Innovate UK

Results of Competition: Newton Fund - China-UK Research and Innovation Bridges Competition 2015

Competition Code: 1511_CRD2_NEWTON_CHINABRID

Total available funding is £13m from Innovate UK and RCUK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Centre for Process Innovation Ltd Novalia Ltd NeuDrive Ltd University of Cambridge University of Manchester	GraphClean - Printed Electronic sensors for urban monitoring applications in China	£990,955	£817,244

Project description - provided by applicants

The project will develop and commercialisation of a series of printable sensor platforms capable of sensing the biggest hazards to urban health in China and the UK providing societal benefits to both the countries long term. It builds upon previous academic work which was funded in the UK and will be further developed by a member of the HVM Catapult. The up-scaled sensors will target industrial solvents, NOx, CO and PM2.5 particles and seek to develop a sensor inlay capable of being integrated with conventional electronics. The basis of the 3 sensors will utilise a novel particle sensing electrode, an OFET gas sensor and a graphene/metal oxide sensor. The printable electronic components will be developed in the UK using high-value materials and large area fabrication techniques and then licenced for production in China. The majority of the work in the project will focus on the optimisation of the design, the functional inks and design of the platform for first application implementation. This will be progressed to a short trial within China of the sensor platform. The output of the project will be a versatile platform which can be exploited in multiple markets.

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Motion Robotics Ltd Loughborough University	YOBAN- a companion robot to assist walking, sitting down and standing up for older people	£790,176	£667,191
Project description - provided by applicants			
Older people in general have difficulty walking, getting in and out of chairs, toileting or standing. Traditional walking and sit-to-stand aids (rolators or couch canes) are too big or heavy to use indoors, in a toilet or cramped corridor. Risk of falling is high. Older people also suffer from a lack of companionship and stimulation. Inactivity, falls and depression leads towards poor physical and mental health and low independence. YOBAN is the first robot of its kind to combine several important features that stimulate the user's mind, provide companionship and physically assist locomotion. YOBAN will help support the user to walk both indoors and outdoors since the variable wheelbase moves in cramped spaces yet provides strong support to help getting in and out of chairs. Integrating Cloud Services into the robot functionality, YOBAN can interact with the user obeying his voice so they can play action games together, can ask it to play old era music, stories or recite poems (mental stimulation and companionship). The user can place friendly or emergency voice calls and at all times YOBAN will monitor negative trends in the user's activity alerting caregivers if needed (24/7 safety).			

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University College London Oxford MESTAR Ltd	Osteochondral Scaffold Innovation for Early Intervention of Osteoarthritis	£861,505	£729,296
Project description - provided by applicants			
Implants that can help osteoarthritis patients to repair damaged or diseased cartilage have had limited success to date and are only available to repair small areas of cartilage damage. University College London has invented a novel biomimetic osteochondral scaffold that replicates the properties of natural cartilage and can be shaped to fit the joint more effectively, encouraging the formation of new cartilage in a biomechanical environment that is conducive for cartilage formation.This project will analyse the scope of the final product, understanding the limitation of the scaffolds and further developing platform technology within the commercial environment to accelerate translation for clinical and economic benefit. It is expected that successful delivery of this program will lead to the development of a scaffold that can be used clinically in a one-step surgical procedure for treatment of large cartilage defects in OA patients. As a result, the quality of life of individuals with osteochondral defects, whichlead to OA will be improved allowing a pain free, more active lifestyle.			

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Queen Mary University of London Agsenze Ltd GRID Smarter Cities Ltd	LIVEQuest: A self-contained wearable Internet-of-Things System for Precision Livestock Agriculture.	£800,161	£680,126
Project description - provided by applicants			
Worldwide demand for meat and animal products is set to increase by c.40% over the next decade; China's total meat production quadrupled in the last 20 years due to rising demand from a rapidly growing population. However, environmental/public health issues are becoming more prominent in China (as with all emerging economies), and sustainable intensification of livestock agriculture is a key concern of Chinese policy-makers &stakeholders. This project merges a team of interdisciplinary experts in animal behaviour, Internet-of-Things (IoT),wearable computing & veterinary diagnostics to develop a highly innovative Smart Wearable IoT platform and Decision Support System for precision livestock farming (with an initial focus on poultry). A fully-networked Smart farmers' boot is proposed to assess animal welfare and farm environment at flock eye-level, allowing ubiquitous, non-obstructive, automated data collection. Guangxi province farm data will standardise animal health and welfare indices for China.This will improve farm productivity, animal welfare, smallholder livelihood and consumer nutrition, contributing to economic development and welfare of the Chinese population.			

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ULEMCo Ltd University of Liverpool	Practical hydrogen fuelled vehicles for China	£997,203	£824,757
Project description - provided by applicants			
The Chinese government have prioritised the need to decarbonise energy and address air quality problems through the use of hydrogen energy from renewables and into vehicles. This business led, 24 month project will investigate the practical challenges of developing mass market hydrogen fuelled vehicles for China, particularly looking at commercial vehicles, novel routes to green hydrogen production and relevant hydrogen storage approaches which will be purposefully designed to meet the specific market challenges in China. Led by UK SME ULEMCo Ltd, for the vehicle and fuelling infrastructure, with Wuhan New Energy Institute (WNEI) of Huazhong University of Science and Technology (HUST) and Hubei Swan Coatings CO., LTD. to bring local Chinese market energy storage capability, the University of Liverpool (UoL) & HUST for a novel H2 production route, success in the project will lead to a clear road map for demonstration of significant carbon reduction and ultra-low air quality emissions for 1000s of vehicles in China, within the next 10 years.			

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University of Hull Phase Change Materials Products Ltd Queen Mary University of London	A High Efficiency, Low Cost and Building Integrate-able Solar Photovoltaic/Thermal (PV/T) System for Space Heating, Hot Water and Power Supply	£984,210	£834,444

Project description - provided by applicants

Through a close collaboration between the leading UK/China universities and the top China/UK companies, this project will develop a novel, high efficiency, low cost and building integrate-able PV/T system for building space heating, hot water and power supply. The universities have specific knowledge of the most advanced PV/T, micro-channel and loop heat pipe technologies and also expertise in China-oriented business strategy. The companies have strong R&D and manufacturing capacity in solar PV, thermal, PV/T and heat storage/ exchangers. The new PV/T system will achieve 30% higher overall solar efficiency and 20% cost saving compar-ed to existing equivalent PV/T systems and will be flexible in components selection to meet different needs in buildings. The innovative technologies include (1) a novel loop-heat-pipe (LHP); (2) a novel PV/T panel; (3) a highly efficient heat storage/exchanger, and (4) an internet-based intelligent monitoring & control system. Such technological advances should open up an enormous China and global business in solar heat and power sector, thus creating considerable impact on economy, industry and environment within China, the UK and beyond.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Crystec Ltd Imperial College London	Accelerating cost-effective development of improved treatments for COPD and other respiratory diseases in China	£960,976	£716,711
Project description - provided by applicants			
This project focuses on cost effective health care provision for debilitating respiratory diseases, and especially chronic obstructive pulmonary disease (COPD). COPD currently affects 1 in 12 of the Chinese population over 40. Frequently patients respond poorly to current treatment due to drug resistance. Our innovative approach will overcome this issue with an inexpensive, simple, efficacious, dry powder inhaler (DPI) device containing a novel combination of two existing drugs. Innovative supercritical fluid (SCF) technology uniquely provides the ability to prepare the high specification drug powders required. Essential knowledge requirements for the project will be met by bridging leading centres - Crystepharma and Imperial College in the UK with SIMM and Shanghai Fudan-Zhangjiang Bio-Pharmaceutical Co. in China. Outcomes will include first in man™ studies for the new DPI, and creating a preclinical testing centre and SCF manufacturing facilities in China. In addition to the COPD product, a range of improved drug/device patient inhaled products will be developed aimed to treat cost effectively other widespread respiratory disease challenges in China.			

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Biovici Ltd NPL Management Ltd Swansea University	Graphene biosensor for point of care hepatitis diagnostics	£803,418	£618,809
Project description - provided by applicants			
Exceptional electronic properties, surface sensitivity and selectivity, make graphene ideal for senso rapplications. Novel, generic, real-time monitoring sensor technology, based on chemically modified graphene channels, will be demonstrated for the detection of salivary / serum hepatitis biomakers. The project will develop an innovative graphene based point-of-care sensor platform for the early detection of multiple hepatitis biomarkers, for simultaneous monitoring of hepatitis A, B and C. The generic POC platform will enable more efficient & effective healthcare delivery and improved health outcomes for patients.Graphene sensors will be fabricated on full wafers and functionalised using a novel chemical and biochemicalmodification techniques. Graphene sensor devices will be integrated with printed electronics and microfluidics to form a self contained packaged, single-use sensor. The sensor platform can also be adapted for the detection of other disease markers including, stroke, heart disease, cancer and dementia. A complete disposable strip and electronic reader system, akin to blood glucose monitoring kits, will be developed.			

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Cambridge Microelectronics Ltd University of Cambridge	Development of High Power Density 3.3kV/1.8kA Reverse Conducting IGBT: RC-IGBTs	£858,653	£711,764
Project description - provided by applicants			
Within this project we will develop a 3.3kV/1.8kA Reverse Conducting IGBT (RC-IGBT) devices to replace separate IGBT and Diode chips currently used in modules for rail transportation, wind power generation and High Voltage Direct Current (HVDC) transmission. Compared with the state-of-the-art IGBT-based modules, the RC-IGBT module will deliver higher output current, lower thermal resistance while ensuring twice as long power cycling lifetime. We will develop and optimise RC-IGBT devices primarily for electric drives for trains which will ensure reliable, more energy efficient and environmentally friendly operation of trains and facilitate growth of the rail network and more efficient transportation of people and goods, a key enabler for urbanisation. Modules with developed 3.3kV RC-IGBTs can also be used in wind turbines and HVDC transmission network and further extended to 1.2kV and 1.7kV voltages and used for electric vehicles and solar PV systems. Thus, the developed RC-IGBT technology will make a significant contribution in solving energy and transportation challenges facing both rural and urban populations in China in an energy-efficient, sustainable manner.			

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City University London Samad Power Ltd	Concentrated solar micro gas turbine with thermal energy storage (SolGATS)	£999,396	£849,396
Project description - provided by applicants			
The collaborative project aims at integrating micro gas turbine systems developed by City University London in collaboration with Samad Power Ltd in the UK with a concentrated solar power parabolic dish with high temperature thermal energy storage allowing for the production of combined electricity, heating and cooling from solar power which reduces the need for back up power and contributes to the reduction in carbon dioxide emissions. The developed system can operate in stand alone mode to provide distributed energy to remote areas thus eliminating transmission losses and reducing grid infrastructure costs. It also can be stacked in a modular manner to provide flexible medium scale power generation. The overall impact is reduction in emissions and reducing poverty and promoting social welfare by creating jobs in the resulting industry in China. It will also support the UK economy through large market for the UK high tech industries in micro gas turbines and their supply chain.			

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University of Exeter University of Nottingham EvoEnergy Ltd Brinell Vision Ltd Couch Perry & Wilkes LLP Yorkshire Photonics Technology Ltd	Embedded systems for Integrated Photovoltaics in Rural Buildings: E-IPB	£899,926	£741,909
Project description - provided by applicants			
Forty percent of the world's energy is consumed by the building sectors. China has the largest building construction output in the world, which constitute to 25% of carbon emissions. As such, net zero buildings/low energy buildings are of a high priority with governments to help reduce their carbon emission levels. The incorporation of solar energy elements into buildings is a way forward to address this issue. This enables generation of electricity at the point of use, minimising thermal load while maintaining light efficacy within the building envelope. This project will demonstrate technical and commercial viability of lightweight glass on glass optical device integrated PV systems with a targeted efficiency enhancement of 2%. This will be achieved through an integrated model for different low cost PV technologies, manufacturing new prototypes and integrating/retrofitting the system with building envelopes. In addition to this, technology viability will be carried out for harsh climatic conditions in China and the UK through accelerated lifetime tests for enhancing durable and reliable products.			

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Imperial College London XL Technology Ltd	Smart-GeoWells: Smart technologies for optimal drilling, completion, design and management of geothermal wells	£990,800	£843,512
Project description - provided by applicants			
A new concept Smart-GeoWells™ will be developed for well design by incorporating many laterals extending from the mother-bore to far-field reservoir regions. The smart technology will provide a unique opportunity to enhance the productivity of geothermal reservoirs that extract renewable and clean heat energy from the Earth's crust. By employing the proposed well system, the geothermal industry will significantly contribute to the global target of zero greenhouse gas emissions. The Smart-GeoWells approach can also serve as an alternative to fracking, enabling extraction of oil and gas from depleted/unconventional reservoirs, whilst minimising the damage to the surrounding environment (groundwater and air). The products of this project will benefit the Chinese energy market and mitigate further pollution generation and climate change, induced by the exploitation and consumption of fossil hydrocarbon resources.			

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University of Nottingham Vale Window Company Ltd Geo Green Power Ltd Solar Ready Ltd	Joint research of key technologies and commercialization of a novel thin-film photovoltaic vacuum glazing (PV-VG)	£811,460	£649,380
Project description - provided by applicants			
The proposed project is concerned with the development and manufacturing of a revolutionary photovoltaic vacuum glazing (PV-VG) for building applications. The PV-VG design features lower heat loss and lighter weight compared with double or triple glazing, and eliminates the need for inert gases such Argon used in conventional windows. The proposed PV-VG technology also generates electricity using the laminated thin-film PV cell and makes use of low-e coating to reduce radiative heat loss or gain to offer better thermal comfort and energy saving. The application of this innovation across buildings for public use, community centres and social housing will have a direct impact on improving the energy security, comfort and economic lives of the ODA citizens.			

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Sunamp Ltd University of Glasgow	An ORC power plant integrated with thermal energy storage to utilise renewable heat sources for distributed heating and power	£996,180	£814,587
Project description - provided by applicants			
Intermittent and low-grade renewable energy sources have unrealised potential to displace the use of fossil fuels, provied their inherent drawbacks can be overcome. We propose to couple novel heat storage technologies to the well-known Organic Rankine Cycle to produce distributed heat and power supply using a wide range of under-utilised renewable heat sources, such as solar and geothermal energy. These heat sources are normally too low-grade to be economically unviable for power generation using conventional technologies. ORC power plants are believed to be the most promising technology to utilise them. In order to improve the cost-effectiveness and to reduce payback period, suitable heat storage systems can be added to ORC power plants to either overcome the intermittency of solar energy or minimise the required capacity of deep geothermal boreholes. Based on the partners™ previous successes with ORC technologies and heat storages in both the UK and China, this consortium brings together comprehensive and complementary expertise to address key technical challenges, thus pushing forward the commercialisation of the proposed technology.			

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TRL Ltd Westfield Sports Cars Ltd	Automated Connected and Electric Urban Transport Solutions (ACE UTS)	£1,000,000	£749,822
Project description - provided by applicants			
This collaborative project between UK and Chinese partners will seek to develop a fully automated and connected, zero emission urban transport solution. It builds on the existing research and development that has been carried out in the UK and China to propose a novel and innovative solution for clean and efficient urban transportation. The proposed project will utilise technologies such as automated, electric vehicles, communication systems and wireless charging solutions. This project will deliver substantial socio-economic benefits within the urban environment to Chinese citizens in terms of reduced air pollution, reduced greenhouse gas emissions, improved transport efficiency and accessibility to vital services while at the same time, opening up substantial market opportunities for UK companies and opportunities for forming strong partnerships for the commercialising of developed solutions.			

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