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Competition Code: 1712_EE_OPEN_R4_12M

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<tbody>
<tr>
<td>FASTR PROPERTY LIMITED</td>
<td>Fastr: Advanced Property EcoSystem</td>
<td>£474,564</td>
<td>£331,028</td>
</tr>
</tbody>
</table>

Project description - provided by applicants

Fastr is a leading, UK based, Construction Management Software provider that is seeking to develop a world first PropTech autonomous residential development ecosystem, stream-lining the approach to building, democratising functionality and taking a pioneering technical skillset and provision to the global property market. This project will develop a cloud based property ecosystem that has the ability to enable new markets & accelerate the entire process of residential new build developments.

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<td>MIMITEC LTD</td>
<td>Game-Changing Patient Monitoring Technology to Transform Clinical and Economic Outcomes in Mental Healthcare: A Feasibility Study</td>
<td>£54,164</td>
<td>£37,915</td>
</tr>
</tbody>
</table>
Project description - provided by applicants

Mental-Health Illness (MHI) inflicts a devastating toll on affected individuals, carers and society as a whole. It's the largest single cause of disability in the UK and affects 1-in-4 people. At £1.6Trillion/yr, it constitutes the largest single source of global economic burden. Key to managing MHI is Early Intervention (EI) and Compliance. The NHS has rightly been promoting a community-care agenda. But effective community-care requires systems and tools in place outside of hospitals to facilitate EI and compliance. The problem with EI is that our target market; patients/service-users with MDs (Mood-affective Disorders: Depression/Bipolar-Disorder/etc.) struggle to identify their own early-warning (prodromal) signs. Standard face-to-face psychiatric assessments are expensive and impractical for identifying impending mood-relapses. As for treatment compliance, it is extremely poor, particularly during periods of mood-disturbance. Government has prioritised tackling MHI in its 'Five-Year Forward View Plan on Mental-Health', calling for tech-innovation to play a 'pivotal role'. There is a strong (and growing) emerging market interest in this MHI-tech arena. Studies indicate high usability/feasibility, and efficacy/effectiveness in outcomes, but only with good Proactive-Patient-Engagement (PPE). Yet PPE typically occurs post-relapse as many patients fail to realise they need help until it's too late, causing all current solutions to stumble at the first hurdle. Mimitec's vision is to help people re-take control of their lives by passively predicting and proactively preventing onset of mood-disorder episodes. To address this, Mimitec has developed a smart-sensor and cloud-based AI system (MiMi) that passively maps service-user mood-progression automatically, without the need for PPE (after fully informed service-user consent is given). MiMi’s AI will then deliver secure, real-time intelligent insights to patients’ care-teams and relevant support-networks, allowing timely/tailored communications, interventions, and patient-education/guidance. The next stage in development (this project) is: 1. Mapping of how/where MiMi fits into the clinical-care-pathway 2. Health Economics Analysis for MiMi’s adoption 3. Full Market-Assessment (drivers/barriers-to-adoption/market-sizing/determination of pricing/product requirements/routes-to-market/etc) It is crucial to have public-patient involvement early on in this project to ensure MiMi is not just another ‘technology piece for the sake of technology’. Rather, the aim is for something that is built ground-up with patients/service-users front and centre. Patient/Service-user representatives will be involved here to provide valuable feedback and insights on understanding key drivers to promote usability, efficacy, and engagement. Outputs will: * Guide future product development * Pave way for clinical trials (e.g. via NIHR-funding) * Help build strategic partnerships with key stakeholders. * Facilitate £100m/yr of UK productivity gains by 2025 * Create 18 jobs within 5yrs

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<tr>
<td>AVALON BEHAVIOUR VENTURES LIMITED</td>
<td>Housing Allocation &amp; Upgraded Solutions (HAUS)</td>
<td>£151,437</td>
<td>£106,006</td>
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</tbody>
</table>

Project description - provided by applicants

Governments around the world spend vast sums providing public housing, but often fail to allocate it efficiently. Our academic research shows that game theory and market design can be used to provide better matches between people and homes, with significant improvements in social welfare. A more efficient housing allocation system could generate many millions of pounds worth of value. We aim to develop a Software as a Service (SaaS) solution to the problem of inefficient public housing allocation that can help councils in the UK as well as housing providers abroad. This SaaS will allocate homes using the latest findings from market design. Our solution will be based on original research conducted by members of our team. We have designed new matching algorithms that are both implementable and far more efficient than the allocation systems currently in place.

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<tr>
<td>LUULATECH LTD</td>
<td>GoodPump Development</td>
<td>£100,000</td>
<td>£70,000</td>
</tr>
</tbody>
</table>

Project description - provided by applicants

The GoodPump is a groundbreaking wearable breast pump that allows mothers to retain their dignity and carry on with their normal lives while providing health-giving sustenance to their babies. It is gentle, ergonomic, small and efficient, with high comfort and usability, fitting into any bra. It is designed and created for women, by women. It efficiently expresses breast-milk to be stored for later use, prevents the development of pumping related injuries, and can be used in public with minimal disruption to mothers’ routines, reducing embarrassment and isolation. The GoodPump is fundamentally different from breast pumps currently on the market and enables mothers to feed their babies breast-milk for longer. Breast-milk contains antibodies from the mother which protect the child from diseases such as diarrhea, Type 2 diabetes and obesity. Breastfeeding has also been linked to reduced rates of certain cancers in women, and improved cognitive development in infants. The World Health Organization (WHO) recommends that babies are fed breast-milk until two years of age. However, in the UK, although 81, only 34, we will also leverage the latest developments in Internet of Things and connected devices to support a comfortable, efficient, and private milk expression experience for lactating mothers. In its final form, the GoodPump will be made with the environment in mind, from sustainably-sourced baby-friendly materials that are comfortable for lactating mothers. The GoodPump has a vast market potential both in the UK and abroad and could significantly and genuinely improve the lives and health of mothers and their babies across the globe.

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<tbody>
<tr>
<td>TO PLAY FOR LIMITED</td>
<td>Applying AI to storytelling - bringing computational research into creative industries</td>
<td>£229,263</td>
<td>£160,484</td>
</tr>
<tr>
<td>King’s College London</td>
<td></td>
<td>£73,711</td>
<td>£73,711</td>
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</table>

Project description - provided by applicants

Charisma.AI is an interactive media platform that allows writers to create interactive stories and characters that audiences can talk to and immerse themselves in. This project is an exciting fusion of creative writing and artificial intelligence to help writers create new forms of dynamic, interactive stories. It specifically aims to understand what the impact of artificially-intelligent memory is on storytelling and narrative structure, and how to transfer the resulting research into industry. The project is being developed by To Play For, a pioneer in interactive storytelling, and a cross-disciplinary team at King’s College London covering digital humanities, culture and software engineering. Together these two teams will undertake the research and development required to interrogate the complexity of memory as a concept in interactive storytelling and the impact that this can have on the story experience. The partnership will leverage To Play For's interactive storytelling technology, Charisma.AI, as a research tool and commercialisation platform. This major new innovation will open up opportunities for creative industries across all media who are interested in harnessing the power of machine learning and artificial intelligence for their craft in writing stories. It will act as both a tutorial and an accelerator for new creative processes, opening up new publishing opportunities, jobs and revenue streams, keeping the UK at the forefront of established and newly emerging creative industries.

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<td>VOID TECHNOLOGIES LIMITED</td>
<td>VO+ Polyethylene Film Commercial Prototype Development</td>
<td>£609,908</td>
<td>£274,459</td>
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</table>

**Project description - provided by applicants**

Plastics have become a core part of the global economy, with global consumption rising from 15Mt in 1964 to 311Mt in 2014. This rapid growth has had a huge environment impact, as large-volume plastic production has created unsustainable levels of waste and reliance on non-renewables. VOID is a groundbreaking materials science company developing a new and extensively patented plastic film technology (branded VO+) that will address these important sustainability challenges. VO+ is a revolutionary technology that engineers micro- and nano-scale voids (hollow cavities) into commodity and bio-plastics to make today’s products with up to 40, stronger, lower cost and more sustainable products. Unlike current state of the art alternatives, this unique innovation addresses three key industry challenges that are difficult to simultaneously solve: sustainability, mechanical performance, and cost. This project is targeting the most consumed plastic film, Linear-Low Density Polyethylene film. VO+ will provide a rapidly adoptable and highly impactful sustainability solution for this mass market.

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<td>CAMBRIDGE MATERIALS LIMITED</td>
<td>CamLED, a disruptive low-cost light emitting diode technology</td>
<td>£99,877</td>
<td>£69,914</td>
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</table>
Cambridge Materials is a Cambridge University spinout that aims to commercialise an ultra-low cost light emitting diode (LED) technology, CamLED, for lighting and display applications. CamLED is based on solution-processed perovskite structures that utilise cheap abundant materials processed at low temperatures (<100°C) and low vacuum conditions. Low-temperature fabrication also allows flexible LEDs to be made. In addition, colour tunability is possible through simple chemical compositional variation of perovskite materials, producing wide spectral bandwidth at low cost. This project is a follow-on from a current InnovateUK-funded feasibility study project which is due to complete at the end of June 2018. In the current project, a 10-fold scale-up of CamLED size is being conducted, increasing the LED size from 5mm x 5mm to 16mm x 16mm. So far, results have been very successful and we anticipate to exceed the project's initial objectives. A record efficiency of 20.4, CamLED's stability still needs improvement for commercial exploitation. The instability of the perovskite layer when in contact with moisture is the main barrier. This project aims to demonstrate >10,000 hours of operational life through optimisation of device structure and development of passivation interlayers, making CamLED's lifetime competitive with commercial LEDs. Stability measurements will be conducted through accelerated lifetime tests. The objective is to deliver highly stable CamLED devices with operational lifetime of >10,000 hours for the first time, fully tested with its performance and economics proven and quantified. Once completed successfully, the project will give us a leading global position amongst competitors and open unique opportunities for the company to secure joint product development contracts with major LED manufacturers such as Hitachi and Cree. "Highly efficient Light Emitting Diodes (LEDs) are rapidly penetrating the lighting and display markets, expected to be worth >£120 billion in 2020. However, cost is the main barrier to widespread growth of LEDs, currently taking only 23, today's mainstream LED technologies do not allow the build of flexible structures, which are expected to take major share in the future display market. CamLED is an ultra-low cost disruptive LED technology that utilises cheap materials, processed and fabricated at low temperatures (<100°C). This also enables flexible structures to be made.
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<td>EDUCAKE LTD</td>
<td>Industrial Research project developing adaptive learning web prototype with explanations for GCSE science</td>
<td>£177,448</td>
<td>£124,214</td>
</tr>
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Project description - provided by applicants

Today, Educake provides online auto-marked science homework and revision for science teachers and students. It consists of a bank of ten thousand questions that teachers assign to their students, saving the teacher hours of marking time while still allowing them to gain insight on understanding and misconceptions of their students. When Educake was launched, students began asking for the ability to set themselves tests for revision. We added this function in a very basic way. This industrial research project will be the design and testing of an adaptive learning system, as well as the writing of explanations for every science concept for a Science GCSE, broken down into individual pieces that can be recombined as needed for each student. This will allow students to set themselves a test and find out what areas they need to improve upon, and Educake will then provide explanations tailored to the questions they struggled with, creating a virtuous circle of learning and testing.

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<tr>
<td>STEM CELLX LIMITED</td>
<td>Regenerative treatment for dog Osteoarthritis</td>
<td>£109,000</td>
<td>£71,300</td>
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<tr>
<td>University of Sheffield</td>
<td></td>
<td>£34,111</td>
<td>£34,111</td>
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</table>

**Project description - provided by applicants**

Osteoarthritis (OA) is a degenerative joint disease, affecting the whole joint, causing pain and discomfort. OA is widespread among dogs and several breeds are commonly affected due to genetic defects leading to weakened joints that are already degenerating before adulthood. Once symptoms develop, the disease is irreversible. OA is currently not curable; present therapies focus on decreasing inflammation and pain, thus temporarily improving mobility but don't treat the underlying cause (joint degeneration). Treatments range from anti-inflammatory drugs to invasive total joint replacement. None of the current therapies are able to stall or reverse joint degradation, therefore, affected dogs require repeated intervention and lifelong clinical management.

We have developed a novel proprietary formulation, which we are now looking to develop into a licensed veterinary medicine to treat osteoarthritis in the UK and EU. The proposed project is an early essential step in this direction, where our Project Team of experts will work together to:

- optimize product formulation required for the large-scale manufacturing and deployment
- establish safety and the minimal efficacious dose in controlled clinical studies
- develop the medicine to meet all regulatory quality, safety and efficacy standards
- develop a comprehensive market development strategy

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<td>XYZ REALITY LIMITED</td>
<td>HoloSite - Augmented Reality in Construction</td>
<td>£996,003</td>
<td>£448,201</td>
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</table>

Project description - provided by applicants

XYZ Reality is disrupting the construction industry with its unique Augmented Reality Hard Hat, HoloSite. HoloSite will enable builders to start building, without the need to wait for an engineer to set out. For the first time builders will be able to walk on site and see the model in context, on site to the site coordinate system. HoloSite offers real time validation for building tasks and features several virtual tools that significantly improve productivity on site. A HoloSite case study was conducted and it was found that HoloSite lead to a 65, from setting out through to building and validation compared to the latest technology used in construction today.

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<td>ALCHEMY PHARMATECH LIMITED</td>
<td>Naltos™, an innovative and rapid approach to treating breakthrough pain using a novel pain relief peptide</td>
<td>£73,921</td>
<td>£51,745</td>
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<tr>
<td>NANOMERICS LTD</td>
<td></td>
<td>£83,369</td>
<td>£44,358</td>
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</table>

Project description - provided by applicants

Approximately 43, or around 28 million adults experience pain, which is more than the combined total of those suffering with diabetes, heart disease and cancer. More adults aged 75 or over (62, uncontrolled pain costs the UK economy far more when considering healthcare expenses, lost income and lost productivity. Analgesics are the frontline therapy for the treatment of cancer pain; however, there has been a recent backlash against opioid-based painkillers, such as fentanyl, due to drug abuse and overdosing. At least 60 drugs deaths in the UK in the past eight months have been linked to fentanyl ([https://goo.gl/iVs1eG][1]). Alchemy Pharmatech is partnering with Nanomerics, specialists in pharmaceutical nanotechnology, to demonstrate feasibility of NaltosTM, a compact, discreet and inexpensive novel intranasal delivery system for quick onset delivery of dry powder-based medications. Successful project delivery will benefit Nanomerics by providing an effective nose-to-brain delivery system for their range of current and future pipeline drugs, thereby enhancing their competitive advantage and increasing revenue and thus, propel both companies in their aim to attract additional funding to develop further products.  

[1]: https://goo.gl/iVs1eG

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<tr>
<td>BLUE SKY BIO LTD</td>
<td>A pre-treatment technique for improving anaerobic digestion hydrolysis, to increase energy output by 20% and achieve 2x throughput</td>
<td>£99,478</td>
<td>£69,635</td>
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### Project description - provided by applicants

Anaerobic digestion (AD) is a well-established, renewable energy solution that plays a role in the supply and security of the UK’s energy -- generating biogas fuel (methane & carbon dioxide) from organic waste (agricultural waste, food waste, wastewater etc). There are currently ~17,300 biogas and 460 biomethane AD plants in operation across Europe (European Biogas Association, 2015) -- with 523 of these in operation across the UK (EBA, 2016). However, the first and last stages of anaerobic digestion (hydrolysis and methanogenesis) are severely rate-limiting and result in the current long throughput times of 30 days and low degradation rates of 50-70, although the technique has been adopted widely throughout the agricultural and wastewater sectors, its cost-effectiveness is considerably hindered and AD processors often rely heavily on government subsidies in order to remain operational. However government subsidies (green energy subsidies and feed in tariffs) have been reducing dramatically over the past few years, in some cases by as much as 40, Jan 2017). Our novel concept will address the poor performance associated with the hydrolysis stage of anaerobic digestion in order to maximise energy output (more energy generated from renewable sources) and improve throughput time of feedstock in order to increase profitability of AD for the benefit of processors and UK society.

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<tr>
<td>APPLIED PHOTOPHYSICS LIMITED</td>
<td>Automated high throughput protein stability measurement system</td>
<td>£61,143</td>
<td>£42,800</td>
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</table>
To ensure product safety and efficacy, protein therapeutic critical quality attributes must remained within tolerances for the duration of the shelf life of the product, as well as during transportation, storage and use. Consequently development of and testing for long term stability of the protein drug product is a major focus of biotherapeutic development and formulation activities. Thermodynamic stability of the higher order structure of the protein is used as a proxy for longer term stability of the drug product, allowing a large number of potential formulation conditions or variants on the drug product to be screened in a period of time significantly shorter than the potential shelf life, greatly increasing the speed the drug can be developed and commercialised. The tools currently deployed are Differential Scanning Calorimetry (DSC), that looks at the change in heat capacity for the protein as it is heated, and the optical spectroscopic methods that look at changes in the higher order structure (HOS) of the protein with temperature. These approaches have traditionally been restricted by low throughputs (1 sample per hour) and high sample consumption. Another approach repurposes qPCR machines by adding fluorescent dyes, that change their fluorescence properties on binding to the exposed hydrophobic core of the protein as it unfolds during heating. This approach allows screening of many conditions at once, in 384 well disposable microplates at relatively little cost per sample. But the utilisation of hydrophobic dye can produce false results due to other binding modes of the intact protein and interference with the dye binding from other buffer components. This project is a feasibility study to determine the technical and commercial viability of a new high throughput technology for the screening of protein stability that requires very little sample, is able to be extensively automated and does not require addition of an indicating dye. The target market will be biopharmaceutical development and formulation, allowing much higher numbers of drug candidate variants or formulation conditions to be screened earlier in the development cycle.
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<td>ATMOS INTERNATIONAL LIMITED</td>
<td>Smart Transient Gas Distribution Network Operations Advisor Platform</td>
<td>£442,312</td>
<td>£265,387</td>
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</table>
Project description - provided by applicants

The UK Government has identified that the UK has the potential to lead the World in the provision of smart energy supply systems and specifically those that match energy supply and demand profiles. Two areas of particular significance are improving the ease and cost of integration of distributed generation and the use of smart systems that integrate energy generation and demand at local, regional or national scale. Atmos International Ltd (Atmos) is a supplier of pipeline operation management systems (including simulation, gas management and leak detection technology) to the oil, gas, water and associated industries. Headquartered in Manchester UK, the company has implemented these technologies on hundreds of pipelines in over 50 countries, including major oil and gas companies such as Shell, BP, ExxonMobil, and Total. 

The aim of the ‘Smart Transient Gas Distribution Network Operations Advisor Platform’ (the Project) is to develop and evaluate a new software solution that uses Machine Learning (ML) algorithms to optimise the operation of gas pipeline networks so that they can operate at minimum cost while meeting the full set of demands of their customers. The machine learning technology will be combined with a state-of-the-art gas flow distribution simulator to enable both steady state and transient condition analysis thereby enabling the handling of unexpected conditions e.g. system failure, leaks, sabotage, etc. This approach will match gas supply and demand profiles. The software will enable a supplier to integrate energy generation and demand at local, regional and national scale. 

The key benefits that accrue from this new approach are: 
- Users of the software will have access to a smart real-time gas network expert advisory system to provide recommendations on how to control their gas transport network to achieve long term improved network performance. It will reduce gas transportation costs whilst ensuring all transport service level agreements/requirements are achieved; 
- Faster and reliable decision making will help gas network operators minimise the consequences of interruptions e.g. unplanned stations shutdowns or other incidents. This will mean improved safety of people, protection of the environment and gas transport equipment and saving of financial cost. The optimisation provides reduction of fuel and energy consumption. Also, it is both environmentally and economically attractive; 
- Maximised utilisation of the pipeline capacity whilst meeting the contractual requirements in event of supply shortages due to unplanned events. This would enable the gas transport companies to maintain or increase sales and avoid penalty payment.
Results of Competition: December 2017 Sector Competition: Open - Up to 12 Months

Competition Code: 1712_EE_OPEN_R4_12M

Total available funding is £19 million

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

<table>
<thead>
<tr>
<th>Participant organisation names</th>
<th>Project title</th>
<th>Proposed project costs</th>
<th>Proposed project grant</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPROOV LIMITED</td>
<td>DEFIDENT - DEtion of Forged IDENTity documents</td>
<td>£270,658</td>
<td>£189,461</td>
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</tbody>
</table>

Project description - provided by applicants

Project DEFIDENT builds on the world-class technology already developed by iProov with InnovateUK support which authenticates online users remotely using face verification, with a unique, patented and highly effective means to prevent the use of fake or replayed face imagery. DEFIDENT will extend this technology for application in a related field, enabling users to verify their identity remotely in a very usable way but with very strong defences against identity theft. The project makes use of recent published research, but extends it in a proprietary way to make the solution more usable and secure. The result of the project will be technology that will be put into production and delivered as a service to customers worldwide.

Note: you can see all Innovate UK-funded projects here [https://www.gov.uk/government/publications/innovate-uk-funded-projects](https://www.gov.uk/government/publications/innovate-uk-funded-projects) Use the Competition Code given above to search for this competition’s results
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<td>M-SQUARED LASERS LIMITED</td>
<td>Light Source for Three Photon Microscopy</td>
<td>£182,491</td>
<td>£109,495</td>
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</tbody>
</table>

Project description - provided by applicants

M Squared aim to develop an ultrafast synchronously pumped optical parametric oscillator (OPO) for three photon microscopy applications. The longer wavelengths of three photon microscopy allow it to image much deeper than current two photon methods, whilst being less phototoxic. This is particularly important in neurological imaging. The ultrafast OPO will use proprietary optical mounting methods developed at M Squared that reduce thermal drift and obviate the need for re-alignment. The proposed OPO will be pumped by MSLs low noise ultrafast Ti:Sapphire laser system -- Sprite XT that has industry leading compactness and low noise levels. The proposed system will operate at long wavelengths centred on 1700 nm and be applicable to a range of markets. The result of the easy-to-use Ti:Sapphire pumped ultrafast OPOs with unique wavelength flexibility, practical power, high output stability and excellent temporal and spatial quality, which open new possibilities for the practical deployment of OPOs in many applications in time-domain spectroscopy, optical microscopy, biophotonics and nanotechnology. The three-photon source will fit into M Squareds microscope system -- Aurora. The ultrafast OPO represents a truly enabling technology across a range of applications and markets. The system will build on M Squareds technical expertise and provide returns on investment through its microscopy and research customer bases.

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<tr>
<td>SCORPION TOOLING UK LIMITED</td>
<td>Machining of Controlled Expansion Alloys (MACE)</td>
<td>£65,233</td>
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<td>NICOFÉ MATERIALS LIMITED</td>
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<td>£26,728</td>
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<td>University of Bath</td>
<td></td>
<td>£34,941</td>
<td>£34,941</td>
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</tbody>
</table>

Project description - provided by applicants

Project MACE will investigate machinability of controlled expansion and soft magnetic alloys for the first time and develops innovative solutions and strategies for economical machining of these alloys for space, electronics, photonics and optoelectronics industries. The new technologies would enable UK industries to penetrate the market for manufacturing of space, electronics, photonics components and allows them to produce parts efficiently and economically.

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