

Proof of Concept 5

AWARDED SEPTEMBER 2024

| PROJECT TITLE | PROJECT SUMMARY | UNIVERSITY/ RESEARCH INSTITUTION | COMPANY |
|---|--|----------------------------------|-----------------------------|
| DENTure Protection Using Remora TEChnology (DENT-ProTec) | This study aims to address the significant health and financial burden of oral biofilms. By incorporating Remora technology (LACTAM-491), an antimicrobial and antifouling material, into materials used in dentistry (e.g. dentures and retainers) we will be able to assess whether these can prevent harmful dental biofilm accumulation. | Glasgow Caledonian University | Penrhos Bio |
| Rapid Legionella Identification Using Multi-excitation Raman Spectroscopy | Legionnaire's disease is a notifiable disease. Even with treatment, 1 in 10 affected will die. Legionella culture is slow, providing results in ~2 weeks, and delays between testing and results risks community transmission and disease outbreaks. We propose a new method for rapid-turnaround Legionella identification using our novel proprietary MX-Raman method. | University of Southampton | Molecular |
| Antifungal Plastic Coating to Prevent Transmission of Plant Pathogens in Glasshouse and Poly tunnel Agriculture | Greenhouse crop production is a source of farmer income and provides food for people globally, however fungal pathogens cause significant crop damage. Gencoa developed an antimicrobial material coating, active against bacterial pathogens. This proof of concept project will test the Gencoa antimicrobial coating against plant fungal pathogens. | Nottingham Trent University | Gencoa |
| Development of Novel Inorganic Antibiofilm Urinary Catheter Coating | Catheter-associated urinary tract infections account for >23% of hospital-acquired infections and are predominantly driven by biofilm formation on catheters. Current catheters provide minimal resistance to biofilm formation. This project will develop novel proof-of-concept antibiofilm medical catheter coatings to substantially reduce the incidence and severity of biofilm-related infection in patients. | Nottingham Trent University | MetalloBio |
| Microbiota Interventions for Optimised Food Safety | Hydroponic systems enable efficient plant growth. However, they lack native microbiota, making them vulnerable to colonisation by plant and human pathogens. We will assemble and test microbial communities for foodborne disease control and yield improvement. This project addresses the microbiome imbalance in hydroponics to create safer, more sustainable food systems. | Quadram Institute | Concert Bio |
| EPIC: Effective Phage Products to Improve Chronic Wound Outcomes | Develop a sustainable treatment for chronic wounds, by combining LAP (Larval Alimentary Product) with phages. Chronic wounds are hard to treat and complicated by pathogenic infections and biofilms, LAP has antibiofilm properties, while phages supplement this with antimicrobial properties. Our approach seeks to improve wound management and reduce antibiotic use. | Bangor University | BioMonde |
| Biofilm Inhibition and Pathogen Control in Food Production Environments | Biofilms endure in food production environments despite rigorous cleaning, potentially harbouring pathogens that can contaminate food. Silane-coupled quaternary ammonium compounds (Si-Quats) prevent biofilm formation, but their efficacy against foodborne pathogens, like <i>Listeria monocytogenes</i> , remains unexplored. We will use advanced methods (calScreener) to investigate their efficacy in eliminating biofilms and pathogens. | Quadram Institute | Vitec Microgenix and Symcel |
| Development of a High-validity <i>In Vitro</i> Endotracheal Tube (IVETT) Biofilm Growth Platform for Basic and Translational Research | Biofilms grow in the endotracheal tubes that connect hospital patients to ventilators. Biofilm-associated microbes can colonise the lungs, causing pneumonia. We are building a device to grow biofilms in endotracheal tubes, in conditions resembling those in patients. This will be used to test new interventions to prevent and remove biofilms. | University of Warwick | Neave Engineering |

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| Assessing the Effects of Novel Non-toxic Precursor Molecules in Biofilms and Re-epithelialisation of Human Skin Explant Wound Healing Models | This study will explore the biofilm efficacy, biocompatibility and re-epithelialisation of delivering of non-toxic precursor molecules, that are encapsulated in PLGA generating peracetic acid and hydrogen peroxide in situ in an <i>ex-vivo</i> human skin explant model. | University of East Anglia | Aga Nanotech |
| Engineered Peptide Immunotherapies for the Targeted Disruption of <i>Pseudomonas aeruginosa</i> Biofilms. | Infections caused by <i>Pseudomonas aeruginosa</i> bacteria represent some of the most challenging hospital/healthcare issues today, especially in patients suffering from Cystic Fibrosis. Unfortunately, many <i>Pseudomonas</i> bacteria are now resistant to antibiotics, hampering treatment. We are developing a novel therapeutic which activates our immune systems to selectively destroy <i>Pseudomonas</i> . | Glasgow Caledonian University | CC Bio |
| SMaRTBIO: Sustainable Management and Tracking of Biofilm Removal to Allow Effective Reprocessing of Hospital Linens | Currently, large volumes of hospital linens are single-use and there is an urgent requirement for safe, efficient, and traceable laundry processes to provide validated reprocessing. We will develop a new biofilm standard to monitor laundry effectiveness, while providing enhanced infection prevention and reducing the carbon footprint of hospital linen reprocessing. | University of Southampton | Revolution-ZERO |
| WATTS-UP: Wastewater Ammonia Treatment and Transformation Using Pilot-scale MECs | This project aims to optimise and validate a pilot-scale Microbial Electrolysis Cell (MEC) system to efficiently recover ammonia from wastewater. This would reduce environmental pollution and create a valuable resource for industries (e.g., fertiliser). The technology offers an innovative and sustainable solution for wastewater treatment and resource recovery. | Newcastle University | METzero |
| Mitigation of Biofouling With Conditioned Nanobubbles | Biofouling presents a significant operational challenge in membrane-based water and wastewater treatment, often regarded as the 'Achilles Heel' of these systems. This project aims to develop and demonstrate a novel, environmentally friendly, and cost-effective approach for membrane cleaning, which is based on nano-bubbles conditioned and enhanced by electromagnetic fields. | University of Southampton | Fluid Conditioning Services |
| Preventative Anti-Biofilm Coatings for Potable Water Systems | Bacterial biofilms within potable water systems cause millions of illnesses annually, and in critical infrastructures such as hospitals, causes an increased mortality rate. This project aims to coat water aerators within water systems with an anti-biofilm polymer to prevent bacterial biofilms without the need for an antimicrobial leaching agent. | University of Nottingham | Angel Guard |
| Biofilm-enabled Wetland Remediation Technology | Urbanization has led to a substantial increase in stormwater runoff. If urban stormwater runoff is not effectively managed, it can result in the contamination of receiving waters. Constructed wetlands, with their natural biofilms, offer a sustainable solution to treat this contaminated water by harnessing the power of microbes for bioremediation. | University of Sheffield | Detectronic |