Innovate UK

Results of Competition: Precision Medicine Technologies: Shaping the Future

Competition Code: 1805_CRD_ASHN_PREC_MED

Total available funding is £5 million

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
BIOGENE LIMITED	PCR based amplification of human genomic DNA direct from crude samples such as cheek swab, saliva and urine samples for point of need pharmacogenomics	£99,600	£69,720

Note: you can see all Innovate UK-funded projects here https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
BioGene has developed a method for detecting viral pathogens directly from crude samples such as blood, removing the requirement for complex lab facilities or expert use. This work will progress this technology by demonstrating that it is also possible to identify changes in a patient's genetic makeup that may make drugs more or less efficacious, this is known as pharmacogenomics, using the same technology. The method works by adding a small drop of blood into a plastic reaction vessel that contains reagents freeze dried within, meaning tests can be shipped round the world without refrigeration. Once the reagents are resuspended and the blood is added, the sample is quickly frozen -- to break open infected cells, then heated and this, in conjunction with the reagents -- lyses the virus in the sample. This feasibility study will provide proof of concept data showing that the method can also be expanded for use on saliva, cheek swabs and urine as well as blood, simple and non-invasive samples, and that the human genome can be amplified directly by the technique. There are many innovative features in this approach, it is normally necessary to take a large amount of patient sample and have this processed by scientists in a dedicated lab, which is costly and time consuming. Being able to detect direct from crude samples, reduces the cost per test, time to giving patients results and makes it possible to make a portable instrument that can be used at the point of patient need or in remote areas with no infrastructure. Commercially, the technology can be applied to a number of areas apart from pharmacogenomics, including human and veterinary diagnostics and forensics. As a result there is a significant potential for growth and export of this UK manufactured technology, in which the market is traditionally dominated by American companies. The technology has the potential to help ensure that patients receive the right drugs for their personal genetic profile. The outputs of this project will be a prototype instrument and reaction vessel for the direct amplification of human genomic DNA from blood, cheek swabs, urine and saliva. Alongside this will be an assay and data set demonstrating the sensitivity of the approach which will be used to drive commercial uptake. The method can also detect the presence of bacterial and viral pathogens and so has wide healthcare application.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
PVOH POLYMERS LIMITED	Development of an infection detecting wound dressing	£75,025	£52,518
University of Bath		£24,883	£24,883

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Project description - provided by applicants
a) Project aim Wound infections can prevent healing and lead to sepsis if untreated. Caring for patients with possible wound infections is expensive. We aim to test our ground-breaking infection-detecting dressing which _changes colour if a wound is becoming infected._ Effective in the laboratory, and successfully tested in an off-patient clinical study, the dressing must be tested on patients. Manufactured under controlled conditions to allow testing on consenting burn patients, the study must show that the wound dressing is safe, the added technology does not interfere with how the dressing works, and that the dressing can detect if the wound is infected or not. b) Research Background The dressing, developed over 8 years at the University of Bath, glows bright green when dangerous bacteria begin to cause harm. It will help NHS staff understand when a wound _is_ or _is not_ infected. Infection can delay healing, cause pain, increase scarring and lengthen hospital stay. However, we currently cannot immediately diagnose wound infection. Doctors therefore need to assume infection and treat, often unnecessarily, by removing dressings and using antibiotics, increasing bacterial resistance, costing money and affecting patient outcomes and quality of life. c) Production of the dressing Will be a partnership between PVOH and the University of Bath, but with final dressing assembly and distribution via the multi-national healthcare products manufacturer, Paul Hartmann AG (http://www.hartmann.info) d) Usage of the dressing The dressing will be used at the first routine change of dressings, two days after injury, and will stay until the following dressing change, three to five days later. We will compare the dressing response to the presence of wound infection. The dressing should _not_ change colour with _no_ infection and _should_ change colour if there _is_ infection. Infection will be determined by senior burn doctors - unaware of the

dressing colour.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
BIOXYDYN LIMITED	Oxygen enhanced lung MRI - towards clinical application	£99,759	£69,831

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Project description - provided by applicants
The lung is poorly served by non-ionising or low-dose imaging technologies. Thoracic CT scanning is the main technique available, but does not permit routine follow-up or longitudinal monitoring because of the unacceptably high radiation dose, especially in children. Bioxydyn Ltd is an imaging services business offering quantitative MRI biomarkers for pharma, clinical and academic clients and was spun out of the University of Manchester in 2010 with proprietary technology offering MRI in the lung known as oxygen-enhanced MRI (OE-MRI). It has provided services based on this capability to pharma since 2012, as it is known to show disease and drug effects with low patient numbers. While Bioxydyn has delivered OE-MRI for pharma clinical trials, long term ambitions are to further develop and validate the technique for imaging services customers and to drive its adoption in clinical management of respiratory diseases. Bioxydyn and its clinical partners believe that OE-MRI is capable of predicting the effectiveness of respiratory therapies much earlier than the current clinical judgements. OE-MRI has commercial benefit as a therapy selection tool, especially for expensive biologics in, for example, severe asthma. OE-MRI also has a significant opportunity to improve the management of cystic fibrosis in children. Ultimately, for commercial adoption, this needs to be proven in a clinical setting. Bioxydyn has so far optimised the image acquisition protocol, installed it on routine clinical scanners, implemented signal processing techniques in reliable software and developed quality control techniques. Most importantly, pilot data from key opinion leaders show the potential of OE-MRI to characterise disease and show therapy response (e.g. Martini et. al. 2018). These steps were achieved through a 2014 InnovateUK project and subsequent in-house efforts. This application now concerns the final pieces of development required before major multicenter studies designed to prove clinical and economic benefit. With this project Bioxydyn and its clinical lead partners will have all of the tools and data necessary to establish major multi-centre clinical trials designed to prove clinical and commercial benefit to the NHS and pharma.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
APPLIED NANODETECTORS LIMITED	FeNO asthma diagnostic	£99,456	£69,619

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Project description - provided by applicants
Applied Nanodetectors (AND) propose to investigate the feasibility of a low cost fractional exhaled nitric oxide (FeNO) breath test for the diagnosis of asthma for use in primary care settings. The rapid and accurate diagnosis of asthma and identification of patients would be essential to ensure that adequate treatment, including hospitalisation when necessary, is implemented as early as possible. This type of diagnostic techniques would lead to more efficacious treatments and help to reduce the burden of disease. Asthma is mainly diagnosed principally on the basis of a careful clinical history taken by a clinician. However, studies of adults diagnosed with asthma suggest that up to 30% do not have clear evidence of asthma. Recent NHS asthma guidelines have recommended the need for objective testing using FeNO that would offer a significant improvement to current practise. We will work on innovatively integrating this new FeNO sensor into a handheld device for use by healthcare professionals. A low-cost gas sensor fabricated using active nanomaterial metal oxide (MOx) gas sensor array for the detection exhaled nitric oxide in exhaled breath associated with the diagnosis and management of asthma. This sensor would be integrated with Applied Nanodetectors sensor electronics and a new prototype would be developed in this project. Nanomaterial formulations will be deposited onto plastic substrates and subsequently modified to selectively detect FeNO and has exhaled gas flow rates. The disposable FeNO gas sensor will be then excited using Applied Nanodetectors new patented innovative technique and then exposed to test gases mixtures to optimize the sensor performance. The target is to provide breakthrough technology in diagnostics which can potentially significantly lower measurement costs and improve diagnostic testing. This would lead to a reduction in costly drugs given to people misdiagnosed and also early diagnosis will ensure patients get the appropriate treatment leading to improve outcomes. Exploitation of these project results will lead to development of prototype that can used for clinical validation and clinical utility studies.

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COHESION MEDICAL LTD.	Precision Medicine Platform for Inflammatory Diseases	£99,995	£69,996

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Project description - provided by applicants
Chronic inflammatory conditions such as asthma, psoriasis, eczema, inflammatory bowel disease and rheumatoid arthritis can be debilitating for patients and families resulting in wide physical, psychological and social impact. COHESION Medical Ltd will build on existing award-winning Digital Health technology to develop an innovative Precision Medicine Platform for Inflammatory Diseases which provides patients with a new empowered approach to improved self-care and trigger avoidance while generating data insights to guide the clinical adoption and delivery of more targeted therapies for safer and more effective patient outcomes.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
HORIZON DISCOVERY LIMITED	Reference standards to enable standardization and wide-spread implementation of non-invasive prenatal testing for chromosome aneuploidies	£375,031	£187,516
Manchester University NHS Foundation Trust		£50,305	£50,305
St George's University Hospital		£74,928	£74,928

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Project description - provided by applicants
Non-invasive prenatal testing (NIPT), the analysis of cell-free fetal DNA (cffDNA) from the maternal blood, has proven to be more reliable in detecting common fetal trisomies than conventional serum screening and ultrasound. Due to the higher accuracy of NIPT, fewer pregnant woman will have to undergo diagnostic invasive testing which carries a risk of miscarriage. Analysis of cffDNA for detection of trisomies is technically challenging because the maternal plasma contains low amounts of highly fragmented cffDNA in a majority maternal DNA background. Companies and laboratories developing or performing NIPT are in great need of reference standards that accurately mimic clinical samples to validate their different testing platforms and methodologies to ensure accurate test performance on this challenging sample type. At present there is no appropriate reference material for NIPT on the market. This project aims to develop reference standards for NIPT to enable the widespread implementation of accurate, non-invasive screening for chromosomal abnormalities in early pregnancy. Reliable NIPT results will reduce the number of pregnant women undergoing invasive testing to those with a positive test result only. This will improve patient outcomes and reduce the healthcare and socio-economic costs of aneuploid pregnancies and live births.

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CORPORATEHEALTH INTERNATIONAL UK LTD	AID-GI – Artificial Intelligence-supported Diagnostics of Gastrointestinal diseases with video capsule endoscopy	£1,172,180	£820,526
Highlands & Islands Enterprise		£18,621	£0
MEDILOGIK LIMITED		£167,931	£117,552
NHS Arden & Greater East Midlands Commissioning Support Unit		£100,006	£100,006
NHS Hihgland		£14,170	£14,170

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SATELLITE APPLICATIONS CATAPULT LIMITED		£60,882	£60,882
WOLFRAM RESEARCH EUROPE LIMITED		£78,311	£54,818

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Project description - provided by applicants
This project is aiming to improve the diagnostic accuracy for lower gastrointestinal diseases, especially inflammations, by applying _machine learning_ to aid the analysis of internal images. Currently, the gastrointestinal tract is analysed using markers in the stool or with images taken via ingestible cameras or traditional tube-mounted cameras. While the former is limited to detecting cancers (FIT) or generic inflammation (calprotectin) and therefore rather unspecific, the latter is undertaken by human operators and therefore prone to human errors resulting from fatigue, distraction, variable experience or other cognitive limitations. The volume of images and the volume of patients requiring screening, places unmanageable loads on the operators in terms of effort and quality. This project focuses on Video Capsule Endoscopy -- ingestible 'capsule' cameras which are increasingly likely to become the dominant approach to gastrointestinal imagery, where the capsules capture images as patients go about their daily lives rather than attending a hospital or clinic. Through the project we will test the latest approaches to automated image analysis, quantify benefits to the patient, clinician and NHS -- financially and clinically -- and make recommendations on how to implement the solution. When successful, this approach can remove the 'diagnostic bottleneck' that limits optimal IBD treatments, bowel cancer prevention, early detection and other disease investigations.

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PSYROS DIAGNOSTICS LTD	Ultra-sensitive diagnostics platform combining photodynamic therapy reagents with a digital readout	£96,817	£67,772

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Project description - provided by applicants
We now live in an age where personalised precision medicine is a reality for many patients, enabling better health outcomes. This personalisation requires access to appropriate diagnostic tools to select the right patients for the right treatment at the right time. Whilst a large number of disease markers are detectable using existing diagnostic tools for patient selection, there are still a significant number of disease areas which have eluded suitable testing in the clinical setting due to limited sensitivity of the tests. A few examples include circulating tumour markers, Cytokines, Alzheimer's disease markers, cardiac markers , infectious disease markers. Psyros are a newly formed spin-out from a Global Pharmaceutical company who had a large presence in precision medicine. The team have a very strong track record developing point of care _in-vitro_ diagnostics and recognise this unmet need of ultra-sensitive testing for precision medicine. In this project, we intend to prove the feasibility of a ground-breaking new concept for ultra-sensitive detection for use in diagnostics. When fully developed, this will open up opportunities for precision medicine for diseases where this is not currently possible, thereby improving the outcomes for patients and ultimately improving the quality of their lives.

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SAFEGUARD BIOSYSTEMS HOLDINGS LIMITED	PathID and value proposition identification	£47,101	£32,971
Newcastle University		£24,906	£24,906
The Newcastle upon Tyne Hospitals NHS Foundation Trust		£10,472	£10,472
University Hospitals Birmingham NHS Foundation Trust		£9,942	£9,942

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Project description - provided by applicants
This project is focused on the commercial and clinical need to understand the common causes of infection (typically bacteria, fungus, yeast and viruses) across the UK, the antibiotics used to treat the infection and the financial savings that could be made from an earlier diagnosis. Because this technology is faster to use and new, it is particularly important to determine how this new system should be integrated into a complex organisation such as the NHS. Bacteria, yeasts or fungi are the most common cause of infections. Severe infections can cause Sepsis and if untreated, or treated with the wrong antibiotics, leads rapidly to organ damage and death. Currently most blood and urine infections rely on a doctor making the best guess as to the organisms responsible because the current diagnostic tests can take two to four days to provide a result. The presence of antibiotics in the sample often prevents subsequent growth & detection but may not adequately treat the infection. As more & more organisms develop resistance to the most commonly used antibiotics the drugs used are becoming less and less effective. Additionally, there is increasing information to suggest* the use of the wrong antibiotic may increase antibiotic resistance. Rapid DNA identification of organisms gets around all these issues. This technology provides results to the doctor in under 12 hours enabling them to make a far more informed decision about the best course of treatment. This provides: better patient outcomes, increased survival, reduced length/costs of stay as well as significant reduction in the progress of antibiotic resistance. The study will consult with the healthcare professionals to understand which are the major sources of infection around the UK that need to be identified quickly for direct treatment. Additionally, it will determine which antibiotics are used to treat where necessary. The work will also survey and discuss with clinicians about the optimal way to use the test to improve health and promote cost savings within the NHS. The underlying technology is designed to deliver a rapid, high throughput, inexpensive and easy to use commercial system to enable the identification of bacteria, and other pathogens in human samples initially from whole blood and then urine and other sample media from their DNA rather than by conventional cultures. Positive samples will be further analysed for antibiotic resistance. *Lord O'Neill report, World Health Organisation and others.

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DIAGNOSTIG LTD	Proof of concept for a rapid diagnosis of infection with non-tuberculous mycobacteria in immune compromised patients	£52,595	£36,816
Royal Papworth Hospital NHS Foundation Trust		£47,080	£47,080

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Project description - provided by applicants
Although infection with _Mycobacterium tuberculosis_, the cause of TB, is very widely studied, non-tuberculous mycobacteria (NTMs) are much more common in the environment but generally do not present any human health problems. However, they are a significant problem in patients whose immune systems are compromised. Thus, up to 10-20 % of cystic fibrosis patients are infected with _Mycobacterium abscessus_. Infection prevents transplantation, and is spread from patient to patient, requiring isolation; treatment can take two years - with a 60 % chance of failure. The problem is so severe that all patients currently are screened; this uses an expensive method, compromised because patients can be positive in the assay but not show clinical disease. **A rapid, cost effective method of diagnosis, which could also monitor the progression of infection and treatment, would represent a step change for clinicians.** **Diagnostig Ltd.** has prepared, in the laboratory, a suite of molecules identical to individual components of complex mixtures present in mycobacteria, the detailed compositions of which are characteristic of a particular species. These molecules bind to antibodies present in the blood of patients with TB, and this antigen-antibody binding can very effectively identify active tuberculosis disease even in patients who have been vaccinated or have 'latent' disease. With appropriate antigens, it can also detect bovine TB and distinguish infection by _Mycobacterium avium_ paratuberculosis in cattle, the cause of Johne's disease. This project will establish that, by appropriate choice of antigens, it can provide a rapid, cheap diagnosis of infection by NTMs, demonstrated using _M.abscessus,_ and also _M. avium_, infection in cystic fibrosis. The company will use its proprietary antigens to evaluate sera from patients with no infection, those positive by standard blood assays but with no clinical signs, and those also showing clinical signs. Samples will be provided, with appropriate ethical approvals, by **Royal Papworth Hospital** **Trust** and expert clinical input on assay development will be provided by Prof. Floto.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
NANOCO TECHNOLOGIES LIMITED	Non-invasive, precise and office-based screening procedure for skin cancer using targeted biocompatible quantum dot nanoparticles	£100,000	£60,000

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Project description - provided by applicants
There remains an unmet need for patients, health providers and payers to enable precise and simple diagnosis of suspicious skin lesions. In this project we plan to exploit functionalized Vivodots(tm) nanoparticles, a safe and biocompatible type of quantum dots, to develop a non or minimally invasive and office-based procedure for the screening and diagnosis of skin cancers in suspected skin or mucosal lesions.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ADAPTIX LIMITED	A novel, stationary 3D X-ray source for improved breast imaging	£63,952	£44,766
University of Surrey		£35,746	£35,746

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Project description - provided by applicants
This project aims to show how breast cancer can be detected earlier by Adaptix's novel X-ray source. In the UK, 1 in 8 women will be diagnosed with breast cancer at some point in their life, the most common cancer in women in the UK (31% of cancers diagnosed in women are breast cancer). Earlier, more accurate detection enables better chances of survival and reduces the likelihood of needing radical surgery (mastectomy) and aggressive follow-up treatment. The Adaptix source will enable higher sensitivity compared to current 2D mammography systems where some cancers can be obscured by overlying tissue, especially in women with dense breasts. Our source uses a stationary array of small X-ray emitters, instead of a single source, thereby covering a range of angles and a unique way to derive 3D information about a breast. This will make the examination faster and more accurate than current 3D breast tomosynthesis systems that physically move the source, since the movement can blur fine detail such as calcifications seen in the early stages of cancer. Adaptix have already demonstrated the use of a flat panel X-ray source for analysing teeth and joints. Breast imaging requires the highest image quality of all X-ray procedures, and requires the Adaptix source to be larger and with a lower X-ray energy. This project will support Adaptix to work with Surrey University and RSCH, who have developed a complete set of end-to-end mammography simulation tools and will apply this to the Adaptix source. The software models every emitter's X-ray output, a chosen detector's exact response to X-rays, and uses these to virtually image a large range of detailed and realistic virtual breast models with and without cancer. The results are indistinguishable from real images. It means that a huge range of parameters can be experimented with and optimized without having to develop multiple physical prototypes or subject women to radiation in a clinical study. This project will demonstrate the theoretical advantages of the Adaptix source, which will help Adaptix secure a contract with a global medical systems company, to integrate this source into a new line of precision mammography devices for worldwide distribution. The UK invented the CT and MRI scanner, both of which are now manufactured off-shore. Supporting Adaptix will help bring another transformational UK technology to market and reduce the cost of world-class healthcare, as well as keeping production on-shore to secure UK manufacturing jobs.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
RANDOX LABORATORIES LIMITED	Develoment and clinical evaluation of a POC theranostic assay to inform therapy choice in Acute Respiratory Distress Syndrome	£988,614	£494,307
Queen's University of Belfast		£672,511	£672,511

Note: you can see all Innovate UK-funded projects here https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
Acute Respiratory Distress Syndrome (ARDS) is a life threatening condition in critically ill patients, caused by infection or injury. Infection and injury induce inflammation in the lungs, causing the lungs to fill up with fluid thus preventing the normal movement of oxygen from the lungs to the blood, for distribution to the rest of the body. ARDS often progresses to further injury to other organs in the body, and is associated with high rates of mortality or long term disability in survivors. The incidence of ARDS is estimated to be 40,000 patients annually in the UK, 200,000 in the US and 3 million globally. Mortality rates range between 30-45%, depending on initial severity at diagnosis. There is no effective drug treatment for the condition despite numerous clinical trials to evaluate possible candidates. However, new evidence suggests that previously tried and discounted drugs may benefit certain patient sub-groups. Medical experts within our project consortium have found that ARDS patients with very high levels of certain markers of inflammation are more likely to respond to several therapies. Several biomarkers (substances we can measure in blood) have been identified to allow identification of these hyper-inflamed patients. This is the essence of stratified medicine, where a diagnostic test can inform individual therapy decisions, also known as theranostics. To allow rapid identification of the hyper-inflamed patient with ARDS, and hence guide the most effective therapy at the point of admission to Intensive Care Units, a near-patient theranostic test is required. Working with our clinical and academic partners, Randox have developed a test to identify hyper-inflamed ARDS patients and confirmed this works by testing over 120 blood samples. This project proposal will further develop this biomarker test to allow rapid near-patient analysis, using our new point of care (POC) diagnostic analyser. Once ready, our clinical / academic partners at Queen's University Belfast will co-ordinate a multi-centre clinical evaluation across Intensive Care Units in the UK to show that the test can be used at point of care to accurately stratify patients into hyper-inflamed and hypo-inflamed phenotypes (sub-groups). This will inform therapy decisions. The project thus aims to develop a theranostic ARDS test and prove that it is effective in identifying those critically ill patients that are more likely to respond to a tailored therapy.

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POCKIT DIAGNOSTICS LTD	Point-of-care for stroke subtype diagnosis to enable rapid treatment	£777,509	£544,256
ABSOLUTE ANTIBODY LIMITED		£106,681	£74,677
CAPILLARY FILM TECHNOLOGY LTD		£12,869	£9,008
Newcastle University		£12,684	£12,684
Oxford AHSN / Oxford University Hospitals NHS Foundation Trust		£33,407	£33,407

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The Newcastle upon Tyne Hospitals NHS Foundation Trust		£32,821	£32,821

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Project description - provided by applicants
POCKiT diagnostics is a UK company focused on the research and development of point-of-care diagnostic devices. Our main target is to develop a device for diagnosis of brain stroke. Stroke is the third leading cause of death and the first cause of physical disability and dementia worldwide. In stroke, the brain is damaged by restricted blood flow to the brain, which leads to death of brain cells. Two main types of stroke exist with patients having similar symptoms: ischemic stroke (IS) and intracerebral hemorrhage (ICH); whilst they have similar symptoms, treatment is opposite. IS is caused by a clot in the brain- and treated with 'clotbusting' drugs which dissolve the clot. If the clotbusting drug given fast enough (within 3-4 hours) the patient may recover with little or no damage to the brain. ICH is caused by bleeding in the brain. Clotbusting drugs incorrectly given to ICH patient prevents clotting and healing, which is a disaster. Therefore, accurate diagnosis of stroke subtype is paramount to inform appropriate treatment, as administration of the wrong treatment can lead to patient death. Unfortunately, if treatment is delayed- for example to wait for results of slow diagnostic tests, or during transport of patient to the hospital- it becomes less effective. Currently, diagnosis of stroke is performed with CT imaging- a brain scan- which takes a significant length of time, it is not always available and the patient must be taken to equipped hospital, and is not accurate enough. "Fplus1" is a revolutionary innovation in that it combines ultra-rapid (<20 minutes) detection of blood biomarkers that are highly specific for stroke subtypes, within a point-of-care device. In other words, the brain scan is replaced by a rapid blood test. Moreover, "Fplus1" will be low-cost and will reduce the need for specialized medical personnel, ultimately resulting in significant cost reduction for healthcare providers. Currently, there are no point-of-care devices on the market for the accurate and rapid diagnosis of brain stroke subtype. In the virtual absence of competition, our innovation has the potential to disrupt and revolutionise current diagnosis of brain stroke and significantly reduce stroke-induced death and disabilities. The collaborative network brought together within this project aims at bringing forward the "Fplus1" prototype towards full development of a product upon regulatory approval, "Fplus1" will initially be introduced in the United Kingdom market, with the final goal of expansion to the European and global market.

Innovate UK

Results of Competition: Precision Medicine Technologies: Shaping the Future

Competition Code: 1805_CRD_ASHN_PREC_MED

Total available funding is £5 million

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
P1VITAL PRODUCTS LIMITED	Optimising the depression pathway enabled by novel digital assessment technology	£422,620	£295,834
Maidstone and Mid-Kent Mind		£8,664	£8,664
NHS Canterbury and Coastal Clinical Commissioning Group		£182,222	£182,222
University of Kent		£201,999	£201,999

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

Project description - provided by applicants
Depression is the leading cause of disability in the UK today with over a million people seeking or receiving treatment at any one time. However, for patients, finding the right treatment can be difficult particularly at a vulnerable time in their lives. For many patients even effective treatment can take weeks and often months to work, and support during recovery can be hard to find. Many patients seek help from their GPs, but may have to wait some time for what can be perceived as a non-urgent appointment. Moreover, the assessment and treatment provided by GP practices varies widely across the country and the quality of care critically depends on the availability of GPs with specialist knowledge of mental health conditions. We aim to significantly improve the treatment of low mood and depression by implementing innovative digital technologies that empower healthcare professionals to better diagnose mental health problems and get patients on to the right treatment sooner than existing methods. The project will assess an optimised depression pathway to improve choice and access to quality care for people with low mood and depression. We will implement a systematic approach to the treatment of depression through local health centres providing a 'walk-in' service with access to a range of healthcare professionals with specialist training and supported by innovative digital technology. Our project brings together GPs, healthcare professionals and charities in one place with the aim of quickly identifying the most appropriate treatment for each patient. Early intervention and monitoring enabled by digital technology is designed to improve outcomes by ensuring that if symptoms escalate, patients can be efficiently and effectively switched to better treatments sooner. This digitally enabled precision medicine approach will reduce the need for referrals to scarce secondary and crisis care services and free up time for GPs to focus on the most severe cases. Initially, this innovative program will be implemented, evaluated and refined in selected GP practices in Kent. Critical to this work is the involvement of patients to ensure that existing concerns and problems faced by them when seeking help with depression are addressed. Such patient involvement is supported by MIND, a charity specialising in supporting people with mental health conditions. Through this optimised depression pathway, enabled by digital technologies we will wrap care around the patient returning them to good health sooner, thereby enabling them to return to the healthy, productive lives they desire.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
KNOWLEDGE NOW LIMITED	Early detection of Papilloedema and Diabetic Retinopathy	£52,169	£36,518
University of Sheffield		£46,889	£46,889

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Project description - provided by applicants
Papilloedema is the swelling of the optic nerve that leaves the eye to go to the brain. The brain is in a closed vault (the skull) therefore any lesion occupying space (tumour, bleeding) can press against the brain and cause death. Diabetic Retinopathy is one of the leading preventable causes of blindness in the world, providing a massive economic burden on both developed and developing countries worldwide. We will develop a smartphone based solution that will use an optical lens attached to the camera to carry out a full Ophthalmologist guided Optical examination, as well as image the back of a patient's eye to detect papilloedema and diabetic retinopathy. Hospital specialities based in central teaching hospitals are being increasingly asked to consult for patients in peripheral District Generals - remote consultation software capable of carrying out basic technical measurements would permit specialist doctors to cover greater catchment areas in a safe manner, improving outcomes for all concerned and avoiding unnecessary missed cases of these serious eye conditions. The automation of simple technical tasks with regards to the ophthalmological examination will also speed up consultations, and increase the number of patients that can be seen during routine screenings. For example, both diabetic retinopathy screening and the pre-school vision screening tests would benefit massively from the use of the proposed solution, and thereby significantly reducing the sight-loss burden in this country. Automated recognition of swollen optic nerves and diabetic retinopathy via a smartphone-based solution enhanced with machine learning capabilities also has the potential to save lives in A&E departments, general practitioners across the country - and even world-wide.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
LIG BIOWISE LIMITED	Feasibility assessment of rapid identification (R-ID) technology for point of care detection of urinary tract infections and drug-resistance markers	£48,958	£34,271

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Project description - provided by applicants
The proposed project aims to evaluate the technical, clinical, and commercial value of LIG Biowise's developed technology (R-ID) to assist diagnosis and management of urine tract infections (UTI) at the point of care (POC), where high proportion of UTI affected patients is treated. Urinary tract infections (UTI) are very common infections, affecting around 92 million people globally with potential serious consequences for patients' health and high cost for NHS. UTIs are mainly caused by bacterial and often require antibiotic treatment for management of infection. In the current UTI management practice the accurate diagnosis is delayed by around 48 hours, when results of urine analysis and pathogen identification are available. In the cases of critical UTI infections the prescription of wide-spectrum antibiotics is necessary, before the test results are available, and it is done based on the clinical symptoms and the use of low accuracy urine dipstick test. This introduces risks of ineffective treatment and contributes to overuse of antibiotics and antimicrobial resistance. The recent UK primary care survey named UTI as a main condition with strong clinical needs for diagnostics and there is growing trend in development of such POC technologies to achieve objective diagnosis and improve precision of infection management. R-ID technology provides sample processing and rapid (30 min) molecular-based identification and quantification of pathogens and antibiotic-resistance markers. Translation of this technology into UTI management may lead to improvement in the current treatment by providing fast and accurate data of UTI pathogen, quantification, and presence of resistance markers. The project will run as 5 work packages, led by LIG Biowise team and the subcontractor -- The Robert Darbishire GP Practice. In the scope of the project the team will work with key stakeholders and potential end-users of the technology to understand the technical, operational, clinical, financial, and regulatory requirements and challenges to consider and adopt it and will carry out initial financial feasibility assessment. The project will also conduct a laboratory-scale proof of concept experiments to evaluate technical feasibility and demonstrate the technology for detection of 3 UTI pathogens and 1-2 drug-resistance markers. The expected outcome of the project is a confirmed feasibility of the technology, demonstration the proof of concept and prepared plan and value proposition for NHS for further development, exploitation, and commercialisation for UTI detection at the POC.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
PREDICTIMMUNE LIMITED	A novel biomarker test to predict therapy selection for Inflammatory Bowel Disease	£99,743	£69,820

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Project description - provided by applicants
Immune-mediated diseases, including autoimmune and inflammatory diseases, are common, debilitating and immensely heterogeneous: two patients diagnosed with the same disease may follow markedly different clinical courses. For many autoimmune diseases, effective and often expensive treatments are now available. However, the immunosuppression they induce also results in substantial side effects. Consequently, there is an increasing need for clinical assays that allow physicians to tailor these potentially toxic immunosuppressive therapies to the right patients at the right time. However, there are currently no robust clinical or biomarker assays that allow personalized therapeutic targeting in these diseases. PredictImmune is developing pioneering tools for guiding treatment options in immune-mediated inflammatory diseases with its first product addressing inflammatory bowel disease (both Crohn's disease and ulcerative colitis). In order to fully achieve the goal of personalized medicine in inflammatory bowel disease, it is necessary to demonstrate more than just prediction but also to show that clinical outcomes can be improved if aggressive therapy is matched to patients predicted to follow an aggressive disease course. This will be the goal of the feasibility study presented here.