Technology Strategy Board
Driving Innovation

Results of competition:
Technology-inspired innovation - August 2013 - Collaborative R&D - Biosciences

Total available funding for this competition was £8m from the Technology Strategy Board.

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
Demuris Limited (lead) Croda International Public Limited Company University of Manchester	Synthetic biology for antibiotic discovery and development	£499,928	£207,857
Project description (provided by applicants)			
New antibiotics are urgently needed to replace and supplement those eroded by bacteria resistance. Synthetic biology approaches have vast potential to aid the discovery and development of antibiotics and other medicines. Benefits may include overcoming common problems associated with antibiotic discovery from natural sources such as poor growth characteristics, reproducibility and poor yield. Demuris has identified a promising broad spectrum antibiotic but it is produced in low quantity. Bioinformatics and synthetic biology tools will be used to identify and refactor the gene cluster for optimum production and allow the creation of antibiotics with improved properties. Developing these synthetic biology methods may give scientists new weapons to be used in the battle against bacterial resistance.			

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M Squared Lasers Limited (lead) University of Exeter	Enabling technologies for advanced multiphoton microscopy	£494,118	£210,000
Project description (provided by applicants)			
A major challenge in fundamental biological research and the development of biotechnology is to measure heterogeneity in chemical composition at the cellular and subcellular scale in living cells and tissues. The current standard in biological imaging, fluorescence microscopy, provides chemical specific image contrast by molecularly targeted probes. However, these probes are too bulky for labelling small molecules such as lipids, carbohydrates, metabolites and many drugs that play essential roles in the function of living cells and tissues. Coherent Raman Scattering (CRS) microscopy has emerged as powerful tool to generate signals from vibrational spectroscopy to provide label-free mapping of biomolecules in real-time. However, due to the specialised laser requirements, this technique is currently confined to a handful of specialised laboratories with the resources and expertise to operate such laser systems. This project aims to develop a simple, compact module that will upgrade pulsed lasers currently used in biological microscopes to provide wider access to CRS imaging.			

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NPL Management Limited (lead) Elforlight Limited	A fusion of high resolution tuneable MALDI MS with SIMS	£327,308	£173,535
Project description (provided by applicants)			
With links increasingly being established between molecular markers and disease states there is a significant interest in techniques for imaging unlabelled molecules directly in tissue. Localised molecular information provides the opportunity to directly investigate the link between tissue structure and function, and mass spectrometry imaging (MSI) has been established as a powerful technique for achieving this. This project aims to improve the MSI spatial resolution, sensitivity and scope of targets through the combination of two major innovations. First, a new tuneable laser system for Matrix Assisted Laser Desorption Ionisation (MALDI) MSI will be developed to increase scope of analytes, sensitivity and resolution. Second, methods will be developed to fuse data from two MSI techniques (Secondary Ion Mass Spectrometry (SIMS) and MALDI). The flexibility of the new MALDI system will allow optimised fusion with SIMS images to provide further improvements in resolution and simplify data interpretation. The combined product will be a novel multi-mode biological imaging strategy with potential applications for combined metabolomic, lipidomic and proteomic research.			

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Oxitec Limited (lead) University of Liverpool	Genomes and synthetic biology for development of novel pest control technologies	£308,868	£129,966
Project description (provided by applicants)			
Oxitec is the world leader in application of synthetic biology to control of pest insects. Oxitec's RIDL® technology relies on release of mass-reared genetically sterile (transgenic) male insects that mate with their wild pest counterparts, thereby causing a drop in population. RIDL efficacy is proven against the dengue mosquito, Ae. aegypti, reducing wild populations in Brazil by ca. 96%. A costly aspect of current technology is the means of selecting males only for release, important as the females blood-feed and transmit disease. This project aims to develop a novel method of producing male-only cohorts of RIDL mosquitoes ('genetic sexing') that would both markedly reduce costs and cement Oxitec's leadership in the field. Next-generation sequencing datasets will be analysed to help develop new RIDL traits in Ae. aegypti mosquitoes, to increase the efficiency of applying our technology in the field. Development of targeted bioinformatics methodology, and successful engineering of a novel genetic sexing technique, will provide a pipeline for development of new RIDL traits in other pests important for public health and agriculture.			

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Puridify (lead) University College London	Novel purification technologies for industrial biotherapeutic manufacture	£499,728	£285,575
Project description (provided by applicants)			
Global demand for cheaper biotherapeutics, which represent many of the new tools in the fight against diseases such as cancer, drives the need for a reduction in manufacturing costs. A significant proportion of current costs arise from the purification technologies currently used to ensure the safety and efficacy of these treatments. Improvements to these technologies are fundamentally limited with the existing dominant technology reaching a point where it is unable to match performance increases in the rest of the manufacturing process. This will impact the ability for drug manufacturers to reach economies of scale and meet market demands from patients. Puridify's novel nanofibre purification technology has the potential to revolutionise the industrial scale production of biotherapeutics. The material's properties can overcome current manufacturing limitations by increasing productivity 10-fold, potentially reducing biotherapeutic manufacturing costs by up to 25%. This will play an important role in widening patient access to expensive drugs in both the UK and worldwide. Puridify seeks to develop key drivers for adoption under a CRD project.			

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Sphere Fluidics Limited (lead) MedImmune Limited	A novel, single cell characterisation, dispensing and imaging platform for accelerated biopharmaceutical development	£405,131	£234,543
Project description (provided by applicants)			
Sphere Fluidics Limited is an SME focusing on the development of novel, single cell analysis technologies. MedImmune, the global biopharmaceuticals arm of AstraZeneca, is a pioneer in biopharmaceutical discovery and development. Both companies have pooled their synergistic, science skills to propose the development of a unique, integrated microfluidic instrument that uses miniaturisation and novel chips to process pools of cells and rapidly isolate single cells for applications in biopharmaceutical research and development.			

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Synpromics Limited (lead) Ingenza Limited	Adaptable synthetic promoters to optimise industrial competitiveness of engineered yeast	£497,715	£298,629
Project description (provided by applicants)			
The collaboration between Synpromics and Ingenza is focused on developing proprietary protein production systems in engineered yeast strains that improve on currently available alternatives by incorporating novel synthetic promoter constructs rationally designed to drive optimal gene expression. The enabling technology that the project aims to deliver will address significant limitations faced by a wide range of bio-manufacturers using yeast-based expression, enabling the more efficient production of protein products and intermediary production enzymes. The combination of Synpromics' and Ingenza's innovative technologies and expertise is expected to validate a platform on which to build an even broader range of solutions to yeast-based expression challenges, thereby establishing in the UK a leading capability in synthetic biology and sustainable industrial bioprocessing.			