum (£4m), growing to 16kt/annum (£16m) by 2025\ . Routes to priority markets will be defined by the market analysis. CPT will initially target the consumer goods and automotive sectors, currently high TPE consumers and potentially high AM-users .

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CROSSWORD CYBERSECURITY PLC	Automated attack mitigation	£76,607	£53,625
Imperial College London		£8,826	£8,826

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### Project description - provided by applicants

Enterprise networks need fast, accurate detection of automated attacks that seek to misuse legitimate capabilities of web-based business services, and to gain access to core business assets for financial gain. These attacks leverage increasingly sophisticated attack technology to obfuscate their origin and amplify their effectiveness, yet the attacker requires few skills to launch them. The average detection time of a security breach is lengthening, resulting in the wrong balance of reactive and proactive defence, and driving up the total cost of security and remediation. Existing monitoring tools are clearly sub-optimal in coping with these threats. Commonly used anomalous behaviour monitoring struggles to differentiate legitimate use from attackers' misuse of those same capabilities, and also overwhelms the defender with false positives and impedes legitimate users. We propose a new approach to security monitoring, leveraging auditable machine-learning. It will shift the advantage back to the defender, by allowing them to "nip attacks in the bud", before the organisation is exposed to significant costs or harm. This approach also provides a novel degree of confidence for each alert, which allows for unprecedented fine-grained and definite mitigations.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MEDIAGAMMA LIMITED	IMAGINE: Developing AI for targeted and dynamic content auto-generation	£229,339	£160,537

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Funders Panel Date: 08/08/2018

Project description - provided by applicants

The digital advertisement industry is undergoing a fundamental technology change with advent of machine-learning and big-data, and the introduction of novel programmatic business models including real-time-bidding technologies. There is massive potential for growth if machine-learning algorithms can be developed to successfully deliver personalised campaigns.

Viewers are exposed to 360 digital ads per day, however engagement rates are just 0.05%. Targeted creative (delivering user-specific content and composition) is proven to have a 54% improvement on engagement and can add 30% value across the advertiser/publisher value chain, however, 97% of campaigns are not utilising these techniques as they are very labour-intensive to produce and not currently compatible with a real-time service.

MediaGamma's existing bid management technology delivers lightning quick response times which has secured initial commercial traction. Now, they have developed state-of-the-art deep-learning techniques applied to auto-generation of images or text, and with this project, aim to be the first to automatically generate entire targeted creative campaigns to maximise user engagement.

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QUMODO LTD	TakeDown - Report explicit personal images for removal from the internet	£553,323	£387,326

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Funders Panel Date: 08/08/2018

### Project description - provided by applicants

TakeDown is a unique service which will enable people to report their explicit personal images for removal from the internet. It has been designed as an iOS App which uses novel AI technology to empower users to take back control of personal content in a way which means their photographs never have to leave their mobile device. The app will encourage individuals who regret sharing self generated images, to exercise their right to erasure under GDPR in a way which is currently not offered by any other company. TakeDown will be able to support service providers by speeding up and reducing the cost for them to remove harmful content from their networks.

People in Europe have access to internet connected smartphones with cameras from a young age. In a recent study (Madigan et al) it was discovered that 14.8% of teenagers had sent sexually explicit images and 27.4% had received them. Around 12% of these images are forwarded without consent, this concerning trend often causes substantial distress to the image creator and can lead to them becoming the victim of very serious crimes.

Take Down minimises the future impact on the content creator, supports content moderators and could substantially reduce the burden this type of content has on Police and Social services, saving valuable public funds.

The key objective for this grant application is to complete the research and development required to realise the technology needed for this product.

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CORROSION RADAR LIMITED	Area Topography Sensing Mat for Digital Corrosion Monitoring of Smart Infrastructures	£99,867	£69,907

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Project description - provided by applicants

CORROSION RADAR (CR) LIMITED strives to be a global leader in remote sensing technologies and advanced analytics systems for smart infrastructures. Monitoring and predicting Corrosion Under Insulation (CUI), which can potentially cause catastrophic failures and/or major downtime for many sectors, are the primary focus of the company. Corrosion Radar has developed a line sensor which could detect and locate corrosion under insulation for pipe sections. It uses industrial internet of things (IIoT) systems to ensure information collected by these sensors are able to be accessed, stored and processed remotely. This proposal is to establish the feasibility of novel area sensor which enables corrosion monitoring and prediction topographically over large and geometrically complex surface areas such as process vessels and associated auxiliary equipment.

Success of this project will enable CR to provide the industry a suite of corrosion sensors to detect and monitor CUI across the whole plant, including pipes, process vessels and associated auxiliary plant equipment. The offered products will increase plant availability and reduce maintenance costs without compromising the safety of people, assets and the environment. An attractive aspect of CR's corrosion detection suite is that it can be applied to many sectors such as oil & gas, renewables, food processing units, chemical processing plants, thermal power plants and nuclear plants.

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REDBLACK SOFTWARE LIMITED	Intelligent Dough Mixer Project	£68,472	£47,930
CAMPDEN BRI (CHIPPING CAMPDEN) LIMITED		£29,210	£29,210

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## Project description - provided by applicants

Our project brings together the data technologists at RedBlack Software, Britain's leading provider of software solutions to the commercial bakery sector, and the food scientists at Campden BRI, the UK's most prominent food and drink industry research association.

The project's aim is to exploit recent developments in machine learning and artificial intelligence (AI) in order to create an entirely automated system that accurately tests and predicts optimal dough quality and consistency for commercial bakers. Moreover, it will be capable of taking data from many sources and learning from it.

Bakeries are highly sophisticated manufacturing environments that use a complex mix of raw materials to produce a wide range of goods in a short time. Getting dough mixes right is critical to operational success but difficult to achieve. This is because of unpredictable reactions between biology (yeast), chemistry (enzyme reactions, oxidation/reduction) and physics (water movement) that takes place during the 3-12 minutes that it takes to mix dough.

Even slightly differing flour qualities have a big effect on the end product quality. Because of this, bakers throw away considerable amounts of dough before it is ever baked. We aim to minimise this wasteful practice and save commercial bakers man-hours and money with our AI dough quality predictor.

Britain has historically been a world-leader in bakery technology. In 1961, for example,

Campden BRI's forerunner the British Baking Industries Research Association invented the Chorleywood Bread Process. This was a new type of dough making now used all over the globe (in the UK, Australia, New Zealand and India it makes up 80% of bread production). This used high shear mixing processes to fully develop dough in around 3 minutes, with later developments in 1995 using pressure and vacuum control in mixing.

Similarly, RedBlack Software had always been at the cutting edge of computer technology with its Cybake family of bakery management software solutions. All the recent additions to

this range of applications take full advantage of the latest cloud, mobile and advances in data analytics technologies. Cybake solutions are

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popular with craft bakers all over the UK and Eire and we are making headway in mainland Europe and in the USA.

RedBlack Software and Campden BRI aim to build on this tradition of British innovation to create a brand new, unique product that will have a big impact on commercial bakers all over the world.

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OPTRICAL LIMITED	Development of Light Extraction Film and a Single Sandwich Lightguide	£219,800	£153,860
LUX-TSI LIMITED		£40,683	£28,478

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Project description - provided by applicants

Optrical has developed a new concept for making an LED light panel, which leads to more efficient lighting at lower costs. For producing such light panels today, one has to use slow, serial and expensive methods such as laser machining, mechanical scoring, injection molding or screen printing. Each of these methods have their own issues but the main point is that these are slow and expensive (capital and time extensive). Optrical has, for the first time developed a film that can be adhered to an unpatterned transparent material and it extracts the light coupled of it very efficiently. Such film can be produced on reel to reel basis at very high speeds (upto 40X faster). Using a handmade "proof of concept" we have demonstrated that the panel produced by this route can reduce total coupling and absorption losses by upto 1/3 and give upto 12% more lumens. Since the LED lighting manufacturers in Europe/ US today are facing very tough price competition from cheaper Chinese imports, this technology can offer a superior product without having to compete on pricing thus can save a significant number of jobs in UK.

In this project we aim to develop the complete process know how for the production of such films and panels leading to a production ready prototype on a reel to reel machine, meeting the commercial specifications. This prototype will fully be tested/ characterized.

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THE MONEY CLOUD LTD	The Money Cloud: Democratising FX Expertise	£229,877	£160,914
COEFFICIENCY LAB LTD.		£297,900	£208,530
University of Warwick		£67,089	£67,089

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Project description - provided by applicants

This consortium brings together The Money Cloud, Coefficiency Lab and Warwick Business School to develop a pioneering approach to the FX market.

Delivering world-first innovations in forecasting, user-engagement and data analytics, the platform will bring UK-generated IP to a global market and result in savings and economic benefits for all stakeholders.

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

# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
LOIS MEDICAL LTD	LOIS	£237,197	£166,038

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

Funders Panel Date: 08/08/2018

Project description - provided by applicants

LOIS is an acronym for Loved Ones Information Service. LOIS refers to a sensor and alert system for patients who have Implantable Cardioverter Defibrillators (ICD). ICD's are implanted defibrillators designed to treat a cardiac arrest in patients that have either survived a previous cardiac arrest or patients who have a heart condition that leaves a cardiac arrest more likely than the general population.

LOIS was created in response to a real life event. A man with an ICD lay dying in the very next room to his wife, his ICD was shocking him but failing to treat his cardiac arrest. His one chance of survival was bystander intervention but with nobody alerted to his plight, he died. Had his wife been aware of her husbands situation, she could have started CPR and potentially saved his life. LOIS would have informed his wife of his cardiac arrest and given him a shot at survival.

There is a patent pending for wearables that detect the electrical activity of medical implantable devices.

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# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
Fotenix	Feasibility of using 3D MultiSpectral Imaging for enhanced classification of fruit ripeness and disease	£71,024	£49,717
Rothamsted Research		£27,393	£27,393

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Funders Panel Date: 08/08/2018

Project description - provided by applicants

In light of the increasing difficulty for fruit farmers to source manual workers to pick soft fruits, there is an increasing need for the development of automatic picking systems, for fruit. This project is focused on assessing the advantages and suitability of a 3D multiSpectral imaging system for use in automatic picking systems. A reduction in manual labour to pick fruit will in turn require that an automated system also needs to play a role in disease surveillance on leaves and fruit. The development of new sensors using 3D imaging may allow detection of pre-symptomatic disease presence and improve the scheduling of fruit harvesting. The project is to assess the feasibility of this new sensor technology with both laboratory and field fruit growing applications and compare to existing technology, using the assessment expertise of Rothamsted Research and the facilities and equipment of Crop Health and Protection Ltd (CHAP) - one of the UK Agri Tech centres This project will trial and test an innovative 3D imaging tool to explore its potential to determine the initial development of diseases in key crops and fruit ripening. This will also be of use to fruit growers, researchers and plant breeders requiring phenotyping.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ALL ABOUT THE PRODUCT LTD	Pollution Guardian	£108,590	£76,013
University of Surrey		£45,599	£45,599

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

Funders Panel Date: 08/08/2018

### Project description - provided by applicants

A feasibility study for an affordable, air quality alerting solution for use within vehicles which will **transform the ability** of both consumers with existing respiratory conditions and others wishing to protect their lungs to take actions to improve their health outcomes.

Air pollution is a challenge in many countries at the moment, but it is a burning issue for those with existing respiratory conditions. In the UK today, there are 5.4M asthmatics with over 60% identifying air pollution as the main trigger for an asthma attack and **30%** requiring unplanned care\*\* at hospital/out-of-hours centres each year.

Several studies indicate the car as the place for the highest exposure to air pollution. We believe that mitigating the exposure within the car will have a significant impact on overall health outcomes.

We aim to perform market research within and beyond the asthmatic group to identify suitable and acceptable "smart interventions" to enable the users to take action to avoid the worst air pollution. The results of the research will be fed into a feasibility exercise, working with the University of Surrey to develop a system, characterise the system and validate its performance in the field, before trialing with friendly users to gain real world feedback.

The solution will consist of a re-chargeable, battery powered sensor which will be mounted in-car to measure the levels of NO<sub>2</sub> and particulate pollution and communicate locally with a Bluetooth enabled app running on a smartphone. Data will be transferred between the smartphone and back-end system in the cloud to provide processing, storage and "presentation" feedback to the smartphone app. Local alerts will be raised according to a 'machine learning' trained algorithm, when pollution levels become high and the user prompted through visual and audible means to make ventilation changes in the vehicle to reduce their air pollution dosage. Offline guidance e.g. logs and pollution maps will be developed according to the guidance seen coming from market research.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ADAPTIX LIMITED	Quantification of dental caries using a 3D X-ray device at the dentist's chair	£103,038	£72,127

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

Funders Panel Date: 08/08/2018



### Project description - provided by applicants

Almost everyone will have had a dental X-ray. These help dentists make informed decisions about diagnoses and treatments. However, each X-ray is just a 2D shadow of a 3D shape so assessing the size and shape of feature such as cavities in teeth can be difficult. Large 3D imaging systems do exist today but they are expensive, only available at specialist centres and they give a relatively high radiation dose.

Adaptix has a new method of obtaining 3D X-ray data. Adaptix have miniaturised the X-ray emitter meaning that many emitters can be arranged in flat panel array. Electronically firing X-rays from 45 different positions means that 3D information can be derived, in the same way that having 2 eyes in different positions gives us depth perception. Adaptix's device is small enough to be used at the dentist's chair, gives a low radiation dose and the 3D images give more information to the dentist than is obtained from current devices. This project will go further and develop software to analyse the 3D slices and quantify the size of cavities. This will help dentists decide if a cavity needs to be filled or whether it can be safely left until next time and monitored to see if it will improve over time or get worse and need treating. This will make dentists more confident in their decisions and improve the quality of care that is provided. This is important as dental caries is one of the most prevalent diseases (42% of an adult population in the UK, Source: Murray et al. 2015, <https://onlinelibrary.wiley.com/doi/full/10.1111/jcpe.12677>).

Enabling Adaptix to bring this healthcare technology to the UK, will support the NHS by reducing the cost of high-quality dental care, as well as enabling our dentists to make earlier and more accurate diagnoses.

Adaptix is a UK company, setting up a UK manufacturing site, creating jobs in the UK. Supporting Adaptix will enable its UK technology to be brought to market, which will benefit the UK, as well as dental care worldwide.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Competition Code: 1803\_OPEN\_R5

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
RISE FINANCIAL TECHNOLOGIES LTD	Disruption of Financial Services Through Distributed Ledger Technology --- The Revolution of The Depository Receipt Market	£359,910	£161,960

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

Funders Panel Date: 08/08/2018

### Project description - provided by applicants

An old saw in the financial markets holds that nothing good happens after a trade is agreed. Trades are agreed instantly on digital platforms today but post-trade delivery of assets still takes days, looking at high costs, errors and omissions. Most of these inefficiencies is explained by the time it takes counterparties and their service providers to reconcile records. Distributed Ledger Technology (DLT) eliminates that need by replacing separate ledgers with a single but distributed one, which is always up-to-date and to which all parties to a trade have access.

At RISE, we are veterans of post-trade processing, and the only company in the UK exclusively dedicated to using DLT to deliver a game-changing series of effects to post-trade processing of financial instruments - like DLT has already done with Initial Coin Offerings (ICOs).

To retain London's status in global finance post-Brexit it must use every tool it can to attract issuers and investors from all over the world. Un-sponsored DRs are a UK originated and long-established instrument for doing this but are at present issued mainly to American investors and suffer from a number of obstacles which hinder both its overall growth and the investment returns available to investors. Our DLT can overcome this, triggering many benefits.

Key to bringing our solution to the market is the support of incumbents; we already secured the commitment from key DR stakeholders with which we will execute the proof of concept. This will serve as basis for a pilot platform implementation, commercialisation and growth once the benefits are visible in the DR market.

By eliminating the operational obstacles to growth, DLT will not only help the market to grow, but attract issuers and investors to London. These and other gains will continue to reinforce London's role as an international financial hub, as it will be the centre of a new, DLT-based model of un-sponsored DR issuance and servicing, creating wealth and jobs.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
CROWD DYNAMICS INTERNATIONAL LIMITED	CrowdSafe: An innovative crowd safety software for multi-party cooperation	£181,066	£123,246

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

Funders Panel Date: 08/08/2018

Project description - provided by applicants

CrowdSafe is a disruptive methodology and software solution that will address the challenges and complexities of planning and managing large crowds at events. It provides a valuable resource for the police, local authorities and the private sector, and supports co-operation between multi-agency teams. Based on the latest developments in crowd safety and crowd simulation, it guides the user through the essential steps of planning for visitor attendance at an event, incorporating capacity analysis, risk assessment, crowd simulation, testing of management procedures to allow the optimum planning between multiple stakeholder and to avoid cancellation, disasters and to protect revenue of the event.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
OXFORD MEDISTRESS LTD	r-STRAT-PRO: Risk STRATification of PROstate cancer patients using novel rapid Leukocyte ImmunoTest™ blood test	£99,324	£69,527

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

Funders Panel Date: 08/08/2018

### Project description - provided by applicants

Prostate cancer is the most common cancer in European males, with over 340,000 new cases and 71,000 deaths each year in the EU. Indeed, experts predict up to 1 in 8 men in the EU will be diagnosed with prostate cancer during their lifetime. Significant progress has been made in recent years in detecting the onset of prostate cancer. In particular, prostate-specific antigen (PSA) from blood tests has been found to be a useful marker of prostate disease; however, a number of studies have shown that it often results in "false positives" that can lead to worry and anxiety among patients. Therefore, a need exists for new tools to rapidly classify patients based on likely disease severity, to monitor disease progression and to enable the development of home monitoring kits for monitoring disease progression and recurrence.

To address this unmet clinical need, Oxford MediStress (OMS) has developed the Leukocyte ImmunoTest(tm) (LIT(tm)) for rapidly assessing neutrophil function, a key aspect of the immune system. The rapid, portable, hand-held point-of-care (POC) test analyses a pinprick of blood and quantitatively evaluates how well an individual's white blood cells (their so-called "neutrophils") are capable of responding to chemical "stimulation" in a test tube when mixed with our patented chemicals. The test has been successfully evaluated recently in a clinical trial involving prostate cancer patients in London to see if the ten-minute test could pick out which patients had the most severe disease. According to our collaborating cancer experts, these results provide confidence the test could one day act as a risk stratification method and as a method to monitor disease progression in prostate and other cancers, including breast cancer.

The outputs of the proposed feasibility study will increase our understanding of how the test can be used in current clinical practice for risk stratification and disease monitoring in prostate cancer and to see whether it could be used in other areas of prostate cancer monitoring, as well as in other cancers. Finally, the project will improve our understanding of the clinical-regulatory and manufacturing strategies that the Company will need to adopt to be successful and, at the same time, benefit the patient and healthcare-provider.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
HAYDALE COMPOSITE SOLUTIONS LIMITED	Continuous Integrated Damage Detection (CIDD)	£97,056	£67,939

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

Funders Panel Date: 08/08/2018



Project description - provided by applicants

This project will develop an innovative composite damage detection system, which can be incorporated into composite laminates at the point of manufacture. This system will allow precise location of the damage event, in addition to an indication of the severity of the damage. The technology that will be developed in the project will be capable of being incorporated into composite parts giving damage detection capability across a large area without adding appreciable weight, cost or complexity.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
TECHQUITY LIMITED	The Improvement of TV show and film Recommendation through Artificial Intelligence and Machine Learning	£62,966	£44,076
Teesside University		£25,653	£25,653

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Funders Panel Date: 08/08/2018

## Project description - provided by applicants

The way in which we watch TV and Movie content is changing. Over the air, scheduled programmes are being replaced by high quality Video on Demand (VOD) services from providers such as Netflix, Amazon, Sky, Now TV and many more globally.

Due to this shift from scheduled program guides, we are now expected to know what we would like to watch or be presented with a VoD providers list of available content driven by factors outside of our control.

There are two main obstacles with this new approach to content offerings:

1. If we know what we want to watch, it is difficult to know which provider, if any, has that content available. We have to login and search and if its not available (more often than not) move onto our next provider.
2. If we don't know what we want to watch we are presented with an overwhelming set of available content, some of which we may have already seen and some irrelevant.

This leads to a frustration that is common amongst viewers and there is a shift to recommendations from friends / family via social media.

<https://www.ericsson.com/en/networked-society/trends-and-insights/consumerlab/consumer-insights/reports/tv-and-media-2016>,  
<https://cstonline.net/why-cant-i-find-anything-to-watch-on-tv-by-john-ellis/>

With more reported VoD suppliers on the horizon (Google - [techradar.com/news](http://techradar.com/news) and Apple - [[macworld.co.uk/news](http://macworld.co.uk/news)][0]) this problem will only worsen.

Our vision is to develop an app that at its core has an Artificially Intelligent recommendation engine that with minimal user interaction will recommend relevant content for viewers based on personal viewing habits.

By utilising whole of market data sources ([[TheMovieDB.org](http://TheMovieDB.org)][1], [IMDB.com](http://IMDB.com)) as a central database, mapped to VoD providers content availability we can provide a solution to problem 1\ . By creating a recommendation engine and smart interactive app that learns via interaction (seen, like, don't like, not interested) and Machine Learning on recommendations we solve problem 2\ . Our aim is to further utilise pre-defined

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lists from both influencers (critics, celebrities etc) and popular current affairs sources to further entice interaction and provide more intelligent AI data.

[0]: <http://macworld.co.uk/news>

[1]: <http://TheMovieDB.org>

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
CYBORN LIMITED	AFRICA - Anonymised Fragmented Redundant Independent Cloud Architecture - Moving Target Defence Privacy for Data	£253,160	£177,212

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Funders Panel Date: 08/08/2018

### Project description - provided by applicants

AFRICA (Anonymised Fragmented Redundant Independent Cloud Architecture) is the world's first Cloud distributed software as a service platform. It's innovation combines data security, privacy and resilience in one technology platform. This means AFRICA provides as close to total privacy and recoverability as is possible for protecting people and organisations concerned about online data privacy.

AFRICA is deployed as a disruptive, consumption based service via flexible API and SDK capabilities for organisations and application providers that desire the world's best data security and resilience.

AFRICA protects your online data, wherever stored. AFRICA delivers data privacy in a way that data can always be recovered by legitimate owners, but is comprehensively protected against compromise by hackers and even ransomware. In doing this, AFRICA provides peace of mind for organisations and people that sensitive and private data is properly secured online and only accessible by legitimate parties.

AFRICA technology is further designed to deliver a data, carbon and cost optimised solution for organisations concerned about data privacy but also the escalating cost of privacy.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
B G RESEARCH LIMITED	Building a prototype PCR reaction vessel for the direct detection of pathogens from blood	£190,904	£133,633

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Funders Panel Date: 08/08/2018

### Project description - provided by applicants

BGR has developed a method for detecting viral pathogens directly from crude samples, removing the requirement for complex lab facilities or expert use. The technique was originally developed in the wake of the 2015 Ebola outbreak to establish if it is possible to perform laboratory standard molecular diagnostics in resource poor environments. The proposal here is to adapt the BGR technology from the detection of viral haemorrhagic fevers to diseases such as HIV that have lower viral loads but impact far higher numbers of individuals. In this project BGR will build a new reaction vessel for performing its in tube detection that enables the use of greater volumes of blood and hence increase the sensitivity. The reagents that BGR have developed are capable of detecting the viral RNA in the presence of high levels of blood, as much as 20% to date, and yet at these high percentages the optical data used to determine the presence of the targets are inhibited. The goal of this work is to create late stage prototype vessels that, in combination with evolved reagents, remove the blood from the optical light path and therefore increase the sensitivity of the approach and greatly increase the number of diseases the approach will be appropriate for. As an example, an Ebola patient may have a million viruses per millilitre of blood whereas a patient with hepatitis C will have fifty thousand and a HIV patient on drugs around ten thousand. The target is to increase the sensitivity to 3000/ml, the WHO has identified 5000/ml as being suited to low-cost diagnostics in resource poor regions for the detection of disease such as Hepatitis and HIV. The BGR approach takes less than fifty minutes, requires no laboratory facilities or training and is low cost simply because each test on consists of a plastic tube and a freeze-dried enzyme. Therefore, the improved reaction vessel, reagents and instrument would greatly increase the health impact of this innovation and the commercial opportunities for the company. The assays can then be used to assist in outbreak situations of blood borne diseases. It is also envisaged that the new vessel developed for this project could make possible the use of other sample types such as swabs for respiratory disease. BGR can then determine how sensitive the new assays are using a model virus and move towards commercialisation of appropriate tests.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
VIVOPLEX LIMITED	VivoPlexBeef: Cattle Rumen Health Monitor	£69,360	£48,552
RAFT SOLUTIONS LIMITED		£30,097	£21,068

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Funders Panel Date: 08/08/2018

## Project description - provided by applicants

Suboptimal health and welfare within the beef cattle industry is significant and costs the livestock industry millions of pounds each year. This proposal represents a 'One Health' cross-over project which seeks to translate a sensor technology from human health into the animal health sector. VivoPlex is developing an innovative sensing device that wirelessly measures dissolved oxygen (DO), pH and temperature within the human uterus, and this proposal is looking to translate this into animal health.

Providing accurate information, collected automatically and presented in clear, easy to use forms, has been shown to encourage more timely farm management activity, allowing vets and their farm clients to seek herd health practices that prevent disease and loss of productivity, rather than therapeutic treatment of disease.

The project team, VivoPlex and RAFT Solutions, specialists in cattle health and sustainable livestock production aim to adapt VivoPlex technology to provide solutions to the two primary problems encountered in the beef production sector:

- 1\ Reduction of antimicrobial usage by use of precision farming techniques in diagnosis of bovine respiratory disease (BRD); and
- 2\ Increasing productivity & managing greenhouse gas (GHG) impacts through optimisation of the rumen microbiome in the feeding challenge represented by the balance between maximising energy intake versus rumen health.

VivoPlex and RAFT, would therefore like to explore the feasibility of designing a beef cattle sensor that continuously monitors the environment of the rumen in real-time. It is envisaged that the sensor will be administered orally via commercially available Bolus guns. The product will focus on rumen fermentation by monitoring all three critical parameters, DO, pH and temperature.

There are no multi-parameter sensing devices that provide DO data within the livestock market. The potential to monitor DO within the rumen, in addition to pH and temperature, could lead to optimising the fermentation process. This will allow livestock farmers to manage feed to provide the maximum daily weight gain but controlling the risk of metabolic diseases such as rumen acidosis and liver abscessation associated with bacteraemia consequent to depressed rumen pH.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MICROMIX PLANT HEALTH LIMITED	Increasing drought resistance in crops by 25% - controlling epigenetic expression to abiotic stress through biostimulants and micronutrients	£567,704	£340,622
Nottingham Trent University		£240,244	£240,244

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Funders Panel Date: 08/08/2018

## Project description - provided by applicants

**\*\*VISION:\*\*** Working with the Sustainable Agriculture Department at Nottingham Trent University (NTU), we intend to map the epigenetic pathways of drought-related abiotic stress in crops and develop the first biostimulant-micronutrient formula to increase drought resistance by 25% -- with the aim of reducing the water consumption (irrigation) required by agriculture without damaging productivity.

**\*\*BACKGROUND:\*\*** The project builds upon the success of Innovate UK project 710633, in which we managed to increase bell pepper (UK's most heat sensitive crop) epigenetic expression to abiotic heat stress - using biostimulants, intermediates for growth and micronutrients.

**\*\*OBJECTIVES:\*\*** Utilising this increased understanding of epigenetics, we intend to extend this abiotic stress response mapping to five indicator crops and develop a novel bio-solution that genetically suppresses a plant's negative responses to reduced soil moisture (drought conditions) and provides the necessary micronutrients to stimulate continued healthy and productive growth under conditions when the plant would normally fail.

**\*\*FOCUS:\*\*** The solution will be targeted at crops with a high water or irrigation requirement such as potatoes, spring wheat, peas, lettuce and pak choi. These crops provide the best indicator crops for a wider range of food crops grown worldwide.

Our aim is to reduce the impact of climate change on crops around the world, as water becomes an increasingly scarce resource and growing conditions become hotter and drier in key production areas. We believe this can be achieved using a unique, proprietary combination of mostly natural plant-extracts and substances that are also safe, toxin-free (even when applied multiple times at high rates -Campden BRI 2017) not requiring long term plant breeding programmes or politically unacceptable genetic modification.

**\*\*INNOVATION:\*\*** When developed, we expect this unique new combination of micronutrients and biostimulants to significantly increase a crop's resistance to all forms of abiotic stress and stimulate growth in environments where moisture is limited. Our initial research (from Innovate UK project 710633, and field tests) suggests a 25% reduction in water consumption will be possible, whilst increases in yields (up to 30%), fruit production (40%), shelf life (44%), disease resistance, palatability and mineral content are also achievable.

**\*\*OUTCOME:\*\*** We are at the forefront of biostimulant and micronutrient technology and this project will help us realise a £30m+ global

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opportunity. Farmers in turn will benefit from reduced crop losses, improved yields, strengthened supply chains, reduced impact of climate change and increased agricultural sustainability, in line with Innovate UK's H&LS aims. ROI: 622%

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Funders Panel Date: 08/08/2018

# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
OSTIQUE LIMITED	An Innovative Medical Device for Ostomy and Wound Care	£257,126	£119,596
BOWEL & CANCER RESEARCH		£13,157	£13,157
University Hospitals Birmingham NHS Foundation Trust		£40,013	£40,013

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Funders Panel Date: 08/08/2018

## Project description - provided by applicants

Bowel surgery to treat inflammatory bowel disease, cancer or bowel trauma can often require diverting part of the bowel through an artificial opening in the surface of the abdomen (a stoma). This bypasses the normal bowel function and diverts waste into an ostomy bag which the patient must wear externally all day, every day. In the UK alone, there are almost 200,000 people living with a stoma, and the global ostomy market is due to reach over \$3.4 billion by 2020 due to the increasing prevalence of bowel disease and cancer.

Existing systems have changed little over the last 25 years and in essence are still 'just' a bag. Problems include bag-leaking, noises, unpleasant odours and skin reactions. The limitations of current ostomy appliances can impact on the patients' daily activities, their physical and social mobility and their psychological well-being.

Many patients find the lack of control of bowel functionality difficult. Many ostomates suffer from loss of dignity and self-confidence. Up to ¼ suffer from psychological symptoms including poor body image, anxiety, social isolation, depression and even suicidal inclinations.

"I'm so scared. I've had my thing for two months and I don't really leave the house. I'm afraid so many things will go wrong." [1]

Our novel ostomy system is inspired by tattoos and lingerie and empowers the wearer through beautiful aesthetics, whilst offering significant functional advantages through material innovation and technology.

It is designed for temporary use: swimming, the beach, intimate occasions, times when exposing a current ostomy appliance can cause embarrassment. It is reusable, can be skin-colour-matched and has innovative and superior skin attachment, odour control and usability.

Feedback from potential customers indicates a strong desire for such a product and the inclusion of a strong Public and Patient Inclusion (PPI) component in our development process will ensure we can maximise the sales potential of the final product.

**\*\*Prospective Customers: Ostique website and Instagram Feedback\*\***

"Absolutely stunning, something I'd love to wear. Would be a dream to walk down the street not having to hide a bag."

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"I would love to have one! I think this is innovative and will lead the way in ostomy wear!"

"This is the future of stoma wear! I'm just in awe. The idea, the design, the process... just everything. This is one of the greatest things ever. Thank you!"

\[1\] OstomyLand Facebook User, 2015

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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
ZERO CARBON FOOD LTD	Improving the productivity, sustainability and scalability of hydroponic growing systems - reducing agrochemical dependency through UV, electrolysis and organic biofilters	£574,228	£401,960
Nottingham Trent University		£209,935	£209,935

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Funders Panel Date: 08/08/2018

## Project description - provided by applicants

**\*\*VISION:\*\*** Growing Underground are the UK's leading hydroponic farm, utilising an abandoned air raid shelter in Clapham, to grow microgreens and salads for local supermarkets and restaurants.

Crops are sown into felt and then grown using nutrient-enriched water, which is then recycled and reused in the system. Hydroponic growing (HG) has a number of advantages over traditional farming, requiring 90% less water, 80% less space, producing yields 50% quicker and enabling crop production in areas typically not considered viable (NCBI comparison:2016). Investment in HG and its adoption, technologically and commercially, is being held back however through inconsistent yields and a reliance on agrochemicals.

**\*\*OBJECTIVES:\*\*** Working with the Department of Sustainable Agriculture at Nottingham Trent University, we intend to improve the productivity, sustainability and scalability of hydroponic growing systems, utilising UV, biofilters and other organic materials including slightly acidic electrolyzed water to sterilize water, seeds and replace agrochemical use in the growing process.

**\*\*FOCUS:\*\*** Chlorine Dioxide/Chlorates (CD) has been the sterilisation technology of choice for the vast majority on hydroponic, vertical and greenhouse growers, despite environmental issues associated with its use. As the regulatory and consumer landscape move away from the use of agrochemicals, it is now vital that a safe, sustainable, environmentally friendly alternative to CD use in closed-loop systems is developed.

**\*\*INNOVATION:\*\*** Focussed on growing our main crops micro herbs (fennel, coriander, salad rocket, purple radish, red mustard, wasabi mustard, garlic chive) and pea shoots, the project will result in innovations in three areas;

1. A chemical-free system to purify water in the closed loop growing processes - utilizing an optimised combination of UV, agrobacterium, carbon filters and polysaccharides (WP2)
2. A chemical-free system for the sterilization and disinfection of seeds - using UV, swelling and vibration system toto 'swell' the bacteria-occupying crevices on a seed's surface and purge bacteria and contaminates (WP3).
3. Determine the optimal UV light configuration combination for each crop to boost yield (30%), growth rate (26%) and reliability (reduction in disease-related crop loss (30% vs other agrochemical-free technologies)

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**\*\*OUTCOME:\*\*** Hydroponic, vertical and other non-traditional growing systems have long promised to be an environmentally-friendly, sustainable and resource efficient alternative to traditional agriculture and meet the 60% increase in demand for crops expected by 2030. With latent consumer demand for UK-grown salads, and regulatory demand for farmers to go agrochemical free, we see this as a £24m opportunity (5-year cumulative revenue) that is strategically important long-term food security.

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Funders Panel Date: 08/08/2018

# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
KW SPECIAL PROJECTS LIMITED	CerAMake	£423,686	£296,580
CAT INTERNATIONAL LTD		£49,820	£34,874
EMMA BRIDGEWATER LIMITED		£48,219	£24,110
LUCIDEON LIMITED		£216,482	£129,889
Manufacturing Technology Centre		£123,053	£123,053
MCGEOCH TECHNOLOGY LIMITED		£79,114	£47,468

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Funders Panel Date: 08/08/2018

XAARJET LIMITED		£44,462	£22,231
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Funders Panel Date: 08/08/2018

## Project description - provided by applicants

AM (Additive Manufacturing) offers significant benefits over many conventional production methods: digital production flexibility, reduced material waste and exceptional design freedom. Processing ceramic by AM offers the potential to create complex parts without tooling and offers precise material control which is not possible by conventional processing methods. The widespread adoption of ceramic AM technology is however hindered by material availability, process maturity, material properties and cost. In particular, the inability to melt ceramics and the requirement for organic phases to aid processing, create significant barriers.

In the CerAMake project novel material chemistry will be developed which exploits the unique processing characteristics of piezoelectric inkjet technology providing significant microstructural control and improved properties via a scalable ceramic binder jetting platform. Advanced material characterisation and evaluation techniques will be applied to validate the suitability of the material throughout the process chain, providing a baseline chemistry applicable to a wide variety of ceramic materials. This will result in the first ceramic AM technology capable of achieving highly complex parts in a rate capable system suitable for multiple market sectors.

CerAMake is also focused on uniform deposition of powder based feedstock material as a substrate for the novel fluid chemistry. Conventional deposition methods limit the range of material/powder particle sizes which can be used, generate anisotropic properties and produce low powder bed density resulting in high part porosity or significant firing shrinkage. The novel deposition process used in CerAMake is designed to uniformly compact the print bed, resulting in higher powder density and homogeneity of the green specimen, aiding the development of mechanical isotropy in the final part. This homogeneity is also essential for uniform densification of unfired parts, facilitating the fabrication of fully dense, complex ceramics.

To demonstrate the innovation in the new approach, material requirements from three distinct sectors of the ceramics industry (high performance ceramic manufacture, refractory filter production and, decorative and practical homewares) will be identified, produced and functional demonstrators manufactured for evaluation by end-users.

This new integrated material and process capability will act as an enabler for increased uptake of ceramic AM in the UK, leading to higher levels of confidence and investment. This will boost the productivity and competitiveness of the partners in the project and will have a transformative effect on the UK ceramics industry as well as placing the UK AM sector in a leading position.

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# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
IMPACT RECYCLING LIMITED	Novel Method for Extracting Colour From Plastic Recyclate - PolyMet	£299,634	£209,744
ECOSURETY LIMITED		£92,509	£64,756
IMPACT LABORATORIES LIMITED		£367,720	£257,404
MCLAREN PLASTICS LIMITED		£89,186	£62,430

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Funders Panel Date: 08/08/2018

## Project description - provided by applicants

Whilst plastic packaging recycling rates have been improving across Europe they still remain low at only 35%. With tough new government targets to come into force requiring 65% of plastic waste to be recycled it is essential new technologies are developed to allow recyclers to extract value from this waste economically and meet these targets. Currently this value has come from simply separating plastics into material groups with the majority of material being of mixed colour. Our project aims to develop a new method for extracting value from this waste plastic by developing a process which can remove the pigment dispersed within the plastic returning it to a natural-recyclate. In doing this recyclers would be able to double the resale value of their mixed coloured plastics making more waste economically viable to recycle and giving manufacturers, molders and producers access to greater quantities of natural-recyclate for use in products.

The project will build on a previously successful InnovateUK feasibility study which showed pigment could be removed from PE and PP at a lab scale using a novel designer solvent and high-shear mixing technique. Our consortium will target removing pigments from waste plastic packaging which makes up approximately 85% of plastic waste and develop this technology (PolyMet) through to a demonstration plant scale at TRL7 ready for full scale setup post project.

This technology fits well within the UK governments new regulatory push for improved recycling in the next decade and will place the UK at the forefront of plastic recycling.

The environmental and social benefits from this technology are significant: increased recycling rates will reduce plastic's carbon foot print by reducing our reliance on new plastic production and reduce waste plastics leaking into the environment through poor waste management. There is also a significant trickle down effect into the circular economy with a recent Deloitte study showing that 75 jobs were created for every 10,000 tonnes of recycle produced.

Ultimately PolyMet will allow recyclers to realise the maximum value from their feedstocks, allowing it to be used in a greater number of secondary application and allowing our society to move closer to a plastic circular economy.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
BERRY GARDENS GROWERS LIMITED	GRASP-berry: High speed picking soft fruit robots	£87,869	£43,934
ABB LIMITED		£80,877	£40,438
CAPACITY BUILDING SUPPORT LIMITED		£533,504	£373,453
University of Lincoln		£294,795	£294,795

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Funders Panel Date: 08/08/2018

### Project description - provided by applicants

The UK soft fruit market is now worth at retail well over £1.3 billion per annum. The UK grows over 160,000 tonnes of fruit and employs 29,000 seasonal and typically migrant pickers. 50% of the total production cost is for labour. The soft fruit industry is extremely concerned with the both the availability of picking labour and labour cost inflation. The impact of Brexit is already affecting labour supply and the opportunities to pass on labour cost inflation are weak and challenging. The soft fruit sector is a UK success story and there are still opportunities for expansion and to reduce fruit imports. However, it is very clear that to thrive the industry needs to drive every possible means to improve to labour productivity. Robotic fruit picking clearly offers great opportunity in the sector. Here we will develop the world's first high speed robotic fruit picking system. We build on ongoing research by CBS, Berry Gardens and the University of Lincoln (UoL), complimenting the team for the first time with the inclusion of ABB, the global leaders in robotic system design and marketing.

CBS have already demonstrated world leading picking performance (in terms of vision system accuracy and picking speed) for their fruit picking robot: GRASP-berry. GRASP-berry is a highly novel parallel robot with two independent picking arms and a novel fruit grasping actuator. The vision system alone is highly novel and deploys advanced AI deep learning algorithms. The initial field trials have clearly shown that to deliver a commercial robot we need to increase picking speed and develop new ways to detect and pick occluded fruit that lie within dense clusters. Here we will test the use of active manipulation to detect and pick occluded fruit, plus a novel high speed robotic picking system that will deploy an ABB Delta robot that is industrially tested and can pick at speeds of up to 120 picks per minute. The system will then be integrated into the world leading Thorvald robotic platform that has been developed by CBS with UoL.

This is a much-needed project that will transform robotic fruit picking from the laboratory bench to a commercially relevant system. The world-wide market for these machines and IP is very significant.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
OCTUE LTD	Digital Twin Wind Array	£241,236	£168,865
INSIGHT ANALYTICS SOLUTIONS LIMITED		£222,599	£111,300
OFFSHORE RENEWABLE ENERGY CATAPULT		£99,738	£99,738
SSE PLC		£0	£0
University of Hull		£79,940	£79,940

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Funders Panel Date: 08/08/2018

### Project description - provided by applicants

The DTWindArray project will prove the highly innovative and disruptive approach of monitoring and predicting the performance and reliability of wind turbines in virtual worlds, minimising the costs of physical inspections, monitoring and data analysis. This cost reduction and improved predictive monitoring will transform the maintenance management philosophy of the offshore wind industry from a reactive-preventative to predictive-maintenance approach.

For OWF Operators (the customers), average Operational Expenditure (OPEX) will reduce by 11% from £69,000/MW/yr to £61,500/MW/yr. For a 500MW representative OWF, the DTWindArray approach will yield cost savings of £3,750,000/yr. For the current 16,140MW EU OWF fleet, this amounts to potential lifetime savings of approximately £3 billion for the sector.

The industrial partners (Octue and OnyxInsight) will commercialise and apply the technology through provision of novel asset management services to OWF Operators. This will result in the creation of around 30 jobs and increase in revenues of c.25% and c.500% over a 5 year period.

ORE Catapult and University of Hull will support Octue and OnyxInsight in the development and validation of the technology. SSE will take a non-funded role to supply operational data from their Greater Gabbard OWF to validate the systems Artificial Intelligence and provide a demonstration opportunity.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
FARADAY GRID LTD	Faraday Exchanger for Renewable Generation Integration (FERGI)	£690,258	£483,181
OFFSHORE RENEWABLE ENERGY CATAPULT		£219,296	£219,296
University of Edinburgh		£67,342	£67,342

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Funders Panel Date: 08/08/2018

### Project description - provided by applicants

In renewable generation and transmission, transformers, converters and compensators are fundamental parts of the electrical system for voltage change, grid compliance and power compensation. The Faraday Exchanger for Renewable Generation Integration (FERGI) project will aim at develop and testing a generation-scale version of a successfully trialled device, the Faraday Exchanger (FE), to address the renewable energy market need to solve some of the fundamental technical challenges of voltage, frequency and power-factor control along the electrical transmission system. The device will benefit both renewable generators and grid operators. This will provide renewable generators will the ability to increase the efficiency of their electrical transmission system by reducing energy losses and thus increase generation income while in the same time helping grid operators to reduce the costs associated with both capital expenditure and intermittent payments to maintain the grid performance within the prescribed limits.

Through the optimization of this innovative and disruptive device, FERGI has the potential to introduce to the market a novel device which provides the functionalities of transformers, reactors and potentially converters. The project can unlock a considerable reduction in the Levelized Cost of Energy (LCOE) of different sources of renewable generation (offshore wind, Tidal and Solar), estimated to be 1.6% reduction in the LCOE of offshore wind. This can lead to increased investment in new renewable generation capacity, reduce carbon emissions and also consumer electricity prices.

Faraday Grid Limited will be the technology developer and beneficiary of the project. They will lead the technical engineering activities, design and manufacturing of the FE demonstrator device. ORE Catapult will project manage FERGI, in addition to leading the validation and test programme of the device using its state of the art "Grid Emulation System" to test the equipment response to grid requirements. Using ORE Catapults' established route to market and commercialisation processes, Faraday Grid Ltd will work closely with ORE Catapult to develop a technology and commercialisation roadmap for FERGI across the different renewable energy sectors.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
VISIONMETRIC LIMITED	Forensic Facial Identification using the Fringe P3 brain wave response (EEG-FIT)	£309,916	£216,941
University of Kent		£92,226	£92,226

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Funders Panel Date: 08/08/2018

### Project description - provided by applicants

The production of facial composites of criminal suspects from eyewitness testimony (commonly known as PhotoFITs or EFITs) is a staple tool used to assist criminal investigations throughout the world. This project proposes a radical, new way of obtaining such images with increased accuracy and speed.

At present, eyewitnesses to crime produce composite images under the guidance of a trained police operator and the process generally involves extensive verbal interaction. The process is thus demanding on human resources (taking 1 - 4 hours) and accuracy is quite low.

The project partners Visionmetric and Prof Howard Bowman, University of Kent aim to overcome the limitations of current methods by combining their expertise and making the necessary advances. The central idea is to present eyewitnesses to a crime a rapid sequence of computer-generated images calculated to resemble the suspect. EEG (electroencephalography) is used to capture an enhanced brain wave response that is observed in response to stimuli which bear resemblance to the criminal offender. This method (known as the fringe P3 method) has been extensively developed by Bowman at University of Kent. Visionmetric specialise in machine learning and AI methods applied to the human face. They propose to develop fast and robust iterative processes for generating increasingly relevant facial images from the P3 signal stream and presenting these to the witness.

This approach is very fast. It directly exploits the normal brainwave activity of the eyewitness and avoids the need for extensive interaction between the witness and operator. The aim will be to show that more accurate images of a suspect can be produced and in a small fraction of the time that is required using existing methods.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ROCKPOOL LIMITED	Flourishzone Productivity Improvement Platform	£706,366	£494,456
STFC - Laboratories		£293,375	£293,375

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Funders Panel Date: 08/08/2018

## Project description - provided by applicants

Productivity improvement is difficult because it's the net result of lots of complex (and busy) people interacting with organisations that have their own systems, processes and pressures. Most organisations lack the breadth of skills necessary to increase productivity. People are complex - with individual needs and goals. Organisations must embrace this in the context of their own output-based drivers.

Unfortunately, UK businesses are 15% less productive than the G7 average and this is a core barrier to UK competitiveness. UK productivity, or output-per-hour by workers, has stalled since 2008. Productivity Improvement is a UK government imperative, a key pillar of the Industrial Strategy and supported by the Bank of England. Our approach is a critical enabler for the success of the UK economy.

80% of leaders cite workforce capability as a critical challenge, yet only 4% believe they can address this. Individual coaching improves staff engagement and can increase individual productivity by >20%. There remains a clear need for a system that builds productivity by addressing what matters to individuals, to create a win-win between people and organisations. Such a system must have the intelligence, responsiveness and hyper-personalisation to enable positive, synergistic development for both the individual and organisation. It is our vision to deliver this.

This project proposes creating an innovative Productivity Improvement Platform (PIP) that integrates a scientifically validated, dataset of over 750 productivity 'factors', a thesaurus, over 2000 diagnostic statements and 2 AI recommender systems.

The platform will have an open content creation facility, forming a new marketplace for developers, and be able to monitor individuals, teams and organisations in an on-going fashion -- continually assessing and improving productivity from several dimensions.

The PIP product will be first to market as a continuous improvement tool and as a smart personalised coaching tool for individuals and teams. Its unique price point will be highly disruptive within the current coaching/e-learning eco-system.

Our PIP will be unique worldwide. Building on feasibility work we will create a prototype technology platform combining the latest AI developments and our unique expert framework to deliver a new, market disrupting, offering that:

- 1\ challenges the "rate per hour" coaching-consulting business model

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2\ provides a new marketplace for learning and development.

3\ converges productivity, wellbeing engagement, feedback, into a single cost-effective solution.

The core of this project is improving business productivity through helping individuals. The platform provides a low-cost solution to increase organisational productivity and competitiveness.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MENDELIAN LTD	Development of the Mendelian Rare Disease Screening Platform - for the fast, accurate, automated diagnosis of rare disease	£936,628	£533,878

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Funders Panel Date: 08/08/2018

## Project description - provided by applicants

**\*\*VISION:\*\*** The diagnosis of rare disease is complex, challenging and costly - with missed and misdiagnosis having a significant health and economic consequences for both patients and the NHS. We intend to redress this and make diagnosis easy, quick and most importantly accurate - overcoming some the key technical and clinical issues associated with the current diagnosis process.

**\*\*OBJECTIVES:\*\*** Building on our prototype rare disease database, which suggests rare disease diagnosis with 78% accuracy based upon the input of of 5 defined symptoms, we want to develop the world's first automated rare disease screening tool.

Designed to sit alongside and integrate directly with medical record software at a GP clinic or hospital, utilizing SnoMed code classifiers, the tool is capable of automatically scanning patient's medical record for symptoms, past and present, and then cross referencing these against our live database of 8000+ rare diseases, flagging potential, undiagnosed rare disease patients. These are then ranked in order to give a weighting, enabling a doctor to make an informed decision regarding likelihood, need and urgency of treatment. Many of these hard to diagnose diseases have effective treatments that can drastically improve patient outcomes and reduce costs and burden on medical systems.

**\*\*FOCUS:\*\*** The project focuses on the development of four key elements;

1. Integration into electronic health systems through API and with SnoMed code classifiers.
2. Development of the patient screening system which will plug onto the current Mendelian diagnosis suggestion tool
3. Working with selected specialist physicians and clinical experts to determine the patterns, weighting and recommendations for each disease group as well as the health economics behind these.
4. Development of the personalised alert system

**\*\*INNOVATION:\*\*** The first real-time patient screening tool that will flag potential undiagnosed rare disease patients within health systems.

**\*\*OUTCOME:\*\*** There are over 3 million rare disease patients in the UK (350m+ worldwide) making this a sizeable commercial opportunity, as well as directly addressing a defined UK NHS and global need. The benefits of this are sizable and immediate;

\* Patients: Quicker access to the correct treatment, improving health impacts and enable preventative treatments through earlier diagnosis.

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- \* Clinicians: Reduce diagnosis time;, reduce misdiagnosis; reducing research needed for diagnosis and number of appointment.
- \* NHS: Potentially save NHS £2.6bn per year in rare disease cost (£15bn NHS spending X 25% diagnosis spend x 70% saving).

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MEDANNEX LIMITED	A novel treatment for systemic lupus erythematosus	£290,184	£203,129

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

Funders Panel Date: 08/08/2018

Project description - provided by applicants

MedAnnex is developing a new therapeutic called annexuzlimab(tm). It targets and binds to annexin-A1, a protein that occurs naturally in the human body and plays an important role in the response of the immune system to inflammation. There are well known links between inflammation and numerous major diseases including several autoimmune conditions such as rheumatoid arthritis, multiple sclerosis and systemic lupus erythematosus. This project is a vital step in the development of annexuzlimab as an innovative therapy with the potential to become a major new drug to extend and improve lives.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>  
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# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
PYROGUARD UK LIMITED	'Pyroguard 2' Fire-resistant safety glass for the future	£867,078	£390,185

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

Funders Panel Date: 08/08/2018

## Project description - provided by applicants

Fire-resistant safety glass (FRSG) is used within windows/doors/walls to control smoke/fire/heat in case of fire. Last year's Grenfell Tower fire, killing 71 people, highlighted the importance of adequate fire safety measures, and the global market for FRSG is worth over £1 billion.

FRSG gets its fire-resistant properties from fire-resistant interlayers between individual glass sheets. The composition and quantity of interlayers is dependent on customer requirements. Foreign competitors utilise a process called the batch evaporation process (BEP) to produce FRSG of all specifications desired by customers. Providing this 'one-stop-shop' of FRSG enables global exploitation. However, the BEP has severe limitations: establishing a plant requires a large capital investment and the process is water and energy intensive. Furthermore, no competitor can produce a UV-stable, fire-resistant interlayer, meaning an additional petrochemical-based layer is utilised to ensure the fire-glass's functional longevity, increasing manufacturing cost and environmental impact.

Pyroguard are the only UK producer of FRSG, however their current manufacturing capabilities inhibit the quality of FRSG they can produce. Pyroguard cannot afford to establish a BEP to match best-in-class due to the high investment required. Unable to offer a 'one-stop-shop' FRSG range, Pyroguard are losing both UK and EU market share to foreign competitors, and their success is inhibited within the global market. To compete and grow on both fronts, it is critical that Pyroguard innovate and develop a low-cost manufacturing process capable of producing a best-in-class FRSG range.

To address these challenges, Pyroguard seek to develop the 'Pyroguard-2' (P2) product range, with best-in-class specifications meeting safety standards worldwide. P2 will be manufactured through an innovative manufacturing process, 'cast-in-place' process (CIPP). Establishing a CIPP plant will cost less than 10% of an equivalent BEP process, and the glass production will require 40% less water and 40% less energy. The P2 range will also be thinner and less dense than competing solutions, with the CO2 savings associated with this reduced mass of glass over the first 5 years of sales equivalent to taking over 250,000 cars off the roads. If successful, these advancements will truly disrupt the fire-glass market, increasing Pyroguard's competitiveness nationally and globally.

With support through Innovate UK a 18-month programme of research is required to take this concept through to a pre-production prototype just 12-months away from commercialisation. The project is likely to lead to significant growth and healthy revenues for Pyroguard, whilst providing significant value for money for UK tax payers.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

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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
AKL RESEARCH & DEVELOPMENT LIMITED	APPA – A New Paradigm in the Treatment of Osteoarthritis	£968,099	£677,669

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

Funders Panel Date: 08/08/2018

Project description - provided by applicants

AKLRD, a UK SME, is seeking funding to take APPA, a new drug for treating Osteoarthritis (OA), through proof of concept clinical testing.

OA, a degenerative joint disease, leads to increasing immobility, chronic pain and ultimately costly joint replacement. In the UK, 8.75 million people have sought treatment for OA and it is a growing problem linked to increasing ageing and obesity in world populations.

Following the withdrawal of a number of medicines for treating OA, treatment options are limited. Available medications that promise to mitigate the pain of OA have a number of risk / benefit considerations. Non-steroidal anti-inflammatory drugs (NSAIDs) are associated with a significant increase in GI bleeds and 50-100% increase in the risk of myocardial infarction or cardiovascular death. Remaining treatment options are subject to significant prescribing restrictions.

APPA has potential as a first-in-class, disease modifying treatment (in addition to significant pain relief and function improvement) with a demonstrably low risk adverse event profile.

This would build upon a robust evidence-base where APPA has demonstrated repeated significant disease modification (slowing of cartilage destruction) in validated \_in-vivo\_ animal models, as well as showing repeated, significant pain relief and function improvement \_in-vivo\_ in validated rat and canine models.

Completion of the clinical work in the proposed project would catalyse further development of APPA and provide patients with a new treatment option.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
KORTICAL LTD	A Scalable AI Platform for Blood Service Demand Planning	£853,528	£597,470
NHS Blood and Transplant		£145,172	£145,172

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

Funders Panel Date: 08/08/2018

### Project description - provided by applicants

Successfully responding to the financial, social and operational challenges the healthcare sector faces, requires innovative use of data. Donated blood is a valuable, short shelf-life product that is essential to the global delivery of patient care. The management of the blood supply chain is extremely complex and as such it represents an excellent model on which to develop advanced healthcare supply chain tools. This project will use the supply of platelets in England as a test system to develop an artificial intelligence/machine learning based demand planning platform.

Working with NHSBT, the sole provider of blood components in England, Kortical will create a scalable AI demand planning platform which will deploy its automated machine learning environment, The Kore, to deliver advanced demand planning and benchmarking tools. These will enable the NHS to better manage its complex blood supply chain as well as leading to improved outcomes for patients who require a blood transfusion.

The project has unique access to data captured throughout the current blood supply chain and will lead to a product which has applications far beyond the collection and supply of blood to the NHS.

Deploying The Kore at the heart of the NHS strategic data platform, will unlock the rapid delivery of AI across the NHS and provide a reusable integrated AI and big data solution that can be rapidly deployed in organisations of any scale.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

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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
DEFINIGEN LIMITED	Platform for the development of optimised NAFLD liver cell models to accelerate drug development	£324,083	£226,858

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

Funders Panel Date: 08/08/2018

### Project description - provided by applicants

The aim of this project is to provide cell tools to help scientific researchers working on a common liver disease called non-alcoholic fatty liver disease (NAFLD). The cell products are human liver cells with genetic mutations inserted that ultimately disrupt the function of the cells duplicating NAFLD in the cells, which can be grown in a lab in large quantities. This "disease in a dish" approach can contribute to the greater understanding of the causes on NAFLD. This disease is particularly important as it is estimated that 25% of the UK population has the condition which if not effectively treated and managed can progress to severe life-threatening liver disease. The cell models can be used to test large numbers of potential drugs to identify the best drug candidates which could be further developed and provide safe and effective drug therapies that can help patients.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>  
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# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
CITY SCIENCE CORPORATION LIMITED	Multi-Horizon Digital Twin Models for Transportation	£595,312	£357,187
ASHWOODS LIGHTFOOT LIMITED		£87,578	£52,547
University of Exeter		£186,709	£186,709

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

Funders Panel Date: 08/08/2018

Project description - provided by applicants

Digital Twins in transport can deliver optimised strategies for movement - reduced congestion, reduced emissions, safer operations and greater network capacity. With air quality estimated to kill 40,000 a year, new approaches and optimised strategies are surely needed.

Extensive market research, combined with customer insights, demonstrates growing demand for Transport Digital Twins. Digital Twins represent the next evolution of the Internet of Things bringing together the physical and digital worlds. The NIC's publication - Data for the Public Good report - sets out a vision for a national Digital Twin: a digital model of the national infrastructure which will be able both real-time, and strategic simulation. This ambition, driven by clear social, economic, resilience and environmental benefits, demonstrates the wider context of the opportunity.

Our project sets out to integrate transport models and 'live' operational data for the first time. This innovation will unlock a range of new optimisation strategies to free up network capacity; improve air quality; mitigate the negative effects of congestion within cities; enhance productivity; reduce costs and risks; and plan for long-term infrastructure.

Our project builds on the cutting-edge work of the consortium including existing Digital Twin, real-time telematics and Optimisation expertise.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
ANTIKOR BIOPHARMA LIMITED	Improved Linkers for Antibody Fragment Drug Conjugates	£522,828	£365,980

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

Funders Panel Date: 08/08/2018

Project description - provided by applicants

Antikor is developing a novel and disruptive platform for oncology drug delivery called **\*\*Fragment Drug Conjugates (FDC)\*\***. Here, cytotoxic payloads are specifically delivered to solid tumours. Our platform differentiates from other similar Antibody Drug Conjugates (ADC) approaches in that our format can penetrate tumours faster and more effectively, deliver more payload and clear from normal tissues quicker, leading to better products for increased patient survival and quality of life.

The current generation of linkers used to connect the payload to the antibody were designed for large antibodies. This project will develop shorter linkers that do not hinder antibody binding but can maintain FDC solubility and other beneficial features. This project will innovate around the design and chemical synthesis of novel linkers containing hydrophilic sugar units and short polyethylene glycol chains using three clinically-established cytotoxic payloads. These linker-payloads will be synthesised to laboratory scale (tens of milligrams) and then be used to make model FDCs to test in a range of biophysical (binding, aggregation and stability) and biological (cell-kill potency and plasma clearance) assays to identify novel, next-generation linkers that better-match our FDC technology. These linkers will be innovative by having novel structures and features that enhance FDCs, leading to improved future products for solid cancers.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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# Innovate UK

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Competition Code: 1803\_OPEN\_R5

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
NAVENIO LIMITED	Game-Changing Indoor Positioning Technology	£605,208	£423,646

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

Funders Panel Date: 08/08/2018

Project description - provided by applicants

Navenio is a pioneering SME seeking to become a world leader in the global indoor positioning system (IPS) market.

The proposed project will see the development and release of an accurate, infrastructure-free indoor positioning system to improve the efficiency of staff and asset movement, producing cost savings of millions of pounds and introducing a transformative new technology to the global market.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Results of Competition: Open Round 5 March 2018

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
GAS RECOVERY & RECYCLE LIMITED	Nitro0	£246,794	£172,756
University of Cambridge		£77,971	£77,971

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

Funders Panel Date: 08/08/2018

### Project description - provided by applicants

Argon is a by-product of large scale air separation mainly for production of steel. It is used, in increasing volumes, in many high technology applications to ensure an inert atmosphere around/within a processing environment, for example, in the production of Silicon Ingots for Photovoltaics and Semiconductor devices, 3D printing of Metal Components, Heat Treatment of turbine blades etc. Historically the argon is used in a single pass and then vented to the atmosphere; it represents a significant cost to manufacture of 5-10%. While argon recovery and recycle may present particular technical challenges, the economic case for it is very attractive as supply is not keeping track with demand, for example the cost of argon to the Chinese Solar PV industry has quadrupled (LONGi Green Energy Technology Co.) in the last 3 years.

GR2L has responded to this opportunity by developing the Argon0 argon recycle system, initially, focused on the Solar PV Wafer Fabrication industry. However, our solution cannot remove nitrogen originating from air leaks from the recovered argon, limiting our ability to expand into other high technology markets, such as Semiconductor Wafer Fabrication, Powdered Metal additive manufacture of titanium and aluminium components for aerospace and specialist heat treatment applications. All of which have sensitivity to nitrogen with requirements varying from ppm to ppb levels. In closed loop recycle even small air leaks quickly build to high nitrogen concentrations in the 1,000s to 10,000ppm level which are not acceptable. The Nitro0 project aims to develop a demonstrator system that will remove nitrogen contamination from recovered argon and enable the recycle of argon for these high technology industries.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

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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
AGILE ANALOG LTD.	Disruptive Process Portable Semiconductor IP Portfolio Development	£982,139	£441,963

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

Funders Panel Date: 08/08/2018

Project description - provided by applicants

AgileAnalog is a UK start-up, founded on the principle of analog design automation for semiconductor devices. Essentially, this means the automatic design of the key analog components - power supplies, analog to digital convertors, and temperature sensors. Today, this IP is designed for each and every silicon process, which makes it costly and repetitive which in turn limits the ability to move some designs to new processes, which limits the ability to reduce cost and power, and hence increase battery life.

This project delivers a key enhancement to our product portfolio, in a way that is very cost-effective for companies to apply. The result of this project is a set of complex IP which can be integrated in electronic devices. This is a fundamental enabler for electronic devices in the Internet of Things (IoT) and Artificial Intelligence (AI) as well as many other applications.

Beyond this, this project allows us to prove our technology scales to more complex IP, and in future can move into portable Radio Frequency (RF) IP which would substantially improve the accessibility of cheap, power-efficient wireless devices and safety-critical Automotive IP which is fundamental to deploying safe self-driving cars.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
R.E. BOWERS & FREEMAN LIMITED	Pulsed-electrochemical machine and process to manufacture powder metallurgy fastener punches.	£353,445	£159,050
Brunel University London		£147,344	£147,344
PECM SYSTEMS LTD		£154,885	£69,698

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

Funders Panel Date: 08/08/2018

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Project description - provided by applicants

A Boeing 787 comprises 10s of thousands of various aircraft fasteners securing an array of components and structures. Fastener recess profile is warm forged using a punch which has a profile opposite to that of the final fastener. Current art tool steel punches afford the forging of 10K fasteners before scrapping due to wear.

Tool steel punches although cheap require frequent tool changes with down-time costs as production needs to be halted. Sintered tungsten carbide punches are ultra-hard and brittle affording them to shatter during fastener forging risking expensive machine damage and production down-time.

A new method of punch production and manufacture is going to be investigated and developed to elucidate enhanced punch production and performance at low cost.

Presently, punch demand is rapidly increasing as airline carriers will have ordered 3,300 new aircraft by 2030 \[Technavio Global Aerospace Fastener Market 2014-2018\]. Demand for punch tooling is out-stripping supply, the aerospace industry desperately wants solutions to increase tooling production and life-span thereby allowing a greater volume of fasteners to be formed accurately yet cheaply. This is the project driver.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

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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
MAGNETIC SHIELDS LIMITED	Lightweight and compact, high performance magnetically shielded rooms for biomagnetic measurements - LightMuRoom	£680,588	£408,353
The National Centre for Young People with Epilepsy		£40,002	£40,002
University of Nottingham		£249,068	£249,068

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

Funders Panel Date: 08/08/2018

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## Project description - provided by applicants

Optically pumped magnetometers (OPMs) are emerging quantum sensors with the potential to revolutionise biomagnetic measurements of the brain (magnetoencephalography-MEG) and heart (magnetocardiography-MCG). These are important tools used to improve understanding, diagnosis and treatment of neurological, psychiatric and cardiological (including foetal cardiography) conditions (impacting >23million people within the UK). OPM-sensors will enable low cost (>10x cheaper), lightweight, portable and reconfigurable devices with direct patient contact; leading to enhanced sensitivity, new patient groups (e.g. children), and new types of experiment involving free movement.

Despite their potential, hospitals have been slow to adopt MEG/MCG due to key barriers, the most significant relating to the magnetic shielded rooms (MSRs) required to shield the sensitive measurements.

Existing high performance MSRs typically incorporate multiple layers of ferromagnetic shielding material, making them expensive, heavy and large/tall, and thus unsuitable for standard hospital spaces. Furthermore, their limited attenuation of the Earth's magnetic fields leaves residual fields which severely constrain OPM operation.

Whilst active shielding (electrically generated cancellation fields) has been applied to improve performance, existing systems have simple designs (tri-axial Helmholtz coil systems) and therefore only offer limited shielding performance; are unable to cancel spatially varying fields; and require a 3D geometry that encloses the patient (patient claustrophobia).

LightMuRoom overcomes these challenges by combining:

- \* a market leading MSR design incorporating novel degaussing functionality for optimum passive shielding performance
- \* an innovative active shielding coil design methodology enabling the creation of complex spatially varying field patterns
- \* an advanced sensor array and control system for the detection and cancellation of static, dynamic and spatially varying magnetic interference to a very low level

The novel active shielding will enable:

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

- \* use of a single Mumetal shielding layer leading to a significant reduction in MSR weight, height and cost
- \* improved cancellation of the Earth's magnetic field, in conjunction with attenuation of temporally and spatially varying magnetic fields.

The MSR will adopt a modular design enabling customisation to end-user requirements and cost-effective integration within standard hospital spaces. These advancements will facilitate mainstream use of OPM-MEG/MCG enabling essential breakthroughs in healthcare provision. The project will result in a prototype LightMuRoom that will be installed at end-user 'Young Epilepsy' and demonstrated for OPM-MEG.

The addressable global market for MEG/MCG MSRs is estimated at ~£585m with the potential to more than double with mainstream use. LightMuRoom targets ~£18.6 million cumulative sales over a 5-year period generating a >30-fold ROI and creating 48 new jobs.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>  
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# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
SMARTWATER TECHNOLOGY LIMITED	SmartWater: Forensic protection to ensure the ethical disposal of waste	£951,275	£665,892

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

Funders Panel Date: 08/08/2018



### Project description - provided by applicants

Globally, production of plastics exceeds 300 million tonnes per annum and it is likely that a similar quantity of plastics will be produced in the next eight years as was produced in the whole of the 20th century. Contamination of the natural environment with plastics can have a range of negative effects on marine life, including species important in commercial fisheries, as well as on maritime industries and infrastructure. Currently, one of the biggest drivers of waste dumping is commercial companies winning tenders to safely dispose of which ends up dumped in the ocean, on our beaches or in the countryside due to cost-cutting and a lack of accountability. Currently, there is no way of bringing the rogue waste management companies to account through "tagging" waste at its origin, hence Governments are seeking a solution to ensure the ethical disposal of waste and reduce this trend.

SmartWater is an award-winning technology company who have for 20 years been at the forefront of forensic tagging science, responsible for the development of a method of establishing provenance, called 'traceable liquids'. Each water-based, clear and non-hazardous solution contains a unique forensic formula, with millions of combinations available, which can be applied to valuable assets, either by spraying or brushing on, and is active under UV light. SmartWater solutions are extremely robust and can reduce fire, solvents and even the harshest of environments and have been accepted as a viable technique for proving ownership of recovered stolen property in both the European/US Federal Courts. However, in order to address the challenges above, SmartWater will need to undertake significant R&D, including: 1) Concentrating their formula from 'parts-per-million' to 'parts-per-billion' to reduce significantly the amount of forensic materials used and, thereby the costs of the process. 2) Adapt the polymer solution to attach the unique barcode to be durable for many decades in a range of geographic environments. 3) Develop a gantry misting device to automatically apply SmartWater to all waste leaving the site. This gantry will be connected with remote monitoring devices and provide data synergise with a Blockchain distributable ledger and reporting system to be made available to international Environmental Protection Agencies and ensure the recorded data cannot be tampered with 4) Develop a remote misting gantry that can be moved with a vehicle for use in other markets, such as tagging commodities such as rare materials/diamonds/amazon timber to hold accountable unethical sourcing.

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>  
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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
HAL ROBOTICS LTD	COSCR: Collaborative, On-Site Construction Robot	£148,284	£103,799
ABB LIMITED		£55,261	£27,630
BUILDING RESEARCH ESTABLISHMENT LIMITED		£126,154	£126,154
INNOVATIVE TECHNOLOGY AND SCIENCE LIMITED		£354,174	£247,922
SKANSKA TECHNOLOGY LIMITED		£120,668	£60,334

Note: you can see all Innovate UK-funded projects here <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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SKYJACK UK LIMITED		£71,966	£35,983
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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

Funders Panel Date: 08/08/2018

## Project description - provided by applicants

Traditional construction is a low-tech but flexible manufacturing process. It is carried out 'on-site' using pre-manufactured components (windows, doors, bricks, blocks etc) and the manufacture of basic elements such as concrete, plaster etc. Whilst its flexibility has much to commend it (given the bespoke nature of buildings and their geographic distribution) it is inefficient in time and costs, and prone to skills, quality, waste and H&S issues that are more complex than in conventional factory manufacture. It also does not lend itself to efficient automation; sales of robots to construction companies is much lower than in other sectors.

**COSCR** project partners (a consortium of construction companies and robotic solution providers) are working to develop cost effective, reconfigurable robots that can be deployed throughout construction supply chains for the factory based manufacture and assembly of component parts that can then be transported to the construction site prior to installation. However, on-site construction presents additional challenges in that robots must be rugged and mobile, and readily reconfigured to new tasks, to enable them to move easily between locations and activities. They must be capable of accurate but autonomous positioning such that activities match the building design (included in a digital Building Information Model). Safety in use is essential; construction sites are dynamic environments, with human workers needing to carry out tasks, potentially in close proximity to a robot.

If these challenges can be addressed there are potentially huge benefits in terms of construction productivity and quality (e.g. potentially dangerous tasks such as drilling at height completed 4 times faster than is possible by human workers) as well as health and safety benefits. On-site robotics will also help to address ongoing skills shortages in construction whilst presenting greater opportunities for upskilling.

The COSCR project will therefore develop and assess an innovative, mobile construction platform equipped with robotic arm, that is capable of delivering a range of repetitive on-site activities in a safe, cost effective manner. The project will be led by UK SMEs **HAL Robotics** and **innotecUK** together with multinational robotics and construction equipment manufacturers **ABB** and **Skyjack**. **Skanska**, a leading international construction contractor will pilot and assess the COSCR solution in the context of real on-site construction projects to enable project partners to identify and plan the next steps needed for the development of a full commercial system. We believe that there is a huge opportunity for use in construction sectors globally.

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# Innovate UK

Results of Competition: Open Round 5 March 2018

Competition Code: 1803\_OPEN\_R5

Total available funding is £21,534,539

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
RUSSELL IPM LTD	Auto-dissemination of entomopathogenic fungi for sustainable control of spotted wing drosophila, an invasive pest threatening the future prosperity of the UK horticulture industry	£415,790	£291,053
BERRY GARDENS GROWERS LIMITED		£277,200	£138,600
National Inst of Agricultural Botany		£194,175	£194,175
University of Greenwich		£98,806	£98,806

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### Project description - provided by applicants

The UK fruit industry is under continual pressure from introduction of non-native pests and diseases. Spotted wing drosophila (SWD), *Drosophila suzukii*, was first detected in the UK in 2013 and populations have increased year-on-year since then. The pest lays eggs in fruit before ripening and the larvae destroy the fruit from the inside, so the damage is only detectable after harvest. Fruits attacked in the UK include raspberry, strawberry, blueberry, blackberry, cherry and grapes and 25-100% of strawberry and cherry crops were lost during 2016\.. The value of UK horticulture production is £400 m pa, and an estimated £20-30 m pa is currently spent on controlling the pest. Equivalent losses and costs are experienced in the US and other European countries where SWD has established. Best practice approaches include rigorous removal and destruction of waste fruit and use of insect mesh barriers. These are costly and growers still revert to routine pesticide applications to prevent economic damage. This strategy is not sustainable. Consumers increasingly demand produce free of insecticide residues and it is vital to prevent emergence of insecticide resistance in the pest. Furthermore, the need to use chemical insecticides against SWD is compromising the impressive programmes of integrated pest management that growers have developed against other pests and diseases.

This research project will provide the basis for development of new products for control of SWD in a sustainable manner, compatible with integrated pest management. The product will use novel lures to attract the flies to a device which infects them with a new strain of fungus which is highly pathogenic to the flies but not to other organisms. The infected flies are released and the fungus can be passed on to other flies before killing the infected individuals, thus greatly enhancing the impact of the initial infection in a way not possible with other products.

The commercial partners are the leading UK producer of biorational pest control agents and the UK's foremost berry and stone fruit production and marketing group. The academic partners are two research institutes with long experience in research on insect attractants and management of SWD. This will ensure timely delivery of research outputs which are suitable for commercial production and acceptable to growers. The research will provide the basis for development of at least three new products with worldwide market potential and their use will increase productivity and profitability of the UK horticulture industry.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
POLYMATERIA LIMITED	A novel additive-based technology for the biodegradable transformation of polyethylene terephthalate in the natural environment	£774,583	£542,208
University of St Andrews		£220,103	£220,103

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## Project description - provided by applicants

Each year, 400M tonnes of plastic is produced of which 40% is single-use plastic that is either sent to landfill as waste, incinerated or enters the environment. Despite initiatives such as plastic bag taxes and proposed measures to reduce use and increase collection/recycling, more than 30% of the world's plastic still escapes collection systems and can end up in waterways, eventually damaging marine life, ecosystems and human health.

Heightened awareness of this waste problem and its environmental impact is driving growth in the biodegradable polymer market. Additive-based biodegradable plastic retains the physical characteristics of conventional plastic throughout a product's usable life, after which the additive accelerates the plastic biodegradation, transforming it entirely into carbon dioxide, water and biomass, thus protecting the environment from the accumulation of plastic waste. This acts as an "insurance policy" when collection/recycling strategies fail.

Current additives are only available for polyolefins (polyethylene (PE), polypropylene (PP)) as a one size fits all solution. Independent testing has proven these to be ineffective, where plastics do not fully degrade, leaving harmful fragments (microplastics) with the entire process of biodegradation requiring timescales often (far) in excess of those claimed by manufacturers. In addition, and despite the fact that polyethylene terephthalate (PET) is the third most commonly used plastic (18.83M tonnes produced p.a.), there is currently no commercially viable biodegradability converter technology for PET.

To address this need, Polymateria aim to develop a portfolio of superior drop-in additives for the manufacture of biodegradable, recyclable, customisable and cost-effective plastic products. In collaboration with depolymerisation experts at the University of St Andrews, this project aims to develop the first additive-based biodegradable transforming technology for PET packaging and disposables, offering the breakthrough technology that the plastic packaging and consumer goods sector is aiming for.

Both partners are well placed to exploit this opportunity; Polymateria has already commercialised bespoke additives for PP and PE, and St Andrews has expertise in the depolymerisation of PET.. Key PET packaging manufacturers have already expressed a keen interest in co-developing the solution once a viable additive formulation has been developed.

With support from Innovate UK, a 3-year programme of industrial research is required to develop the formulation and test the associated biodegradation performance and safety. Success will facilitate a co-development deal with plastic/packaging manufacturers for final

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development and commercialisation by 2022, helping to establish Polymateria at the forefront of the biodegradable additives for plastics market poised for significant growth.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
BIONEMA LIMITED	Novel microencapsulation of fungal spores for major crop pest control and more effective Integrated Pest Management procedures	£571,178	£399,825
University of Birmingham		£195,403	£195,403

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Funders Panel Date: 08/08/2018

## Project description - provided by applicants

Crop losses from pest attack continue to be a major agricultural problem. Western Flower Thrip (WFT) and Black vine weevil (BVW) cause economic losses in high value horticultural crops internationally. European combined losses from virus transmission and direct feeding damage by WFT is estimated at £550m pa, with worldwide costs over £6.0bn. BVW alone causes annual losses of £40m to UK; >£4.0bn+ worldwide.

Current approaches to control are often inadequate. No individually effective control measures exist for WFT and BVW and growers/producers must use combinations of techniques - IPM - for adequate control. These don't reliably provide control levels required and losses can be considerable. In addition to implementation issues - education, time, cost, complexity, two other major challenges exist:

1)WFT is adept at developing resistance to chemical insecticides, while increased regulation makes BVW control difficult due to removal of Chlorpyrifos (organophosphates) from the market in 2016. There is increasing consumer led retailer demand for growers to reduce or eliminate the use of chemical pesticides (and residues) in crop production.

2)Current biopesticides have significant limitations including: need for low temperature storage (cost/complexity in supply chain); low adhesion to the pests during application (low efficiency); limited relative humidity range for germination and establishment (>95% RH; reducing efficacy); low germination rates after adhesion (low efficacy); greater sensitivity to application conditions (reduced efficacy).

New solutions to pest control are urgently needed including more effective tools within IPM systems to improve effectiveness. Bionemas' innovative technology will produce biopesticides that have easy distribution (ambient temperature); high efficacy; reduced number of required treatments (reducing costs); optimised for available application methods; wider applications for fungal disease control.

This will be achieved by developing novel processes for microencapsulation of fungal spores, which will: maintain biological stability of fungal spores stored at ambient temperature; create a micro-environment to retain water to enable germination; enhance their adhesion to plant surfaces. They will have a dramatic impact on improving agricultural productivity.

This IUK grant will facilitate the raising of investment funding into Bionema and result in significant sales 5 years after product launch. Additional impacts include enabling Bionema to address > £500m+ global market opportunity; £100m reduction in annual UK horticultural

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crop losses due to WFT & BVW; potential simplification of growers IPM programmes; reduction in usage of chemical pesticides; creation of approximately 15 new jobs by 2020; meeting increasing consumer demand for reduced chemical pesticide use.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
H.L. HUTCHINSON LIMITED	Precision Fruit Tree Dosing to Optimise Yield and Quality	£52,539	£26,270
National Inst of Agricultural Botany		£222,563	£222,563
NP SEYMOUR LIMITED		£104,640	£73,248
OUTFIELD TECHNOLOGIES LTD		£134,692	£94,284
PLUMFORD FARMS LIMITED		£38,938	£27,257

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THE ACCLAIMED SOFTWARE COMPANY LTD	£179,558	£125,691
WORLDWIDE FRUIT LIMITED	£12,538	£6,269

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### Project description - provided by applicants

There is substantive tree-to-tree variability in tree structure (size, density) and crop load and quality in tree fruit orchards which are the major causes of less than optimal, often poor, overall yield and quality. Previous work in Innovate UK project 101405 showed that tree-to-tree variability in yield ranged from 2-3 fold in the six most productive and uniform apple orchards in the UK, with much greater variability in poorer orchards. Larger scale within-orchard variability and inter-annual bienniality also contribute to poor performance.

In this project, we shall develop precision dosing orchard foliar spraying system to improve the uniformity of orchards and greatly increase their economic performance, using apple as an exemplar. Current practice is to spray whole orchards at the same dose regardless of tree structure or crop load. The equipment will apply precision doses according to need to optimise performance. The performance of poorer performing trees will be increased towards that of the best and the tendency for out of sync tree-to-tree biennial bearing minimised.

IP will be protected and the system sold internationally, creating a new substantive UK business contributing to the UK economy. The technology will have application for the wide range of spray applications to tree fruits for crop protection and crop management worldwide. The precision orchard mapping technologies will have additional wide application for other methods of crop management and Agri Decision Support Systems (AgriDSS) worldwide. This new technology will have substantive impacts on the UK apple industry making a step change in productivity and competitiveness and allowing the UK industry to increase production.

Keywords: Precision orchard spraying, tree fruit production, apple production, crop scanning and mapping, Decision Support System

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
UNILEVER U.K. CENTRAL RESOURCES LIMITED	A novel Rhamnosidase: immobilised for repeated biocatalysis use to produce high value chemicals	£480,376	£240,188
PUROLITE LTD		£249,294	£149,576
University of Edinburgh		£270,115	£270,115

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### Project description - provided by applicants

Bio-inspired processes will have a major impact on the challenges of the global society in 21st century, including those associated with environmental sustainability. The employment of biocatalysts in industrial processes is expected to boost a sustainable production of chemicals, materials and fuels from renewable resources. The scope of this proposal is to encourage and translate academic research and its outcome into a novel industrially usable platform technology for the sustainable production of commercial high value materials.

Rhamnolipids (RL) are biosurfactants from the glycolipid family produced by certain microorganisms (Kiran et al. 2016<sup>\\*</sup>) that could address the growing consumer demand for environmentally friendly, sustainably produced ingredients in everyday products. RL are chemical compounds composed of lipid and sugar moieties containing one (mono-RL) or two (di-RL) molecules of Rhamnose. Di-RL, Mono-RL and Rhamnose all have potential for broader commercial applications (Rhamnose in the flavour/food industry & Skincare, RLs in Skincare, Fabric/Surface Cleaning and Pharmaceuticals). This project will address key challenges in the process of the biocatalytic conversion of RL species, and will therefore be a key enabler for a scalable supply of diverse products to the market.

<sup>\\*</sup> Kiran et al. (2016) Rhamnolipids Biosurfactants: evolutionary implications, applications and future prospects from untapped marine resource. Crit Rev Biotechnol., 36(3): 399-415

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
TRAXION-NDT LTD	RightLines - Overhead Line Equipment Monitoring	£597,475	£418,232
TTI TESTING LIMITED		£401,240	£280,868

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Project description - provided by applicants

The principle aim of this project is to develop a prototype NDT method based on guided wave technology (GWT) which will be able to identify damage which currently can not be detected -- at the locations where it is most likely to occur.

This project addresses the need for improving the method of identifying critical damage in overhead line equipment (OLE). Current non-destructive testing (NDT) methods of inspection are visual and are limited by the fact that they are often unable to identify critical damage because it is obscured by structural components. The limitations of current methods are widely recognised and have been highlighted in Network Rail's own challenge statements which states the need for intelligent assets and condition monitoring systems applied to OLE.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MATTER ARCHITECTURE LTD	An Intergenerational Housing Model	£108,859	£76,201

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## Project description - provided by applicants

This project explores and tests the potential for a form of housing that is based on the traditional concept of the extended family home, where care and other services are shared out amongst the community. We're calling this intergenerational housing. At first it may seem ambitious to imagine this could work amongst people who are not related, however with the right design and incentives we believe that this model can have a dramatic impact.

Crises of housing affordability, appropriate housing, health and care are all connected and so we must consider ways that they can be solved together. Currently, responses to these challenges are segregated in planning, the law and funding. The perfect storm of funding cuts and inflating land values means even the too few homes being built mostly serve the people in least need and are inflexible so don't support changing requirements throughout our lives.

The effects of severe shortages of suitable, affordable housing and care, particularly for the elderly and working adults with children, are now being felt severely by NHS, Social Care and community services. The strain will become more pronounced as the UK's population ages, and the challenge can only be confronted through innovative approaches that connect the problems and solutions across societal and organisational boundaries.

Over the course of this project, the team will work with public and private organisations who are facing these challenges, including the GLA and Camden Council. We will develop a set of tools that will appraise possible sites for intergenerational housing. Intergenerational housing is as much about the way that people live together and share support for one another as it is about buildings and so we will test out how different operational models could work. A specialist provider in our project team, Baxendale, will help us do this.

During the 20th Century there was great innovation in social and affordable housing that lifted large sections of society out of poverty and improved their health and wellbeing. Many of these models no longer suit contemporary life or the ways we deliver housing and care. Intergenerational housing has an important part to play in a new wave of innovative housing models fit for the 21st Century.

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