

# Innovate UK

**Results of Competition: Creating Smart Products from Smart Materials**

**Competition Code: 1503\_CRD2\_HVM\_SPSM**

**Total available funding for this competition was £6M from Innovate UK and EPSRC**

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MatOrtho Ltd Wallwork Heat Treatment Ltd Queen Mary University of London University College London (UCL) Royal National Orthopaedic Hospital	SMART SPACERS	£840,846	£615,708
<b>Project description - provided by applicants</b>			
Infection after total knee replacement is a serious, complex and traumatic complication of total knee replacement (TKR). Smart Spacer consists of a purpose-designed TKR with a smart innovative coating. The patented chromium nitride-silver coating (CrN-Ag) will be applied directly to an existing cobalt-chromium TKR for use in a temporary spacer device, used during 2-stage treatment of periprosthetic infection. The 'Smart-Spacer' will directly treat infection (including MRSA and Staphylococcus Epidermis) which can be resistant to standard antibiotics, presenting significant advantages to the current treatment methods and exciting opportunities for the future of long-term coated primary prosthesis. Financial burden of revision for infection is over £300 million per annum in the NHS, UK alone and economic burden is worldwide. It is in both the public and Government interest to find better solutions to treating and preventing infection which is significant drain on resource and the economy worldwide.			

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<b>Team Medical Devices Ltd</b> Constantia Sittingbourne Ltd Jabil Circuit Ltd Cambridge University Hospitals NHS Foundation University of Hertfordshire	Occoris - Self Activating Smart Inhaler	£702,450	£460,242
<b>Project description - provided by applicants</b>			
Occoris is an entirely new type of active dry powder inhaler (DPI) for delivery of respiratory drugs into the lungs. Powdered drug is filled into small foil blisters which are compressed with nitrogen gas. Blisters are burst upon inhalation releasing a cloud of highly aerosolised and respirable drug particles which can be inhaled reliably deep into the lung. This project will help demonstrate the scalable, robust manufacture of foil blisters using highly automatable production processes.			

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G2O Water Ltd Haydale Ltd Centre for Process Innovation Ltd	Smart Filter Membrane	£706,922	£564,642
<b>Project description - provided by applicants</b>			
<p>Membrane filters can be applied for a variety of industrial liquid and gas separations applications such as waterdesalination, water/oil separation during oil drilling and industrial waste water treatment. A major operationalissue with filter membranes is their tendency to foul with use over time, which results in lowering throughput,increasing energy consumption and the need for costly maintenance. The aim of this project is to develop a lowcost self-cleaning coating technology based on functionalised graphene, which once applied to industrialmembranes makes them resistant to fouling. The technology has already been demonstrated successfully inlab-scale tests. Led by G2O Water Limited, this project will translate the lab-scale work into a working robust,reliable manufacturing process which can be scaled-up to enhance the performance of existing filtermembranes. The coating will be formulated and validated by the consortium for deployment in a number ofdifferent applications, in order to ensure the resulting smart product can be taken to market and be readilyapplied to improve the performance of a broad range of industrial processes.Finance Summary Table ' How to complete this section</p>			

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Smith & Nephew UK Ltd Nottingham University Hospitals NHS Trust University of Liverpool	Smart Responsive Antimicrobial Implants	£993,492	£668,800
<b>Project description - provided by applicants</b>			
The primary objective of this collaborative research project is to develop a smart antimicrobial orthopaedic implant suitable for mass production in the established and emerging markets. The 3yr project is industry led by a global medical device company (Smith and Nephew) collaborating with a charitable NHS hospital trust and academia. The antimicrobial technology developed herein will help reduce the global threat of anti-microbial resistance and level of bioburden experienced in trauma by improving the aseptic conditions during surgery. The primary output of this project will be a demonstrator suitable for first in man/clinical trials, and a platform technology, which is applicable in other healthcare and industrial sectors given its high level of innovation..			

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Boots UK Ltd Sefton Technologies Ltd University of Liverpool	Smart Hybrid pH Responsive Coatings for Healthcare	£539,120	£413,373
<b>Project description - provided by applicants</b>			
This project is a collaboration between Boots (a leading Pharmacy, Health and Well Being company), the University of Liverpool (a member of the Russell Group of Universities) and an innovative SME. The project aims to develop a smart release technology to deliver ingredients on demand within a cosmetic delivery system for a healthcare application. The University of Liverpool will provide specific expertise in the smart release components and advanced spectroscopic and imaging characterisation, and the SME will provide material expertise. Boots provide both a potential route to market and an extensive knowledge of the market and application area.			

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Imperial Chemical Industries Ltd Omya UK Ltd University College London (UCL)	Stain resistant paints from smart hydrophobic surfaces	£523,044	£366,457
<b>Project description - provided by applicants</b>			
This InnovateUK project, led by AkzoNobel Decorative Coatings in partnership with University College London, and Omya UK Limited, is striving to deliver smart decorative paints. The smart decorative paints will aim to deliver the highly prized customer attribute of reliable self-maintenance. It is envisaged that these smart decorative paints will be based on recent innovations in materials science from University College, London and taken into the UK (30ML) and European (80ML) decorative broadwall paint market using commercially realistic materials from Omya used in AkzoNobel's Dulux paint.			

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<b>Seagate Technology (Ireland)</b> University of Southampton Ilika Technologies Ltd	Nanomaterials for Smart Data Storage	£892,300	£584,046
<b>Project description - provided by applicants</b>			
Demand for data storage continues to grow at a rate of over 40% in part a result of the movement to cloudstorage. Most of the world's digital information is and will continue to be stored on hard drives. Innovation inthe read-write transducer, from which information is recorded and read, is critical to increased hard drive datacapacity. Today, 25% of the world's transducers are manufactured in the UK giving us a unique opportunity togrow as demand for this complex nano-engineered component increases. This project will deliver a smart harddrive with improved data capacity using atomically engineered materials to enable Heat Assisted MagneticRecording (HAMR). Smart materials, engineered at the atomic scale, will boost performance and reliablity forHAMR hard drives, decreasing time to market. Seagate is a leader in developing HAMR technology and we willdemonstrate the feasibility read-write transducers with these new engineered materials. SouthamptonUniversity a world leader in the area of engineered nanophotonic materials while Ilika provides theimplementation path to demonstrate these materials at the required pilot line scale for the first time.			

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Haydale Composite Solutions Ltd Haydale Ltd SHD Composite Materials Ltd Airbus UK Ltd 5 West Ltd Element Materials Technology Hitchin Ltd	PLAsma Funtionalised CAPsules for Composite Damage Detection (PLAFCAP)	£712,657	£393,105
<b>Project description - provided by applicants</b>			
This project aims to develop materials that when incorporated into composite structures, provides those composite materials with the ability to 'bruise' or show a visible indication that the material has suffered damage.			

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<b>Contamac Ltd</b> Aston University Contact Lens Precision Laboratories Ltd Rayner Intraocular Lenses Ltd GEO Specialty Chemicals UK Ltd	Application of Nanostructured Smart Surfaces to Ophthalmic Medical Devices	£908,146	£639,333
<b>Project description - provided by applicants</b>			
<p>Contact lens discomfort is the primary factor that limits an annual increases in the proportion of successful contact lens patient outcomes. A stagnant level of 3.7 million UK patients masks an underlying turbulence with 30% discontinuing lens wear annually and over 50% of these citing discomfort as the causal factor, a trend repeated globally. Recent research has pinpointed the eye-to-lens interface, ie. the lens surface, as the critical factor in patient perception of comfort. Specifically the surface factors that can enhance comfort are the reduction of (i) friction between the CL and ocular surface; (ii) and accumulation of denaturated protein and lipid deposits. Inclusion of hydrophobic silicone monomers in contact lenses to amplify oxygen transport to the avascular cornea tend to reduce lubriciousness whilst increasing lipid deposition. Contamac propose to exploit novel nanofabrication protocols to create nanoscale polyethylene glycol (PEG) lens surface coatings that can facilitate smart properties in order to provide greatly enhanced contact lens comfort through elimination of the causal factors outlined above.</p>			

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