

Results of competition: Agri-Tech Catalyst - Early stage - round 3

Total available funding for this competition was £2.13m from Innovate UK/Department of Business, Innovation and Skills, the Biotechnology and Biological Sciences Research Council and the Department for International Development.

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
AgSpace Agriculture Ltd; The Satellite Applications Catapult	Investigating crop DNA: Using free Sentinel 1 RADAR data to study crop growth	£186,077	£127,930
Project description - provided by applicants			
<p>This feasibility project will consider the use of Sentinel 1 synthetic aperture radar (SAR) data to aid the arable food production system. The current use of crop biomass imagery from optical imagery (NDVI) is popular with farmers but is reliant upon clear, cloud-free skies. SAR will provide data in all conditions, day and night thus providing a detailed and reliable source of crop growth data for farmers. This project could present a huge breakthrough in non-space related satellite applications. Previous study suggests that SAR data is capable of pinpointing different growth stages which is critical in arable farming for delivering treatments and fertiliser at the right time. This study will use existing NDVI imagery along with detailed SAR data and field data to help model a new crop growth index. Not viable previously, due to the restrictively high cost, Sentinel SAR data is now freely available allowing the development of new applications that could make a real difference to farmers.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Alpha BioPesticides Limited; 13ApresLabs; Food and Environment Research Agency	Novel natural synergistic compounds for the enhancement of insecticide activity	£306,279	£221,870
Project description - provided by applicants			
<p>The project aims to develop a product that can be used in conjunction with insecticides to enhance their effectiveness. Through improving the activity of insecticides, the product will facilitate reduced application rates in the field and contribute to the aim of lowering the quantities of synthetic insecticides used in agriculture and horticulture. The product will be made from materials extracted from non-crop plant sources and synergism of insecticides will derive from the inhibition of the enzymes responsible for their detoxification. This synergism will not only enhance insecticide activity in the field, it will also uncouple metabolic resistance in populations of pests that have developed tolerance to a given insecticidal compound. The innovation will have various benefits, including abrogating resistance, enabling more efficient pest control and reducing the environmental impact that insecticide applications currently have.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Asymptote Ltd; CABI; University of Ghana	Improved methods for freeze drying of entomopathogenic fungi	£368,441	£274,497
Project description - provided by applicants			
<p>The project brings together the technological expertise to develop a cost effective mass production and delivery a more effective biological solution to control pests with expertise in fungal cell processes and whole organism survival to ensure product long term shelf life whilst retaining organism function. It combines improved product formulation with effectiveness to reduce crop losses and chemical pollution causing soil quality deterioration. The project will: Apply advanced technology to biological product development with the potential for transfer to other biological applications; Take improved laboratory knowledge to improve the cost effectiveness and efficacy to a product in the field; Develop formulations increase shelf life and confidence in the use of biological solutions to replace chemical pesticides; Produce a product appropriate for storage and use in developing economy countries; Reduce crop losses by utilisation of organisms that previously could not applied in the field.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Duraweld Limited; Nonwovens Innovation and Research Institute; Aberystwyth University; National Institute of Agricultural Botany	Improved crop breeding programmes through advanced Pollination Control Bag materials technology	£340,432	£239,512
Project description - provided by applicants			
<p>The project will investigate the technical and commercial feasibility of developing an innovative pollination control bag to improve crop breeding programmes used for three important agricultural crops: sugar beet, wheat and Miscanthus. Existing technologies are unfit for purpose and their use can be detrimental to plant health and seed yield, and increase disease incidence and expense. A range of materials (films and nonwoven), fibre technologies and techniques will be investigated and trialled with academic and commercial breeders with the aim of developing the next generation of pollination control bags to improve breeding outcomes, reduce losses caused by poor temperature and humidity control within the bag, and increase seed yield. This will reduce costs for plant breeders and accelerate the rate at which new commercial crop varieties (with improved yields, drought, disease or pest resistance, and higher crop quality), can be discovered and brought to market.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Gnosys Global Ltd; National Institute of Agricultural Botany; Frontier Agriculture Ltd; G's Fresh Ltd	CAPSEED - A New Seed Conditioning Process for Arable and Horticultural Crops	£413,133	£276,624
Project description - provided by applicants			
<p>The objective is to determine whether plasma treatments, particularly those using cold atmospheric plasma, can improve the health and quality of crops by improving seedling emergence, vigour, disease control, as well as biochemical reactivity. If successful, this would lead to healthier crops whilst reducing the chemical burden on the environment. Manipulating the properties of seeds with a non-invasive, physical process could have far-reaching effects on crop production. More vigorous seedlings, able to withstand biotic and abiotic stresses such as disease, pests and drought, could reduce risk in crop production and result in increased productivity and resilience.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Mylnefield Research Services; James Hutton Institute; Totalworldfresh; S&A Produce (UK) Ltd; AHDB	Developing genetic resources in blueberries	£222,219	£158,580
Project description - provided by applicants			
<p>There has been increased demand for blueberries in recent years fuelled in part because of their many recognised health benefits. Development of new blueberry cultivars with high fruit and nutritional quality combined with early and late ripening and appropriate climatic adaptation is needed. With the availability of more genomic resources, marker-assisted breeding could be used in cultivar development to more efficiently combine traits for fruit and nutritional quality specific to UK climatic adaptation. This project would therefore develop pre-breeding populations and a high resolution GbS linkage map to allow the UK to develop adapted blueberry cultivars efficiently, cost effectively and in a shorter time frame than would be feasible by traditional breeding means. This would allow the UK to produce more home grown fruit for consumption to increase from the 5% UK fruit currently available.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Mylnefield Research Services; James Hutton Institute; Totalworldfresh; Thomas Thomson Ltd; M&S plc; S&A Produce (UK) Ltd; AHDB; Berry Gardens Ltd	Using genomics technologies to determine the mechanism of resistance to phytophthora root rot in raspberry for future breeding applications to raspberry and other crops.	£284,682	£197,265
Project description - provided by applicants			
<p>In the Northern Hemisphere with damper conditions, Phytophthora root rot is causing a rapid decline in raspberry plantations grown in soil and also greatly decreasing the life span of production of raspberries grown in substrate with negative environmental consequences.</p> <p>Plant based resistance is the only way forward and limited material exists that consistently withstands infection with little/no symptom production. The development of gene based techniques offers an opportunity to identify genes that have a significant role in this plant-pathogen interaction to determine the mechanisms of resistance and develop novel strategies of protection including breeding. How both resistant and susceptible varieties respond at the level of gene expression and how the pathogen responds to the differing phenotypes will identify gene markers and allow strategies for control to be developed.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
SRUC; Aberdeen-Angus Cattle Society	Evaluating a potential proxy test for Feed Conversion Efficiency in beef cattle.	£158,768	£119,207
Project description - provided by applicants			
<p>The aim of this project is to explore options for implementing a new approach to assess feed conversion efficiency (FCE) in UK beef cattle. The longer-term aim is to use the new approach to breed for cattle with high FCE. It is important to maximize FCE because feed is the largest production cost in beef production and breeding for high FCE is a good long-term strategy that has worked well in the pig and poultry industries. The traditional approach to breed for FCE has been to measure feed intake and weight gain over long periods of time, but this is expensive for beef cattle and so has only been implemented for a few breeds in other countries. The project is based on testing for a novel biomarker and we will explore the practicalities of implementing this method alongside other on-farm testing of beef cattle and use the results to define options for future sampling and testing protocols.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
University of Lincoln; R Fountain and Son	3D Vision Assisted Robotic Harvesting of Broccoli	£177,736	£137,538
Project description - provided by applicants			
<p>There is an urgent need to reduce the costs of production of field brassica crops, in particular broccoli. Labour costs are a significant proportion of overall production costs. High labour usage also drives complex management and potentially social issues. In this project we will test whether low-cost commercial 3D camera technology can be used to identify and select broccoli which are ready to harvest within commercial crops. This will provide a key underpinning step towards the development of a fully automatic and camera guided robotic harvesting system for broccoli. The commercial benefits are highly significant, as the broccoli crop is one of the worlds largest vegetable crops, and almost all of it is manually harvested.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
The University of Nottingham; John Bowler Pullets and Feeds LLP; P.A.K Engineering Ltd; Geo Green Power Ltd; Environmental Process System (EPS) Ltd	WelChic – Welfare Enhanced Living Conditions for healthier Chickens.	£495,112	£381,848
Project description - provided by applicants			
<p>The overall aim of the project is to develop and test an efficient and environmentally-friendly, precision engineering solution for cooling/heating to improve indoor air quality and thermal comfort to promote better animal welfare and productivity in poultry houses. The system will use a novel membrane -based dew point evaporative technology using water and air as the working fluids to provide thermal regulation and improved air quality in the summer period. In addition, a low-cost poly heat exchanger ready loop integrated solar roof collector will be used to harness solar energy to heat working fluid to drive a heat pump. This is an efficient method for providing heating requirements in poultry houses. The solar collector has a simple design with direct integration in the poultry house roof. The project will involve the design, construction and testing of a prototype cooling/heating system. The new system will provide an environmentally friendly and economic solution to compete with traditional HVAC systems.</p>			

Results of competition: Agri-Tech Catalyst – Industrial Research - round 3

Total available funding for this competition was £7.24m from Innovate UK/Department of Business, Innovation and Skills, the Biotechnology and Biological Sciences Research Council and the Department for International Development.

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
APS Biocontrol Limited; Monaghan Mushrooms Limited; BioRationale Limited	Innovative and Sustainable Control of Mushroom Blotch	£588,445	£245,224
Project description - provided by applicants			
<p>The UK mushroom market is facing fierce competition from EU growers and rising operating costs; imports now make up 55% of the UK marketed total. A novel competitive advantage would provide an important boost to the UK industry and this application aims to provide this through tackling one of the most serious bacterial disease of mushrooms; bacterial blotch, which is responsible for crop losses of up to 10% (≈ £20M industry losses). This project will build on proof-of-concept data from a previous TSB feasibility project in which an innovative biocontrol technology based on naturally-occurring antimicrobial agents (bacteriophage) was shown to control bacterial-induced mushroom blotch symptoms in the laboratory. A business-led consortium will carry out further investigations on the technology, addressing key questions of technology deployment and efficacy, together with formulation and integration into commercial practice.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Aviagen Limited; The Roslin Institute, University of Edinburgh	Precision Breeding: Broilers from Sequence to Consequence	£2,724,848	£1,750,120
Project description - provided by applicants			
<p>This project is a collaborative partnership between Aviagen, the world’s leading broiler breeding company and The Roslin Institute, the world’s leading research centre in the application of genomics and quantitative genetics for livestock species. Our goal is to advance the sustainable intensification of broiler production for the benefit of the UK and global supply chain. We propose to develop a new, highly innovative, platform technology to accelerate the rate of genetic improvement we can achieve in our nucleus populations. With the support of the Agri-Tech Catalyst, we will collect sequence and genotype data on a huge number of individuals and we will analyse this unique repository to increase the precision of our breeding and obtain better biological insight on the mechanisms governing the phenotypic expression of traits in our holistic breeding goal that are of economic, environmental and societal importance. Our objective is to establish the feasibility of this UK innovation.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
ECOspray Ltd; Target Set Technology Ltd; Universty of East Anglia	Side Ridge Injector (SRI)	£936,575	£508,044
Project description - provided by applicants			
<p>Prompted by environmental and health concerns, an increasing number of chemical pesticides now under threat of being banned. The loss of such pest control methods (especially in mainstream crops like potatoes) poses a substantial threat to crop production and food supplies.</p> <p>This project aims to establish side-ridge injection technologies for localised under-soil delivery of environmentally benign (garlic-derived) pesticide treatments in order to tackle the threat of the prominent potato pest (potato cyst nematode (PCN)) potato crop quality and productivity. Ultimately this will enable farmers to sustainably secure high yielding and high quality crop protection in the UK, across the EU and further afield.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Greengage Lighting Limited; T. L. R. Limited; Cambridge CMOS Sensors Limited; Campden BRI; Tioga Limited; Nettlecombe; University of Nottingham	Poultry Livestock Sensor System (PouLSS)	£779,796	£539,687
Project description - provided by applicants			
<p>Raising poultry for meat is a large industry which is highly regulated by government and quality assurance bodies, due to consumer concerns about animal welfare and health and safety of meat products. To help farmers meet such regulations a consortium has designed a product to monitor the welfare of chickens and the environmental conditions of barns in which they are housed. The consortium aims to turn the design of this all-in-one environmental and welfare monitoring system into a tried and tested product. The product will help farmers more closely monitor and respond to changes in chickens' environment or welfare. It will improve existing legal and quality assurance requirements by providing real-time monitoring and will provide up-to-date advice to famers on how they can create better, more productive environments for their chickens. This innovative product will help farmers to more easily comply with regulations, whilst improving welfare and maintaining a healthy profit.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
International Controlled Atmosphere Ltd; Sainsbury's Supermarkets Limited; AC Goatham and Son; Norman Collett Limited; Natural Resources Inst., University of Greenwich	SafePod: New technology for intelligent control of fresh produce storage	£860,385	£616,596
Project description - provided by applicants			
<p>Over 170 k tonnes of apples are stored annually in the UK. In the absence of post-harvest chemicals, losses due to poor quality and disease are estimated at 3-15%. The project will deliver a new engineering solution to reduce losses. By monitoring metabolic status of fruit, SafePod will allow growers to use lower storage O2 concentrations than currently achievable, extending storage-life of fruit without risking damage. The project will optimise the use of the prototype SafePod in growers' stores and under lab conditions to define optimum storage for different apple varieties and operating conditions for SafePod. Furthermore use of the technology will be translated to other commodities. The project brings together post-harvest researchers, storage engineers, growers and the retail sector to deliver better quality fruit to the consumer and reduce waste. The global market for SafePod is huge with potential markets in UK and worldwide including USA/Canada, Australia, Europe and India.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
KWS UK Ltd; The James Hutton Institute; Mylnefield Research Services Ltd	Breeding for Durable Resistance to Rhynchosporium (DRRUM)	£476,243	£328,715
Project description - provided by applicants			
<p>Leaf scald, caused by the fungal pathogen Rhynchosporium commune is one of the most damaging diseases of UK barley. Current control strategies rely heavily on fungicides, but the most effective and sustainable way to protect crops is to develop new cultivars that incorporate and express effective built-in resistance. In order to do this, we need to, simultaneously introduce multiple, complementary resistance genes into a single line. This is extremely hard to do if traditional selection methods are used. This project will translate cutting edge advances in barley genetics to deliver innovative breeding methods along with DNA markers that are needed to achieve this objective. These resources and knowledge will be used by the commercial partner (KWS UK Ltd) to produce the next generation of highly resistant barley varieties that will protect yield and quality for growers and end users of barley grain.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Nestlé Product Technology Centre York (Nestlé PTC York); KWS UK Ltd; The Scotch Whisky Research Institute; ADM Milling; United Biscuits	To develop sustainable approaches to improve grain quality and help end users of soft wheat to mitigate challenges in downstream processing	£554,107	£202,835
Project description - provided by applicants			
<p>Users of soft wheat have identified variation in quality to be a major root cause of challenges encountered in downstream processing. These challenges are currently managed reactively, and are exacerbated by a fundamental lack of understanding in terms of defining the principal quality characteristics of soft wheat for a given process.</p> <p>This project will address this challenge by identifying desirable quality characteristics, developing analytical tests to allow screening of soft wheat lines, and finally testing the stability of these characteristics in the context of variation according to growing environment and year. This will enable a new pipeline of quality soft wheat varieties in the UK, less reliance on wheat imports, and a reduction in downtime and use of processing aids in downstream manufacturing.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
PIC (Pig Improvement Company UK Ltd); University of Edinburgh	Innovative NextGen pig breeding using DNA sequence data	£2,576,784	£1,655,523
Project description - provided by applicants			
<p>This Project addresses food security and sustainability by substantially increasing the efficiency of genomic selection of pigs. Specifically we will develop a new technology we call NextGen Breeding, based on the collection and utilization of very large quantities of sequence data, which will enable us to dramatically accelerate the rate of genetic improvement in our pig populations. The project involves collaboration between two world class UK partners, PIC (part of Genus plc), the world’s leading pig breeding company and The Roslin Institute (RI), the world’s leading research centre in the application of genomics and quantitative genetics to farm animal breeding. The project requires whole genome sequencing of samples on an unprecedented scale and even though our innovative approach dramatically reduces the costs over the conventional paradigm, the risk and costs are still considerable.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Seawater Greenhouse Ltd; Aston University; Gollis University, Hargeisa	Sustainable intensification of agriculture in the Horn of Africa	£722,377	£518,078
Project description - provided by applicants			
<p>The project will develop an integrated agricultural enterprise that is both profitable and sustainable in the arid conditions of the Horn of Africa. Traditional agriculture is marginal and risky in this climate because it is generally too hot, too windy and there is a shortage of fresh water. As a consequence, evaporation exceeds rainfall by a large factor and crop yields are low. The project will overcome these obstacles with a low cost shade net structure to protect the crops from the extremes of wind and solar radiation and which is cooled and humidified with seawater, using the prevailing wind to drive the evaporative cooling process. Brackish ground water will be treated by reverse osmosis, powered by solar PV to provide irrigation and drinking water. The pilot will be built near Berbera in Somaliland and managed by a local team with support from the UK. Once demonstrated, the technology will be scaled up and replicated locally and in other hot, arid coastal regions.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
SoilEssentials; The James Hutton Institute; Scottish Agronomy Ltd; MyInfield Research Services; SRUC; Mack Multiples	Assessment of SOIL quality using a BIOindicator (SoilBio)	£1,340,737	£875,511
Project description - provided by applicants			
<p>Providing sufficient food to feed an increasing global population is challenging given limited resources. Soil is a key component of food production providing nutrition and organic matter. However, modern methods of crop production have resulted in degraded soil leading to reduced yields. This contributes to the so-called yield gap, the difference between yield in optimal conditions to that actually achieved. This project focusses on developing a test for soil quality that uses measures of soil biology, chemistry and physics. We profile soil nematode community DNA, similar to genetic fingerprinting, to inform the status of soil quality. Whereas soil chemical and physical measures are snapshot measures in time e.g. hours, nematode data is a reflection of weeks/months. The consortium partners will develop a tool for farmers to be used in a precision agriculture framework to identify fields in need of soil quality improvement.</p>			

Results of competition: Agri-Tech Catalyst - Late stage - round 3

Total available funding for this competition was £414,000 from Innovate UK/Department of Business, Innovation and Skills, the Biotechnology and Biological Sciences Research Council and the Department for International Development.

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
National Milk Records plc; Evidence Based Veterinary Consultancy Ltd	Developing a bovine ketosis risk indicator using milk spectral analysis and animal phenotype data	£204,466	£63,369
Project description - provided by applicants			
<p>This project sets out to expand the use of easily attainable milk spectral results to provide a risk status of ketosis likelihood at an individual cow level. There is significant potential for this new tool to increase the efficiency of GB milk production by reducing costly body weight changes, improving health and fertility, and ensuring more targeted use of energy resources on farm.</p> <p>Being able to provide a ketosis indicator that's hassle free, low-cost and non-invasive on a regular basis using a controlled system such as milk recording, will offer greater opportunities for the 5,000 dairy herds recorded by NMR to partake in ketosis monitoring. Currently, time constraints and the complexity of data required to generate meaningful measures are a barrier for participation. NMR, along with SRUC and EBVC seek to overcome these via this project.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Noble Foods Limited; DSM Nutritional Products (UK) Limited	'Sunshine Egg': A novel and healthier vitamin D enriched food	£619,678	£123,936
Project description - provided by applicants			
<p>Vitamin D deficiency is a common public health problem within the UK. As vitamin D is found in significant amounts in few foods there is an urgent need to develop higher vitamin D containing foods, which will increase vitamin D nutritional intake of the population. The aim of the proposal is to develop vitamin D-enriched eggs which will have significantly higher vitamin D content than eggs currently available. There is scientific information that this may be achieved by manipulating hen diet. We will achieve our aim by conducting industry scale feeding trials in hens, where we will manipulate the dietary composition of feed while adhering to strict European feed guidelines. The beneficiaries of this project will be the project partners and the UK egg industry who will benefit economically from the project outcomes, the wider public will be provided with a rich source of vitamin D and the health and welfare of the laying hen population who may benefit from increasing vitamin D feed composition.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Odyssey Labs Limited; BSFF; Solidaridad	HealthyShrimp: An affordable salinity sensor device for increased aquaculture yields and reduced environmental damage.	£152,330	£90,794
Project description - provided by applicants			
Odyssey Sensors develops and delivers affordable environmental technology in support of low-margin producers in agriculture and aquaculture markets.			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Shearwell Data Ltd ; AHDB	Livestock Industry Data Exchange Hub	£281,914	£47,484
Project description - provided by applicants			
<p>The project is an industry-led initiative to achieve more efficient sharing of livestock information from farm through to retailer. The focus will be on exchanging cattle health information and farm assurance status, between operators at each stage in the food supply chain. This will be achieved by developing a data exchange 'hub', providing secure access for commercial data providers and data users. The benefits will be reduced operational costs in the handling and transfer of data, improved national control programmes for production diseases of cattle, improved animal health and welfare, reduced environmental impact, increased international competitiveness, and enhanced consumer confidence in the GB food supply chain. Ultimately, the system could be extended to cover other farmed species. In addition, it is expected that the facility will stimulate further innovation in how data is collected and utilised, to benefit the economic, social and environmental sustainability of GB livestock production.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Techneat Engineering Ltd; First Light Lamps Ltd	An Experimental Determination of the Benefits of using a Pulsed UV Treatment on Seed and Ware Potatoes	£294,696	£88,409
Project description - provided by applicants			
<p>Techneat Engineering has developed a pulsed uv system to treat bacterial problems on potatoes. The process can be used on seed or ware potatoes. Previous work has shown great promise but extensive replicated trials are required to provide final proof of efficacy to farmers and growers. It is intended to conduct seed trials in Scotland and ware trials in England, with the harvested produce being assessed by the British Potato Council.</p>			