Innovate UK

Results of Competition: UKI2S Accelerator Programme for Technology Development Projects: Round 7

Competition Code: 1907_UKI2S_R7

Total available funding is £798,027

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
QDOT TECHNOLOGY LTD	Battery Thermal Management - Enabling Extremely Fast Charging	£100,000	£70,000

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

Funders Panel Date: 21/08/2019

Project description - provided by applicants
The UK's stated objective to emit zero carbon emissions by 2050 means that future cars and commercial vehicles will need to be driven by electric motors powered by compact batteries. The battery technology of the future is expected to be a descendant of existing Lithium ion (Li-ion) batteries used in existing Electric Vehicles (EVs) - such as the Toyota Prius and the Tesla range of EVs. To optimise the cycle life (running cost) and performance (range and power) of Li-ion devices, the battery temperature must be maintained within a narrow window of operation - typically 15-50 degC (Wang, 2016). It is therefore not surprising that Battery Thermal Management Systems (BTMS) are acknowledged as key to the development of EV technology. One of the main challenges for future BTMS will be the facilitation of Extremely Fast Charging (XFC). XFC would enable a battery pack with a 200-mile range to be re-charged on a time-scale like that for refueling a conventional petrol or diesel car. However, XFC is challenging from a BTMS perspective as it leads to the generation of considerable amounts of heat in the batteries. Being able to maintain the batteries within their operational temperature envelope during XFC, particularly in hotter climates, is currently an un-solved problem in the automotive sector. The aim of this project is to assess the feasibility of incorporating Qdot's high performance cooling technology into a battery module, containing several pouch cells, that is capable of XFC.

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MIRICO LTD.	LOLIPOP: LOcked Lasers for Integrated Path Optical Probing	£758,490	£530,943

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Project description - provided by applicants
The drive towards cleaner energy resources and energy security policies is promoting the development of a wider range of oil and gas reserves, such as fracking, in very remote locations. However, the loss of methane gas which is associated with these energy resources has a potent greenhouse impact on the environment that is far worse than carbon dioxide, which has been given much attention in recent years. To reduce the loss of methane into the environment from the equipment used in oil and gas extraction it is necessary to have an effective leak monitoring system to enable operators to spot leaks as they arise and take rapid action to fix them to minimise the release of methane into the atmosphere. Present methods of leak monitoring rely on a tedious, resource intensive manual process of sending an engineer to site with a hand held gas leak detector. This is particularly problematic when monitoring a very remote location, which is increasingly the case for newly developed oil and gas reserves. The use of laser beams from an autonomous system to scan a wide area has proven be an effective method for detecting gas leaks in oil and gas facilities, as it has the required sensitivity to detect small leaks and locate them precisely. Compared to current methods of manual surveying such "open path" laser instruments provide continuous 24/7 monitoring which enables much faster and efficient response to repairing gas leaks than would otherwise be possible. If these are not detected they could continue unabated until the next survey, which may be as infrequent as an annual basis for some sites. It also allows the methane mass emission rates to be continuously monitored, which is necessary to support the implementation of legislation to regulate greenhouse emissions from such oil and gas sites. The same laser technology can be applied to other sources of greenhouse gas emissions such as landfill and agricultural sites. Despite the great potential of this laser technology it is not yet suitable for long term unsupervised deployment in remote locations. The barriers to this for commercially available open path laser instruments are the high electrical power requirement, instrument size, and reliability of the laser beam alignment. MIRICO's LOLIPOP project is designed to address these limitations by developing the technology to enable a low power, easier to deploy instrument to be developed for commercial use in these applications

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PENCIL BIOSCIENCES LIMITED	Developing a Novel, Precise and Programmable Genome Editing Technology	£394,169	£197,084

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Project description - provided by applicants
Pencil Biosciences aims to develop a novel and artificial genome-editing tool, that retains the programmability of the CRISPR-Cas system but overcomes the challenges associated with the currently available genome-editing technologies. It intends to achieve this by aggregating the advances in various fields of science, especially genetic engineering and synthetic chemistry and infusing desired characteristics in an artificial and synthetic molecule. The CRISPR-Cas9 system is a re-purposed, powerful RNA-guided DNA targeting platform for genome editing. Unfortunately, it has many disadvantages such as off-target editing, a large size that restricts efficient delivery, a requirement for PAM sequences and immunogenicity etc. An optimal genome-editing tool should be able to edit any targeted locus in a genome with a high degree of specificity and without any undesired effects. However, in a real world, such a tool doesn't exist as nature developed it for a (partially) different purpose. Scientists have therefore recognized the necessity to improve the existing tools' scope, especially in the context of eukaryotic genome modulation and human therapeutic applications. Some of their efforts have already started yielding fantastic advances towards this objective. Nevertheless, one big drawback of these advances is their narrow focus. Oftentimes improvement in one area of the genome-editing tool does not offer any solutions to existing issues in another area. Pencil Biosciences aim to overcome these challenges with its holistic approach in solving the problems and by pooling the advances made in the different areas of modern sciences.