Innovate UK

Sustainable Medicines Manufacturing Innovation Programme

Expression of Interest (EoI) projects for Grand Challenges

Contents

Introduction

Innovate UK, in partnership with the Department of Health and Social Care (DHSC), is investing in Expression of Interest (EoI) projects as part of the Sustainable Medicines Manufacturing Innovation Programme (SMMIP). SMMIP is funded as part of the wider VPAG Investment Programme agreed as part of the 2024 Voluntary Scheme for Branded Medicines Pricing, Access and Growth (VPAG).

Sustainable medicines manufacturing is the process of producing medicines in a manner that minimises environmental impact, conserves natural resources, and ensures economic and social sustainability. This approach focuses on reducing waste, energy consumption and emissions, while enhancing efficiency, safety and cost-effectiveness throughout the manufacturing lifecycle. It also includes the adoption of innovative technologies and practices that promote the long-term viability of the medicines manufacturing industry.

The SMMIP will drive innovation by giving organisations the capacity to collaborate in developing new innovations, technologies, tools, data sets and approaches that can ultimately contribute to a sustainable medicines manufacturing sector.

The goal is to promote environmentally conscious production processes, reduce waste and energy consumption, and enhance the efficiency and long-term sustainability of the medicines manufacturing industry through innovative technologies and practices.

The SMMIP EoI competition is funding a diverse range of projects. This EoI seed funding will support the formation of consortia and the preparation of proposals for future Grand Challenges - large-scale collaborative research and development (CR&D) awards of up to £10 million per project.

This brochure provides an overview of the successful EoI projects, detailing the lead and partner organisations involved, the proposed Grand Challenge, and specific needs or opportunities for potential new partners during the consortium-building stage.

How to get involved

If you are keen to speak to a project in this brochure about collaboration opportunities, please contact **Owen.burbidge@iukbc.org.uk**

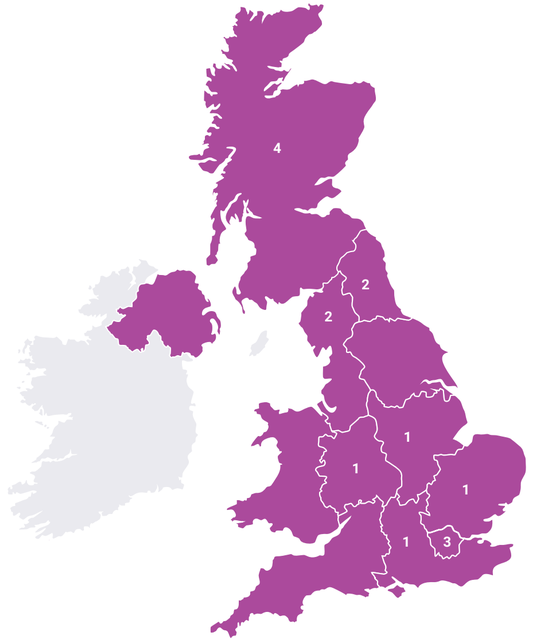
15
Projects funded

£1.3 million
Amount of grant funding committed

31
Organisations supported

Geographic locations of project participants

East Midlands	1
East of England	1
London	3
North East	2
North West	2
Scotland	4
South East	1
West Midlands	1
Grand Total	**15**

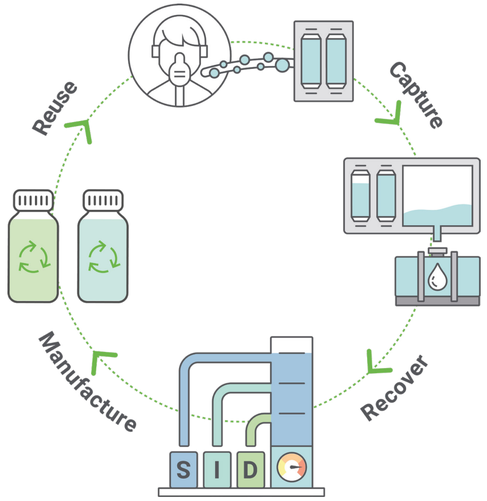


Circularity in Volatile Anaesthetics

The Grand Challenge

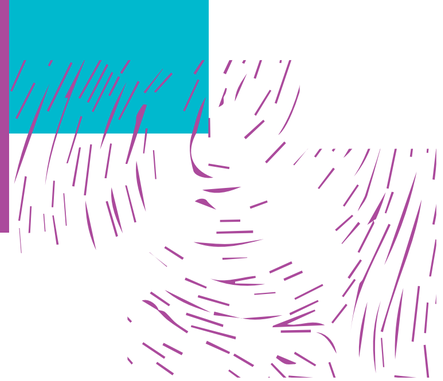
The project will address the problem of the high carbon footprint associated with the use and disposal of volatile anaesthetic agents used in healthcare settings around the world. Currently, the anaesthetics are vented direct to the atmosphere or bound to filters destined for landfill or incineration. Disposal via landfill will eventually lead to atmospheric emissions as filter media degrade. Incineration is inefficient and has the potential for generating toxic degradation chemicals in the process. Both methods ignore the inherent value in the used volatile anaesthetics, <5% is metabolised and they are stable so make excellent targets for reuse.

There are several innovative aspects to the solution. There is innovation in the capture technology, the recovery process, and the remanufacture processes. The solution is most sustainable when deployed at large scale. Bringing the capture, recovery, and remanufacture of volatile anaesthetics scaled for global reach in a highly regulated industry is also innovative.



The project is important as the emissions from the use and disposal of volatile anaesthetics contribute four million tonnes of carbon dioxide equivalents each year.

The solution will establish the UK as the leading provider of the technology and will generate skilled jobs in development, engineering, and manufacturing.



SAGETECH MEDICAL

Building the Consortium

The key attributes that SageTech are looking for in consortium partners include:

- Equipment design expertise
- Innovative manufacturing expertise and facilities
- Process design expertise
- Logistics planning expertise
- Regulatory expertise in waste management and pharmaceutical processing
- Software development expertise
- Test sites
- Project planning.

Project lead:
SageTech Medical Equipment Ltd

Funded amount:
£60,807

Green Processing Technology Platform for Development of High-performance, Smart, Sustainable Packaging

The Grand Challenge

300 million tonnes of plastic are required annually by the pharmaceutical packaging industry, 50% of which is single use. Concerns around contamination and health risks have hindered the adoption of 'greener' packaging across the industry, with manufacturing processes, expiry date implications and end of life options being critical factors. A lack of viable alternatives and regulatory approval considerations can make the adoption of more sustainable packaging a complex multi-faceted process.

The aim of this project is to improve the adoption and support the uptake of sustainable pharmaceutical packaging using green chemistry and sustainable manufacturing process. To help overcome some of the challenges and enable a circular economy, the consortium will focus on the development and implementation of a versatile supercritical carbon dioxide (scCO2)-based technology to support packaging manufacturing and material innovations in pharmaceutical sector through:

- Supporting a circular economy through state-of-the-art decontamination process
- Green chemistry for production and material innovation
- scCO2 enabled productivity and resource enhancement
- Standards to support confidence in measurements and data
- Upskilling the next generation of regulatory intelligence.

The proposed work seeks to address industry challenges and help shape the development of innovative processes/ materials that can meet sustainability requirements without jeopardising product performance or integrity.

Building the Consortium

The National Physical Laboratory hope to expand the consortium to include:

1. Stakeholders with expertise in polymer recycling and manufacturing
2. Pharmaceutical manufacturers of all sizes, regulatory authorities and end-users (retail)
3. Access to facilities for postconsumer processing and manufacturing, including but not limited to plastic sorting, cleaning, processing, remanufacturing.

Specific expertise in:

- Circular packaging supply chain
- Packaging decontamination (in relation to efficiency, product integrity and H&S regulatory compliance)
- Recycling and reuse
- Material innovations (green polymers and active packaging)
- Life cycle analysis
- Regulation compliance for pharmaceutical packaging applications and beyond.

Project lead:
National Physical Laboratory

Partners:
Alga (Seaweed) Ltd, CPI, The Naked Pharmacy, University of Kent

Funded amount:
£98,764

Harvesting the UK's Radionuclide Assets for Medical Applications

The Grand Challenge

New treatments, such as **Targeted Alpha Therapy (TAT)**, are expected to replace current chemotherapy treatments. They are more targeted, more effective, and have fewer side effects. Other countries are already researching and developing these treatments, but the UK does not yet have a sustainable pipeline of radiopharmaceuticals to secure access for UK patients.

To develop these treatments in the UK and improve survival rates of cancer patients, we must invest in the infrastructure necessary to support early pre-clinical and clinical trials for new radiopharmaceutical treatments.

Drawing on its longstanding capability of isotope separation for nuclear fuel recycling, United Kingdom National Nuclear Laboratory (UKNNL) has been developing processes to extract and purify potential TAT radionuclides from nuclear waste for the last 8 years. A promising route, which has been developed to significant maturity, is the extracting of lead-212 from reprocessed uranium.

The proposal for the full Grand Challenge funding is for a first-of-its-kind lead-212 extraction and purification facility, providing this radionuclide for researchers and drug development companies to use for TAT research and development, leading to clinical trials.

UKNNL and Medicines Discovery Catapult will take a consortium-led approach, combining specialised nuclear and drug discovery expertise to execute the delivery of this infrastructure. The long-term aim is to enable commercial production and routine use of nuclear medicines within the NHS for the benefit of patients and the development of a new community.

Building the Consortium

The project team across UKNNL and Medicines Discovery Catapult are looking for key companies/organisations/individuals to join the consortium as members. These include:

- Design and engineering construction companies with experience of working in highly regulated sectors
- Drug development organisations specialising in TAT development
- Logistics/transportation companies specialising in rapid shipment of radionuclides
- Quality assurance/analytical expertise in alpha radionuclides measurement
- Expertise in nuclear and medical regulation.

United Kingdom National Nuclear Laboratory

CATAPULT Medicines Discovery

Project lead:
United Kingdom National Nuclear Laboratory

Partners:
Medicines Discovery Catapult

Funded amount:
£99,868

Remanufacturing for a Sustainable Future in Combination Injection Devices (ReSCid)

The Grand Challenge

ReSCiD aims to transition the healthcare industry from single-use combination injection devices to a circular economy model by introducing remanufacturable devices.

Globally, about 2.5 billion disposable single-use injection devices are produced per year, generating a total Green House Gas (GHG) equivalent of 750,000 tCO2e.

Today there is no concrete project to move away from disposable injectors and no credible alternative.

The ReSCid project aims to build a circular eco-system for injection devices and cut associated GHG by at least 95%.

This involves developing processes for return, disassembly, refurbishment, GMP in decontamination, reintegration into the manufacturing and supply chains and a regulatory framework to be agreed upon. This will reduce the need for raw materials, production energy, and minimises waste.

Building the Consortium

The project will create a circular eco-system for injection devices thus expertise and experience in takeback schemes and remanufacturing will be the cornerstones of the eco-system.

Also knowledge of any of these areas (but not exclusively):

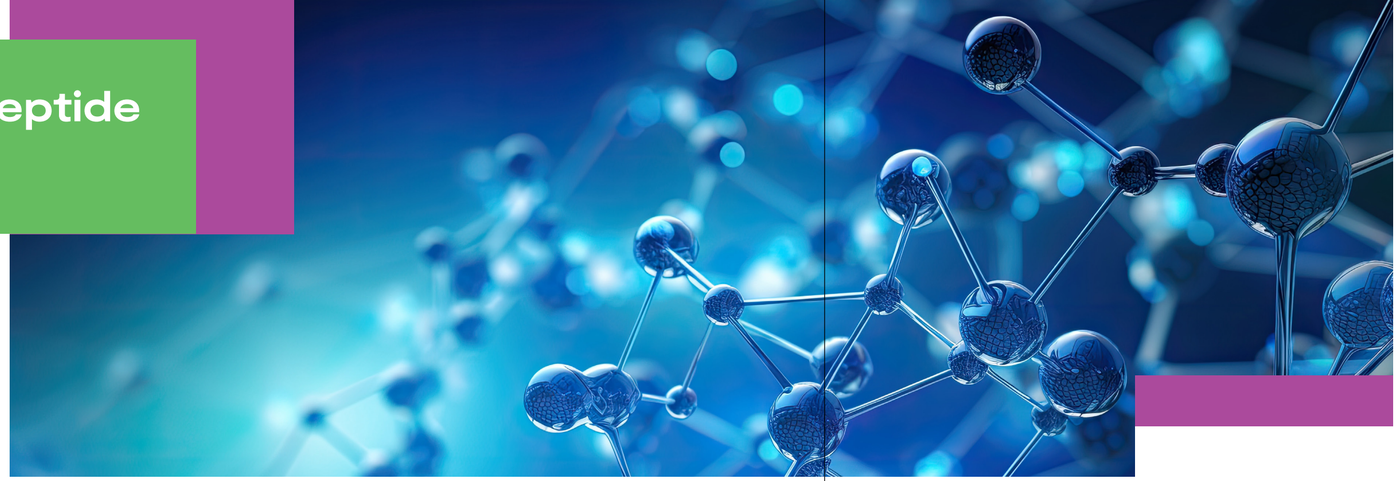
- Pharma drug distribution
- Designers involved with pharma primary containers and/or autoinjectors
- Clinical partners
- Alternatives to current fossil-fuel based plastics and metals and incorporating sustainable practices like biomanufacturing or sustainable polymers
- Reverse logistics for the return and sorting of devices
- Cleaning/decontamination and testing of medical devices
- Tracking of device components, including component life
- Data analytics to optimise inventory control and operations in a circular eco-system.

Project lead:
Owen Mumford Ltd

Partners:
CPI

Funded amount:
£99,263

Environmental Peptide Production



The Grand Challenge

Peptides are naturally occurring molecules that play a significant role in cell signalling and function. They are also artificially synthesised due to their important properties in research and as medicines, such as insulin. However, peptide medicines are difficult and expensive to make. The current manufacturing processes are extremely wasteful, requiring environmentally hazardous chemicals.

The Origin Peptides project will develop our novel peptide synthesis technology, in combination with industry-leading product sampling technologies, to create a commercially ready peptide manufacturing system to make life-saving medicines with the smallest environmental footprint and at the lowest cost.

Our technology has been demonstrated in the laboratory at small scale. The next step is to expand that process at larger scales which pharmaceutical companies can utilise to make medicines for those in need.

In this collaborative project we will work with the world's biggest manufacturers of peptide medicines together with the world-class experts in engineering, chemistry and manufacturing processes from the renowned Centre for Process Innovation (UK), we will be building a cutting-edge process and hardware suite for environmentally friendly peptide manufacture.

These will be produced locally, ethically, environmentally and using circular economy, in a way that is only possible with Origin Peptides' new technology - a world first in aqueous templated peptide synthesis.

Building the Consortium

Origin Peptides is interested in:

- Pharma producing peptides
- Mini LC systems
- Small mass spec systems
- Inline sampling experience and systems
- Peptide purification (at scale).

Origin Peptides

cpi

Project lead:
Origin Peptides Ltd

Partners:
CPI

Funded amount:
£69,466

Overcoming Technical, Commercial and Regulatory Barriers for Integrating Low-GHG Solvents in Sustainable Medicine Manufacturing Supply Chains

The Grand Challenge

Solvents play a crucial role in the medicine manufacturing process, including in the production of Active Pharmaceutical Ingredients (APIs). Solvents have the highest aggregate greenhouse gas (GHG) impact of any group of raw materials for most small molecule pharmaceutical manufacture and are also significant for many companies outside the pharmaceutical sector. Many also have other negative impacts, such as toxicity.

Water-based solvent flow chemistry solutions are being developed, and the pharmaceutical industry is working on solvent recovery and reuse solutions, but these will not result in the reductions in GHG emissions necessary to meet ambitious GHG reduction targets. Sustainable solvents produced using green chemistry and bio-based or recycled carbon will be required. Today, there is only very limited volumes of only a few of the sustainable solvents that meet the pharmaceutical industry's requirements, both in the UK and globally.

Although the UK is in a strong position to overcome these sustainability challenges due to its mature pharmaceutical industry and world-leading expertise in green chemistry R&D, there are significant barriers to scale-up. This EoI project will assemble a supply chain consortium to identify and overcome barriers to integrating low-GHG solvents into medicine manufacturing. The outcome will be a Grand Challenges application to bring measurable improvements to sustainable medicine manufacturing via emissions reductions, energy use reductions and resource efficiency gains.

Building the Consortium

Key attributes for consortium members include:

- Medicine manufactures with assets in the UK and producing medicines for the NHS
- Companies outside the medicines industry using significant volumes of solvents and investing in reducing scope 3 emissions from purchased raw materials
- Specialists in green chemistry
- Technology developers and producers of renewable and recycled chemicals and solvent alternatives who are actively assessing/identifying market opportunities for sustainable solvent use
- RTOs and universities focused on advancing sustainable manufacturing and high-value supply chain innovations
- Renewable feedstock producers
- Supply chain solutions innovators.

ERM

ayming

Project lead:
Environmental Resources Management Ltd

Partners:
Ayming UK Ltd

Funded amount:
£94,053

Sustainable Seaweed Based Components in Medicines Manufacture

Mercel
Seaweed Cellulose Technologies

Edinburgh Napier UNIVERSITY

The Grand Challenge

Medicines manufacture incorporates numerous components and ingredients which require either energy intensive, high waste processes or use unsustainable fossil fuel resources. Applications include transdermal drug delivery systems, aerogels, hydrogels, wound healing dressings, as superdisintegrants in fast dissolving tablets, emulgel, microparticles, gels, foams, thickening agents, and stabilisers.

Mercel's seaweed based nanocellulose products out-compete both wood pulp material and synthetic polymers in a range of binding, stabilising and thickening applications and the zero-waste technology requires no upstream processing or harsh chemicals. The innovative technical processes use only water or citric acid, which can be recovered, and the conversion from cellulose to nanocellulose represents a 98% reduction in energy requirements compared to wood pulp material.

In addition to the sustainability benefits of low energy plastic-free products and processes in medicines manufacture, the impact of this technology will be significant for seaweed farmers and processors within the blue economy. This technology elevates a low value co-product of seaweed processing, cellulose, to a high value ingredient for multiple applications. This will give coastal communities a more prominent position in the value chain to the benefit of the local economy and provide wider benefits to the strategy and coordination of seaweed production in the UK.

Building the Consortium

The consortium requires the technical expertise of seaweed processors, the clinical facilities and expertise for product testing, and the commercial facilities and experience of medicines manufacturers. A key component however is the lived experiences, skills and knowledge of coastal communities who have been harvesting and processing seaweed since the 18th century. A key attribute for a successful consortium will be due consideration to these communities, to boost local economies and jobs and to benefit the industry as a whole by creating value throughout the chain.

Project lead:
Mercel Ltd

Partners:
Edinburgh Napier University

Funded amount:
£80,161

A Sustainable Future Factory

The Grand Challenge

Our vision is to transform pharmaceutical manufacturing by integrating robotics, automation, AI, and data-driven approaches to create sustainable, future-ready factories. This initiative aims to develop next-generation manufacturing techniques and improve downstream processing to enhance circularity by recovering products, reagents, and solvents. By addressing environmental impact, efficiency, and quality control, these technologies will meet the demand for sustainable manufacturing processes.

The industry has been slow to adopt robotics and automation, but we aim to change this by increasing the use of collaborative robots (cobots) and automation in both R&D and manufacturing. Robotics integration will boost precision and efficiency, reducing energy consumption and waste. We will also develop self-optimising reactors and employ high throughput experimentation to minimise material use and time, feeding data back into AI for further optimisation.

We will explore next-generation pharmaceutical manufacturing and continuous processing techniques, which offer sustainability benefits despite existing challenges. New reactor types and advanced downstream processing techniques, such as membrane-based technologies, will be developed to accommodate diverse drug processes, minimise waste, and ensure efficient extraction of high-quality products.

Robust data collection through Process Analytical Technologies (PAT) and AI will underpin our future factory, reducing environmental impact, improving efficiency, and enabling automation. A consortium of large Pharma, SMEs, and academia will ensure the successful adoption of these innovations, reducing emissions and waste in the sector.

Building the Consortium

AstraZeneca is open to potential consortium members with technical expertise in:

- Automation for pharmaceutical drug substance and drug product
- AI to enhance development and manufacturing
- Disruptive processing technologies for DS and DP - both small molecule and biologics in scope
- New technologies to support downstream processing including product purification; solvent recycling; waste valorisation.

AstraZeneca is open to potential consortium members to share knowledge on:

- Regulatory aspects of sustainability
- Sustainability metrics.

AstraZeneca

Britest LABMAN

Project lead:
AstraZeneca UK Ltd

Partners:
Britest, Labman

Funded amount:
£99,662

Digital Formulation Design and Manufacture for a Sustainable Pipeline of the Next-Generation of Bioavailable Medicines

The Grand Challenge

Medicine formulation development and manufacture before clinical trials is a significant source of inefficiency and waste in the pharmaceutical pipeline, with poor bioavailability being a prevalent issue and a major cause of failure at phase I trials.

Amorphous Solid Dispersions (ASDs) are widely used to improve bioavailability (70-90% of pipeline molecules) but face critical sustainability challenges:

- High resource use (API, solvents, energy, time, cost)
- Significant energy loss (30%) during spray drying
- Reliance on non-eco-friendly solvents
- Extended drying for residual solvent compliance
- Stability issues causing rework and waste.

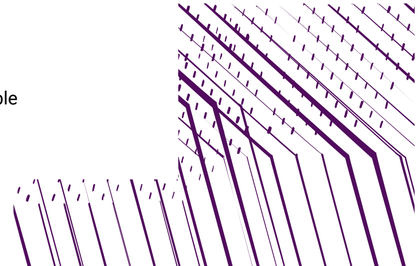
We will integrate molecular digital formulation models with secondary processing, scale-up, and Pharmacokinetic models to establish a digital process for ASD design and manufacture. This will reduce trial and error, improving productivity while cutting waste, time, and costs. Predictive tools will minimise product iterations, while circularity and sustainable substitutions like non-destructive optical spectroscopies will replace solvent-heavy analytics, reducing chemical waste.

This project will digitalise ASD formulation, enabling faster screening (from 12-52 weeks to days or weeks), minimising costs (~£5m/product), reducing waste (30% energy, 50% solvent), preventing stability failures, and embedding sustainable digital protocols into bioavailability enhancement practices.

Building the Consortium

Mesox is looking to bring in consortium members in the following domains:

- Pharma companies to evaluate and demonstrate the innovation in relevant therapeutic case studies with added value to unlock sustainability advantages
- CDMOs for running cGMP demonstrator trials
- Digital/AI/ML innovators capable of applying these tools to formulation development
- Regulatory experts to evaluate and propose routes for implementing digital formulation innovation into dossiers and submissions.



MESOX

Aston University
BIRMINGHAM UK

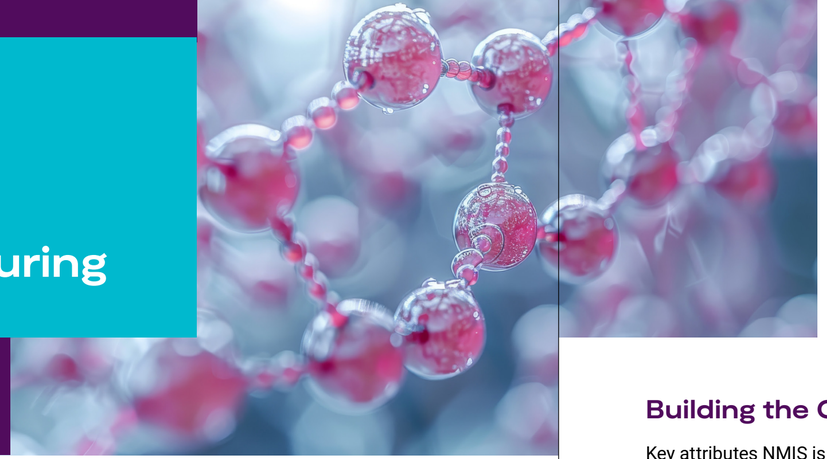
NPL
National Physical Laboratory

Project lead:
Mesox Ltd

Partners:
Aston University, National Physical Laboratory

Funded amount:
£99,308

DPN-MED: Digital Plug-and-Produce Network for Sustainable Medicines Development and Manufacturing



The Grand Challenge

Pharmaceutical emissions are 55% higher than those of the automotive industry, generating up to 100kg of waste per kg of product. This carbon footprint is expected to increase further due to the rise in smaller production volumes, personalised therapies, and increasing complexity of molecules and processes.

This Grand Challenge project aims to transform how medicines are made by shifting from outdated, costly medicine development and manufacturing systems to automated and resource efficient approaches. This new approach will integrate advanced digital tools with medicines development and manufacturing technologies, allowing labs and factories to produce medicines more efficiently and with less waste. A key feature is the creation of a network of self-driving development and manufacturing systems, which can communicate, operate and share information securely in real-time.

DPN-MED drives sustainable medicines manufacturing by reducing emissions, waste, and energy use while boosting productivity and creating UK jobs. It accelerates drug development, enables personalised treatments, and enhances security of medicines supply. Key impacts include cutting raw material use, clinical trial stock waste, and establishing global greenhouse gas standards, fostering economic, societal, and environmental advancements.

Building the Consortium

Key attributes NMIS is looking for from potential members:

- Industry insights on regulatory affairs, supply chains, and sustainability
- Regulatory agencies and standardisation bodies interested in digital transformation
- Technologies and services in monitoring, tracking and standardising sustainability metrics
- Technical expertise and capabilities including automation, data engineering, data science, cloud services and cyber-security
- Scalable digital service architectures and data products
- Expertise in material supply chain, material properties and sustainability
- GMP pilot-scale manufacturing facilities
- Industrial use cases
- National Health Service expertise to align sustainability targets and local healthcare impact.

Project lead:
National Manufacturing Institute Scotland

Partners:
CCDC, University of Strathclyde

Funded amount:
£93,472

ECOCAR

Sustainable CAR-T cell manufacture

The Grand Challenge

Autologous CAR-T cell therapies have great success in the treatment of several cancers, with multiple products licensed for hematological malignancies. Recent clinical data also suggests that CAR-T therapy can be transformative in autoimmune diseases, resulting in considerable increase in the manufacturing demand.

Current CAR-T cell manufacture is typically a labor-intensive process involving culture bags or semi-automated small bioreactors. Manufacture involves many discrete steps such as T cell isolation, activation, lentivector transduction, expansion and cryopreservation. Each one of these steps requires separate disposable culture systems/tubing kits and individual consumables such as magnetic separation beads/columns. Due to their autologous nature, economies of scale cannot easily be applied. Therefore, CAR-T cell manufacture has a unique and significant environmental impact.

The EcoCAR project will build an expert consortium of UK academics and industrial partners to inform and work with governmental agencies and stakeholders, to develop a more sustainable CAR-T cell manufacturing process. They aim to engineer the envelope of the lentiviral vector used for genetic engineering in CAR-T cell manufacture, incorporating T cell capture, mitogenic and cytokine moieties in the lentiviral membrane. Along with the use of microfluidics, this will allow manufacture in a single vessel resulting in a “one-pot” CAR-T manufacturing solution.

NHS Royal Free London NHS Foundation Trust

Autolus

CATAPULT Cell and Gene Therapy

mfx

Building the Consortium

Royal Free Hospital is looking for the following key attributes to complement their project:

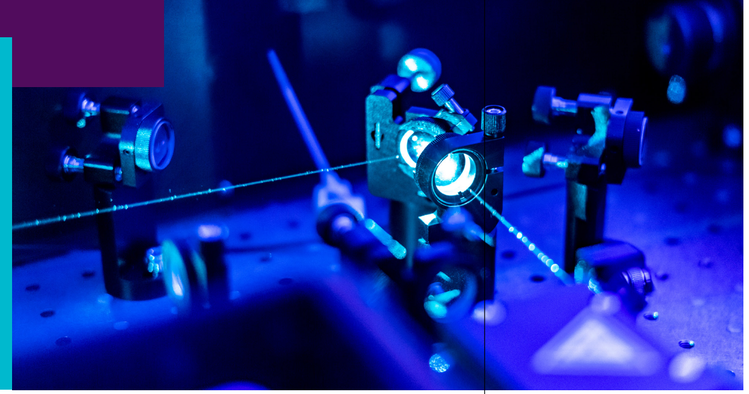
- Expertise in environmental impact assessment of biotechnological applications to measure the current process and how to build in sustainability metrics for the entire project
- Expertise in low volume release assay development
- Patient groups with an interest in sustainable manufacture
- Other CAR-T cell manufactures and manufacturers of other cellular therapies
- Other representatives from the supply chain such as plasticware and media.

Project lead:
Royal Free Hospital

Partners:
Autolus, Cell and Gene Therapy Catapult, MicrofluidX

Funded amount:
£99,154

InSPIREmed – Integrated Spectroscopy and Photonics for Increased productivity and Resource Efficiency in Medicines manufacture



Fraunhofer UK

NPL National Physical Laboratory

University of Strathclyde Glasgow

The Grand Challenge

The scope of photonics in pharmaceutical manufacturing is broad and continuously expanding. The InSPIREmed Grand Challenge project will exploit advances in photonic sensing across medicines manufacture and across the supply chain with the aim of reducing waste and energy usage and increasing process yields. This will be accomplished by bringing precision sensing to the process to enable real time monitoring of key parameters and product attributes.

Technology platforms that we will explore will include advanced Raman and mid infrared spectroscopy, in-line particle analysis and machine learning.

Led by Fraunhofer Centre for Applied Photonics, nationally leading in photonics, the project includes two other partners:

- The National Physical Laboratory (NPL) bringing validation, verification and calibration expertise alongside digital integration of the sensing platforms into the manufacturing and supply chain
- The University of Strathclyde will provide expertise on process analytics through the Centre for Process Analytics and Control Technology (CPACT) and the Centre for Continuous Manufacturing and Advanced Crystallisation (CMAC), they will provide engagement with global pharmaceutical companies, innovation centres and technology providers, vital to the final consortium.

During this consortium building, the team shall host workshops – including in-person in Glasgow, to give stakeholders a look at the opportunities emerging photonics can bring.

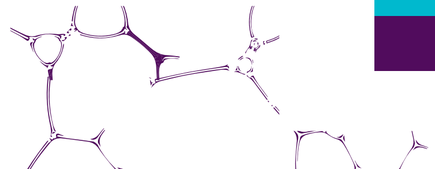
Building the Consortium

Fraunhofer is seeking to build a wide-ranging consortium with representation across the medicines manufacturing supply chain consisting of sensor hardware developers and component suppliers, process analytic sensor providers, machine learning and data science, contract manufacturers, pharmaceutical companies and innovation centres.

Consultation with regulatory bodies will be critical to build a programme of work that meets regulatory requirements.

Partners with the capability to set up pilot line processes would be of interest.

Partners with the capability to quantify decarbonisation impact in the pharmaceutical sector would also be of interest.



Project lead:
Fraunhofer UK Research Ltd

Partners:
National Physical Laboratory, University of Strathclyde

Funded amount:
£63,606

Optimising Energy Efficiency for Sustainable Medicines Manufacturing

The Grand Challenge

The proposed Grand Challenge aims to address the significant energy consumption in medicines manufacturing, a sector characterised by energy-intensive processes and strict regulatory requirements. This challenge is particularly critical as the sector seeks to balance sustainability goals with the demand for high-quality production standards.

Our innovation lies in developing a scalable platform that integrates advanced analytics, renewable energy insights, and production planning tools. This platform will enable manufacturers to optimise their production schedules, aligning operations with periods of peak renewable energy generation, thus reducing reliance on traditional energy sources. Additionally, the project will incorporate real-time data collection and analysis, fostering continuous improvement and compliance with industry standards.

This initiative is important because it targets a sector with unique sustainability challenges, offering a practical solution to reduce carbon emissions and energy costs while maintaining productivity. By addressing both technical and regulatory barriers, the platform will ensure that energy-saving strategies are actionable and compliant.

The expected impacts include a significant reduction in greenhouse gas emissions, enhanced energy efficiency, and cost savings for manufacturers. Furthermore, this project supports the UK's sustainability goals, promoting a greener, more resilient medicines manufacturing industry that can serve as a model for global adoption.

Building the Consortium

- Decision Lab are seeking consortium members with expertise in renewable energy integration, production optimisation, and sustainability analytics
- Partners with access to advanced manufacturing facilities or pilot sites or testing energy-saving strategies are vital
- Decision Lab value collaboration with regulatory experts to navigate compliance challenges and academic researchers specialising in sustainable manufacturing and energy efficiency
- Knowledge-sharing partners with experience in life cycle analysis (LCA), carbon footprint reporting, and standards development will enhance transparency and scalability
- Additionally, industry leaders in medicines manufacturing can provide critical insights and data for refining the solution, ensuring practicality and widespread adoption across the sector.

DECISION LAB

GSK

Project lead:
Decision Lab Ltd

Partners:
GSK

Funded amount:
£63,592

Smart, Sustainable RNA-LNP Manufacture

The Grand Challenge

This Grand Challenge addresses the need for sustainable, scalable, and efficient manufacturing of RNA-based therapies, which could revolutionise treatment for diseases like cancer and genetic disorders. Current methods are expensive, wasteful, and resource-heavy, limiting their availability and environmental sustainability. Additionally, a lack of standardised processes slows development and complicates small-batch production for personalised treatments.

Their approach involves creating a sustainable and digitally supported platform for RNA-LNP manufacturing. Key innovations include simplifying and intensifying production steps, using automation, advanced modelling, and a modular system to test new methods. By applying sustainable practices, reducing waste, and improving resource efficiency, they aim to transform RNA-based medicine production.

This is critical because RNA therapies offer groundbreaking possibilities but need cost-effective and eco-friendly manufacturing to realise their full potential.

Expected benefits include lower production costs, faster access to life-saving treatments, and the ability to scale manufacturing for personalised medicine. With this adaptable platform, the UK can lead in RNA-based healthcare while making it more accessible and sustainable.

Building the Consortium

CPI is seeking partners committed to collaboration, sharing risk and reward, to advance sustainable RNA-LNP manufacturing. CPI welcome UK-based drug developers, CDMOs, suppliers, and technology providers with solutions in process optimisation, automation, and advanced analytics.

Partners should bring expertise, access to facilities, and innovative technologies ready for market translation. Equally important is a commitment to co-develop practical, impactful solutions that address industry challenges. This project emphasises open knowledge-sharing and teamwork to deliver meaningful outcomes and benefits for all participants.

Project lead:
CPI

Partners:
National Physical Laboratory, University of Strathclyde

Funded amount:
£99,146

Streamlining the use of Biocatalysis for API Manufacture through Digitisation, AI and Machine Learning

Disyn Biotec

The Grand Challenge

Biocatalysis offers a sustainable method for medicines manufacturing, yet without expert domain knowledge it is often overlooked during synthesis planning or route optimisation. Furthermore, the development of biocatalytic reactions is often too slow to meet the necessary timelines in drug development.

This project aims to build a digital platform leveraging AI and machine learning to support scientists across all aspects of chemo-biocatalytic route development.

- Route scouting with sustainability as a central consideration, and feasibility predictions which de-risk the use of enzymes
- Predictions allowing rapid initial enzyme identification, with links to enzyme manufacturers allowing simple and quick procurement
- Tools to accelerate reaction development and engineering
- Automated route analysis for sustainability and productivity.

Digital tools for planning and evaluating chemo-biocatalytic routes would have a huge impact in supporting scientists planning sustainable manufacturing routes, by providing the expert knowledge and highlighting the significant economic and environmental benefits of biocatalysis.

This would greatly benefit the entire value chain and enhance the UK's medicine manufacturing capability by pioneering a new faster, efficient, and intuitive approach to implementation of biocatalysis for medicines manufacture.

Building the Consortium

Technical expertise: Medicines manufacturers, AI specialists, data scientists, enzyme characterisation, enzyme suppliers, enzyme engineering, web-app tool development, structural biology, computational chemistry.

Facilities: High-throughput screening, enzyme characterisation.

Knowledge sharing: Biocatalysis datasets, renewable starting materials.

Project lead:
Disyn Biotec Ltd

Funded amount:
£84,277

Innovate UK

Innovate UK
Polaris House
North Star Avenue
Swindon SN2 1ET
03003 214357
support@iuk.ukri.org
ukri.org/councils/innovate-uk