Innovate UK

Results of Competition: Newton - UK-China Agri Tech Challenge 2017

Competition Code: 1706_CRD1_NEWTON_CHNBBSRC

Total available funding is £8 million/Split £4m Innovate UK and £4m BBSRC

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Cisco International Limited	Precision Crop Disease Management for Farm Productivity & Food Security - CropDoc	£568,351	£284,176
Manchester Metropolitan University		£441,925	£441,925
NquiringMinds Limited		£256,167	£179,317

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Project description - provided by applicants
CropDoc seeks to exploit existing research on Potato disease identification & outbreak management in the domain of precision agriculture, agriculture digitisation & decision management support. It will harness cutting-edge technologies (i.e. IoT, mobile devices, crowd sourced data, big data analytics and cloud computing). It will build a decision support system that generates insight from multiple data collected from remote sensing above the fields and IoT ground sensing within the fields for monitoring & prediction of disease in real time. The initial focus will be on potato late blight disease, one of the most devastating crop diseases in China. In a typical blight pressure season crop protection chemicals cost the global industry an estimated $10-20bn per annum. Late blight has been referred to as a 'community disease', due to its ability to spread rapidly from field to field under the right weather conditions. Asexual spores travel easily on the wind when the weather is cool and moist, and can rapidly infect neighbouring fields. As such, understanding the symptoms of the disease and what to do when it is detected are essential to preventing an outbreak from rapidly turning into an epidemic.

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Chelsea Technologies Group Ltd	Advancing Digital Precision Aquaculture in China (ADPAC)	£463,036	£324,125
Perceptive Engineering Limited		£279,387	£195,570
University of Bedfordshire		£223,209	£223,209
University of Surrey		£226,872	£226,872

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Project description - provided by applicants
This project aims to advance digital precision aquaculture in China towards “Aquaculture 4.0”, which is a highly connected and automated cyber-physical system using digital technologies. Aquaculture production in China reached 45.5m ton in 2014 accounting for more than 60% of the global production. However, this sector in China suffers from the extremely low production efficiency, leading to high labour intensity, high consumpiton of energy and water, and severe enviroment pollution. Innovation is urgently needed for a transformation from traditional small-scale to digital industrialised aquaculture. The proposal is a timely response to the needs; it will apply and integrate the latest technologies of advanced sensors, 5G-based Internet of Things, Big Data analytics and automation to pilot highly digital precision aquaculture in China. The system is expected to deliver 10-fold increase in production efficiency. The project will open new business opportunities in China, and the developed solution will be also applicable to aquaculture worldwide.

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Koolmill Systems Limited	Next Generation Rice Processing	£205,409	£143,788
Aston University		£205,779	£205,779
Cox and Plant Limited		£139,198	£97,439
New-Food Innovation Ltd		£110,156	£77,109
Sheffield Hallam University		£332,173	£332,173
Siemens PLC		£74,924	£37,462

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Project description - provided by applicants
Achieving optimal efficiency in the post harvest handling and processing of rice is a ubiquitous challenge for China's agri-food sector. Rice is the staple food of 2/3 of population & it produces c. 1.3bn of quality rice p/a. This is insufficient to meet the aggressive population (13M p/a). This is due to land pressure & inefficient milling process handling resulting in an average 50% grain losses in machine batch processing. There are 6000 medium large mills across China operating at 50-60% efficiency rates. Conventional milling machines are manually operated & have no mechanism to responding to process variants (temperature, machine failures, contaminants) that can result in a whole milled batch being ruined. The project aims to develop a novel digital milling processes, supported by AI software platform that will intuitively respond & adapt to potential process failures, reduce milled waste & inject an additional 3MT of high quality rice (worth an additional £1.2bn to regional farming communities) into Chinese food chain p/a. 100% uptake would deliver 40MT (worth £12M p/a). This will be supported by a new business model, and education programme to support technology uptake and changes in work practice.

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TEKEVER Ltd	Utilizing Earth Observation and UAV technologies to deliver pest and disease products and services to end users in China	£479,894	£335,926
Assimila Limited		£200,995	£140,696
CAB International (CABi)		£170,469	£170,469
King's College London		£165,873	£165,873
Loughborough University		£160,211	£160,211

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Project description - provided by applicants
Locusts and rust diseases are major problems for agriculture globally, including for cereals in China. Currently they are often controlled by blanket-spraying of chemicals so this project aims to reduce unnecessary application of pesticides to improve the efficiency of resource use. The work will provide a comprehensive approach to dealing with these pests by combining earth observation and modelling technology with biological information to develop pest and disease monitoring, forecasting and management service products. Dynamic pest and disease risk assessment and warning maps will enable the Chinese Government and service providers (providing crop pest and disease control) to determine the best areas to spray with pesticides, and to plan flight paths for Unmanned Aerial Vehicles (UAVs/drones) to follow for precise spraying of crops. Applications for biopesticides (biological control agents) will also be investigated and developed. The project will reduce costs of crop protection, leading to better incomes for farmers, and will protect environmental and human health by reducing release of chemicals into ecosystems.

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Wells Plastics Ltd	Zero-Waste Agricultural Mulch Films for Crops in China (ZEWAMFI)	£151,575	£90,945
Bangor University		£392,361	£392,361
Scitech Adhesive Systems Limited		£129,799	£90,859
Skymark Packaging International Limited		£51,242	£30,745
Velcourt Limited		£79,600	£47,760

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Project description - provided by applicants
The project will develop cost competitive agricultural mulch films for arable crops that will perform during use but degrade thereafter with no negative impact in terms of producing micro-plastics/ or leaving un-degraded plastics in soil. Agricultural mulch films have been introduced in semi-arid zones in China to make efficient use of limited water supplies and increase crop yields in the production of staple food crops (rice, maize, and potatoes). Commonly used mulch films are made of polyethylene, which when buried in the ground show very limited levels of degradation. On the long-term, this plastic waste accumulation impact on soil microorganisms and soil fertility, thereby threatening advances in terms of increased food production. This project is targeting the design of a cost-competitive advanced-polymeric material that would secure that they will be stable during use, but once buried in soil, (after useful life) they will degrade in the presence of suitable enzymes/ soil microorganisms.

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Fera Science Limited	REmote sensing and Decision support for Apple tree Precision management, Production and globaL tracEability (RED-APPLE)	£179,440	£89,720
Newcastle University		£388,339	£388,339
Nigel Kitney Farm Management Service		£24,956	£17,469
OptiSense Limited		£240,075	£168,053
Precision Decisions Limited		£120,083	£84,058
Project Provenance Limited		£173,033	£121,123
RSK Adas Limited		£35,660	£17,830

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Rutherford Appleton Laboratory Space (RAL)		£111,652	£111,652

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Project description - provided by applicants
Red Apple is looking to develop and implement technological innovation in the China and UK apple production systems to increase yield and quality as well as reduce supply chain losses. The project is testing two technologies: 1) spectral cameras that can identify plant stresses due to, for example, water or nutrient imbalances or pest and disease; 2) traceability systems that can transfer appropriate information to stakeholders along the supply chain to maintain higher quality levels and reduce losses. The findings from the first technology are expected to help growers to achieve a better orchard management around pruning, blossom management and harvest dates, which will eventually increase yields and quality in a sustainable manner, reducing inefficient inputs of fertiliser and pesticides. The second will ensure not only the reduced losses but also that quality attributes can be linked to particular producers as well as production techniques, management of the crop, and harvest dates. Thus the two parts of the project are interlinked

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Keracol Limited	Citrus waste valorization for improved food safety and human health (Citrusafe)	£198,405	£138,884
Biopower Technologies Limited		£119,998	£83,999
Parkside Flexibles (Europe) Limited		£158,042	£94,825
University of Leeds		£417,462	£417,462

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Project description - provided by applicants
The proposal addresses China's development priorities to eliminate waste and improve food safety. The project will exploit complementary Chinese and UK research and industrial expertise to valorise waste from large scale (>10 million tons of waste) Chinese mandarin canning manufacturing for food safety applications. Efficient green technologies will be optimised to extract and refine food grade hydrocolloids and citrus bioactives from both solid and liquid waste streams. The focus will be on improving extraction efficiencies and solubility of the compounds to ensure compatibility with foods and packaging matrices. The exploitable outputs will be well defined biomaterials with downstream processing applications in two manufacturing sectors: (1) food additives and (2) food packaging. Food and packaging prototypes will be developed and selected according to optimal antimicrobial and antioxidant properties against key spoilage pathogens in high risk foods (e.g. meat and fish products) and consumer acceptability. This project will utilise China sustainable materials, provide commercial opportunities to Chinese and UK industries with benefits to the environment and the safety of consumers.

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RoboScientific Limited	Envirobot: an autonomous roving platform for envionmental, health and welfare monitoring of poultry	£424,570	£297,199
Hudson & Sanders Limited		£241,620	£169,134
Ross Robotics Limited		£335,473	£234,831
Royal Veterinary College		£262,298	£262,298

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Project description - provided by applicants
Despite China's exceptional economic growth there is still extreme poverty effecting large numbers of people. This need can be addressed by large quantities of affordable high protein such as chicken meat & eggs. The Chinese chicken industry lags behind the best standards of production yields; food quality; low anti-biotic usage & disease free status. This project will combine robot technology with advanced sensors & climate management; with real-time monitoring to maintain the best climatic conditions, improving animal welfare & production yield; & early detection of poultry disease & minimal anti-biotics use. The project will build a data collection platform for poultry buildings, (giving detailed information on the climate & health of birds) & add data analysis with climate control to provide optimal health, welfare & production yield conditions. The Royal Veterinary College leads the project; Ross Robotics; the robot; Applied Poultry, remote monitoring; RoboScientific early detection of diseases; China Agricultural University precision livestock farming; Beijing Deqingyuan Agriculture Technology, poultry facilities & Beijing Tobor Technology, optimisation of the robot.

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AGROPY UK LIMITED	Environmentally Benign Combination Biopesticides: Transforming Pest Control in Chinese and UK Agriculture	£589,795	£412,856
University of Greenwich		£410,535	£410,535

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Project description - provided by applicants
Environmentally benign fungal pathogens and naturally insecticidal plant extracts could offer a sustainable alternative to synthetic chemical pesticides. Fungal control does not have many of the problems associated with conventional control such as pest resistance, toxicity to humans and persistence in the environment. One downside to such a technology is that it can be slow acting to achieve effective control. In this project we will create a formulation combining fungal pathogens with pesticidal plant extracts for effective pest control. The new product may confer additional benefits as the modes of action may work in synergy to achieve greater pest control with less material required. This collaboration between the Natural Resources Institute and Eurorganic Ltd in the UK and Fujian Agriculture & Forestry University and Jiangxi Tian-Ren Ltd in China will also stimulate growth of the UK and Chinese market, provide safer working conditions, creating job opportunities and allowing local growers to receive a greater return for their produce by conforming to EU regulations on pesticide use.We will use field and laboratory studies to determine the optimal formulation.