



Annual Review **2018/19**





Nigel Perry

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Chief Executive Officer

Foreword

Welcome to CPI's Annual Review of 2018/19. I am delighted to share and celebrate CPI's many achievements which have been accomplished jointly with our customers, collaborators, and by our outstanding people over the last year. Our proven contribution to UK manufacturing complements the work of the High Value Manufacturing Catapult, of which CPI is a proud founding partner.

As we move into our 15th year, we are continuing to work towards our vision to enable innovations that help create a healthier society, a cleaner environment and a vibrant UK economy through leading capabilities in science and technology innovation. Working closely with industry and academia we are able to bring life changing products to market. We bring together key stakeholders in unique innovation networks to enhance cross sector knowledge transfer and rapidly deliver solutions that accelerate the innovation cycle.

We have worked hard over the last 15 years to establish ourselves as an ambitious enabler, driving innovation forward for industry and academia in order to successfully translate great ideas into commercial products. We've worked with more than 2000 companies who are developing new technologies in diverse markets such as **Medtech, Logistics and packaging, Pharmaceuticals** and **Agritech**.

I am incredibly proud of the efforts of CPI this year in facilitating all types of manufacturing across the UK; the scope of which continues to grow, with the development of our world-class facilities and breadth of expertise to meet technological demands.

Through 2018/19 we have launched three new facilities, secured funding for a fourth, brought innovations to commercialisation across a number of sectors, welcomed new members to our senior team, and attracted many high calibre employees and partner companies. I am delighted that we are continuing to make our commitment to developing our people; our multi-disciplinary workforce is pivotal in assisting our partners to achieve their visions and is what differentiates CPI as a leader for UK innovation.

I take enormous pride in CPI, we are recognised as an organisation that can help make a difference in a number of markets which is exactly what we set out to achieve. The following pages provide a snapshot of the fantastic things we have accomplished over the past year and I hope you enjoy reading.

Who we are and what we do

CPI acts as a catalyst bringing together academia, businesses, government and investors to translate bright ideas and research into the marketplace. We do this by connecting our customers with the right experts, equipment, facilities, networks, funding and more – joining the dots for effective innovation.

We are a leading independent technology innovation centre and a founding member of the UK Government's High Value Manufacturing Catapult. Established in 2004, our teams tirelessly apply their many years of experience to ensure that every great invention gets the best opportunity to become a successfully marketed product or process. We work with our partners across diverse markets in the UK and around the world, driving their innovations forward and helping them to reduce the risk and cost associated with product development.

Our vision is to enable innovations that help create a healthier society, a cleaner environment and a vibrant UK economy enabled through leading capabilities in science and technology innovation. We work with universities, SMEs and large corporations to bring life-changing products to market with increased speed and cost-effectiveness. By bringing together key stakeholders in unique innovation networks, we enhance cross-sector knowledge transfer to rapidly deliver solutions that accelerate the innovation cycle. This supports the creation of next-generation manufacturing jobs and economic growth to the UK.





Our integrated approach incorporates our **three core offerings** to ensure you are given the best chance of successful commercialisation:

- **Industry relevant expertise and assets**
Delivering product development, proof of concept and scale-up services
- **Expertise in securing funding for partners**
Enabling the right partnerships, connections and funding routes at the right time
- **Knowledge and application of innovation processes**
Business services and consultancy to reduce risk and speed up time to market

A team of experts who understand your innovation needs

We know that taking your idea through to commercialisation may require a broader range of skills outside of your core area of technical and scientific expertise. For your innovation to be successful, a complete supply chain is needed from raw materials to finished product, as well as a comprehensive regulatory, pricing, sales and marketing strategy. We employ bright minds from both academia and industry, to create a bespoke team that will provide the right support and help you navigate the journey to commercialisation.

Supporting our customers from concept to commercialisation

At CPI, we provide flexible access to our advanced and industry-relevant facilities, for product and process design, development and scale-up. Throughout the process of commercialisation, we offer transparent and impartial advice that will help you make informed decisions in order to reduce risk. We enable you to demonstrate the feasibility of your ideas so that you can approach investors or funding bodies with confidence, while ensuring your IP is fully protected throughout the process.

Driving innovation forward

By forming innovation networks across the supply chain we facilitate the necessary partnerships for effective innovation. These innovation networks share cross-sector knowledge, allowing us to apply learnings in one sector to problems in another. Our team of experts are fully immersed in the markets they serve and are constantly working to develop our technologies and processes. As part of the High Value Manufacturing Catapult, we can also provide access to a large network of problem solvers and potential end users.

Our approach uniquely positions us to accelerate the innovation cycle and get your product to market faster.



Measuring our impact

CPI is committed to our customers' success. We deliver a range of support activities that enable the translation of their great ideas into commercial products and processes. Here are some of the activities we conducted in 2018/19:



Corporate social responsibility

This year CPI has begun the process of developing our corporate social responsibility policy. This will enable a clear and focussed strategy for ensuring we support our people and local communities, protect our planet and utilise our partnerships for the better.

Some initiatives we have been working on to date:

Community

Improving lives and creating opportunities extends beyond our day to day jobs at CPI. We work with our local schools, businesses and charities to support our community.

As part of CPI's apprenticeship programme, all of our apprentices are currently working in teams to raise money in creative ways for the MFC Foundation. The money raised will fund a project called Meaningful Encounters which will work with young people from less affluent backgrounds to help and support them in realising the wide range of careers opportunities available to them. Additionally, CPI has raised hundreds of pounds for charitable causes such as Brain Tumour Research, Macmillan, St Teresa's Hospice and many more.

STEM

CPI has engaged with over 1000 local children spanning primary and secondary schools and beyond, bringing science and engineering to life and providing vital career advice to young people. We are very proud of our work with schools as we are committed to serve the communities we work in. By utilising our passion for technology and innovation we hopefully inspire the next generation of engineers, scientists and leaders.

Social Mobility Index

2019 will see CPI participate in the Social Mobility Index UK assessment, which recognises businesses' efforts in recruiting and progressing talent from all backgrounds. CPI will utilise the assessment feedback, to continue broadening our approach to ensuring a diverse workforce from all socio-economic backgrounds.

As a Real Living Wage* and 5% Club** employer, CPI is committed to ensuring it is an open, accessible workplace for everyone.

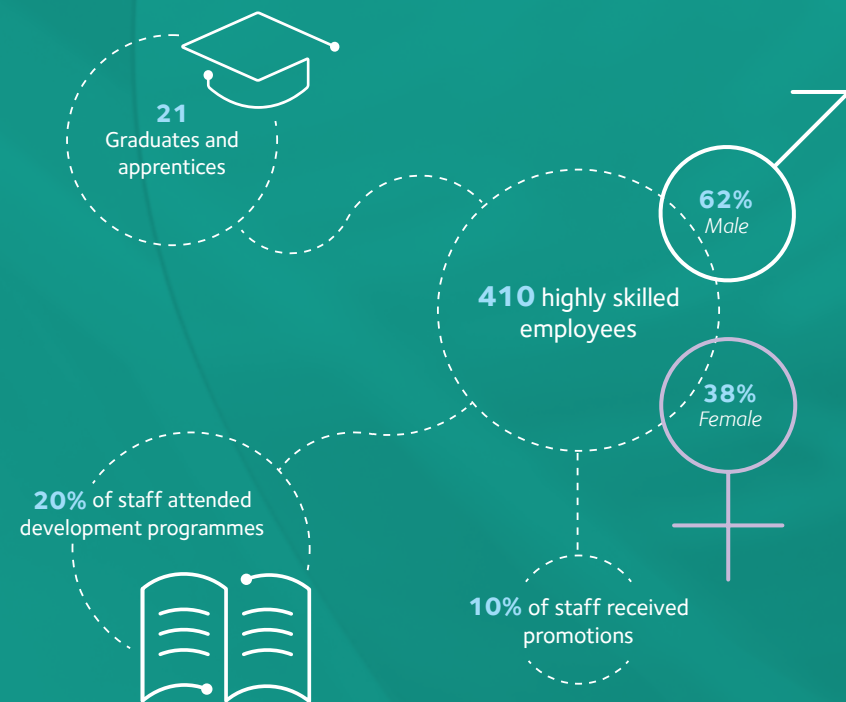
Safety, Health and Environment (SHE)

CPI is proud to be a safe workplace, ensuring SHE is at the centre of our business operations. 2018/19 saw no reportable lost time injuries, and our staff were extremely proactive in their reporting of positive SHE learnings, ensuring prevention of potential hazards and continuous improvement of our working environment.

People

At CPI we recognise that our staff are our greatest asset and are at the centre of everything we do. We strive to be a diverse, inclusive and open workplace that our staff are proud to be part of. We reward and recognise our people's commitment to CPI, and in 2019 we formally launched our reward and recognition programme to celebrate our staff's exceptional achievements, as well as new health and wellbeing initiatives promoting activities such as mental health awareness.

In 2018/19, CPI has:

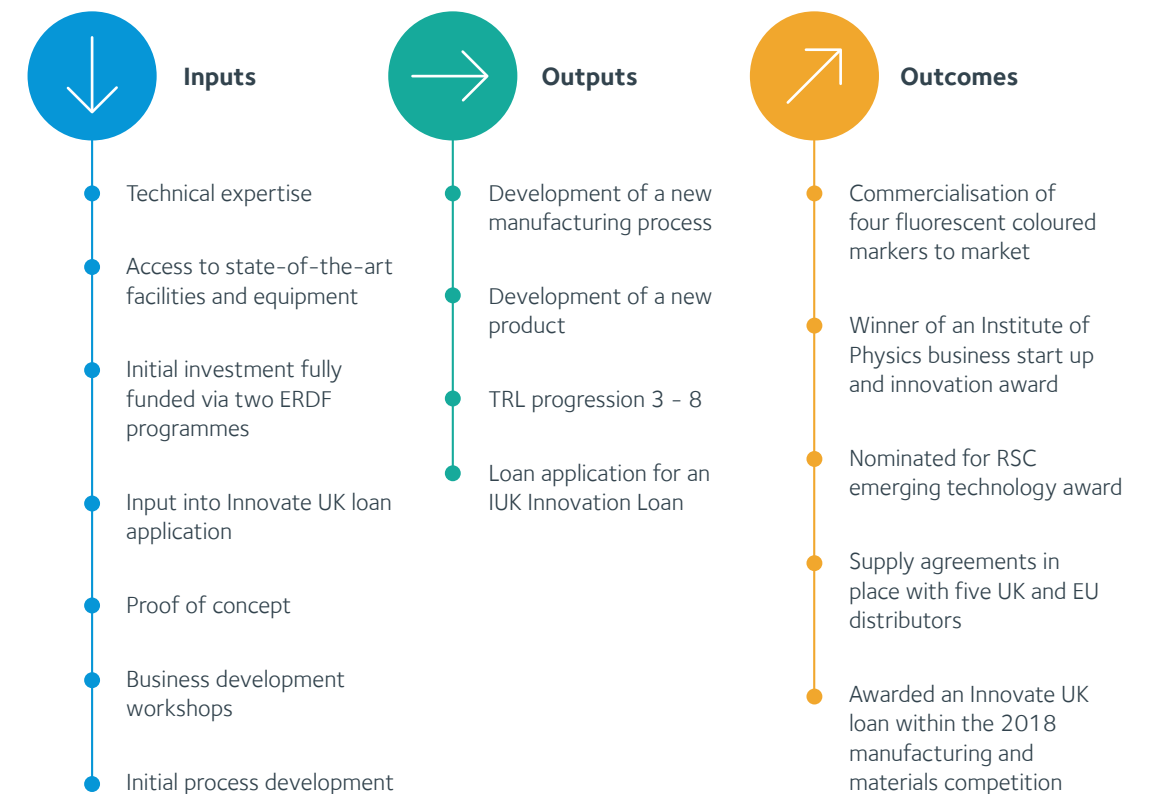


Case studies

stream bio

UK-based SME Stream Bio has worked with CPI to progress their technically challenging project from a lab-based invention to commercialisation. Originally developed and patented by King's College London, Stream Bio was founded specifically to commercialise the technology, and to demonstrate the wide-ranging benefits and applications of Conjugated Polymer Nanoparticles (CPNs™) to the life science community.

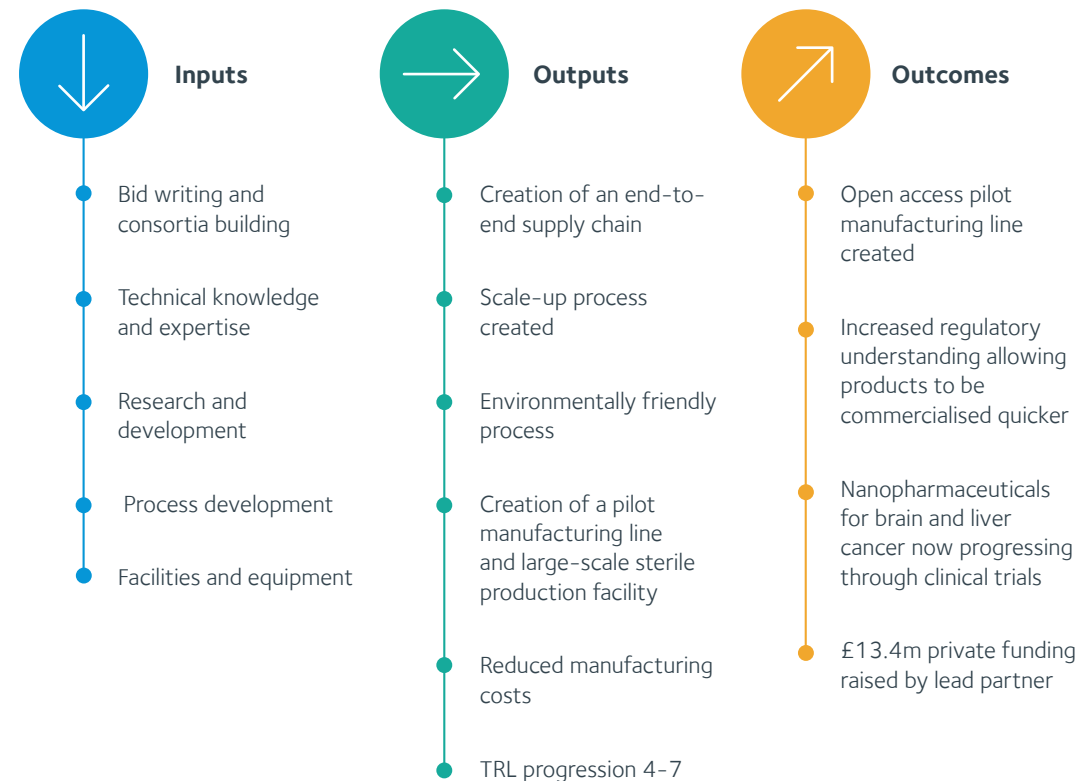
This collaboration has enabled Stream Bio to develop a commercially viable manufacturing process and four colours (wavelengths). The main outcome of which is CPN™ solutions for various strands of the life science industry that could positively impact in-vitro R&D, diagnostics and therapeutics.



CPI has worked as part of the pan-European 'Nanofabricating' consortium to develop new manufacturing methods and improve supply chain co-ordination for nanopharmaceuticals, to advance treatments for rare cancers, autoimmune diseases and viral infections. The Nanofabricating collaboration has accelerated the development of nanopharmaceuticals with the goal of bringing more targeted and effective therapies to market quicker.

Specifically, the eight-partner project has centred upon the processing of glycan-coated gold nanoparticles. These small nanoparticles, which act as a carrier to therapeutic drugs, can pass across blood vessels to deliver medicine directly to diseased sites increasing their efficiency and reducing patient side effects.

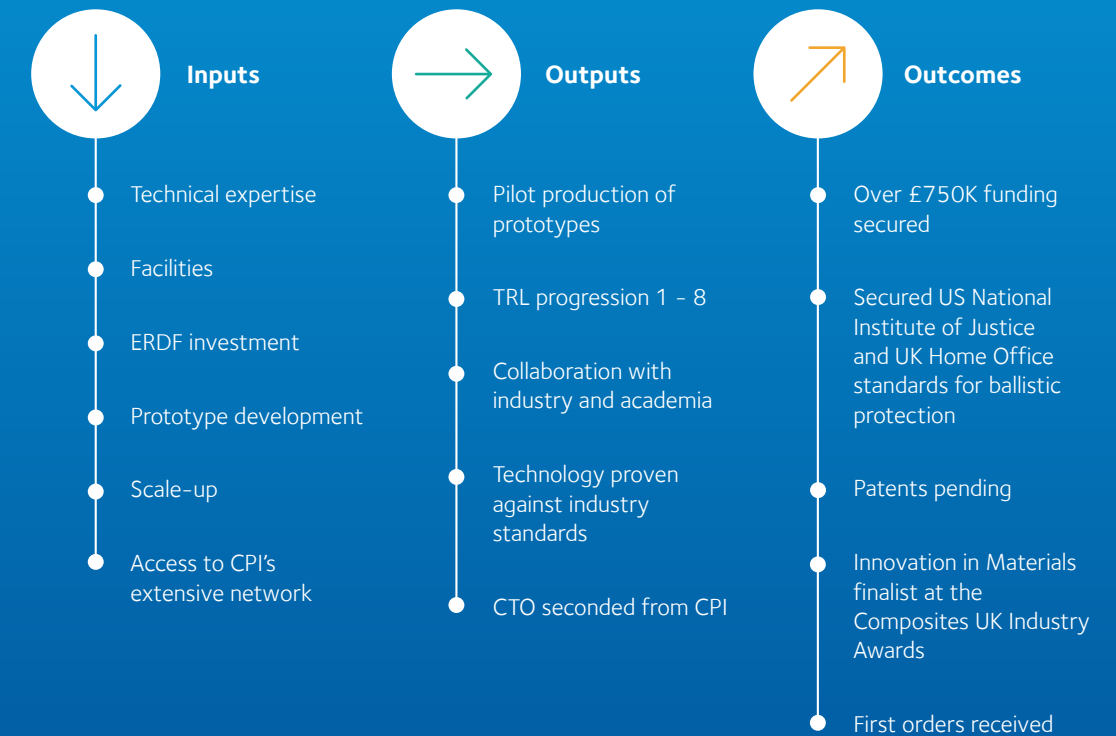
14



UK based SME Graphene Composites (GC) has worked closely with CPI to accelerate the development of their novel product from early proof of concept through to pilot scale production. GC's principal product, the GC Shield™ combines graphene, aerogel and other advanced materials into strong, light, flexible and impact resistant composites for end-use in body armour. GC sought to create a product that provided quick, lightweight, adaptable protection against knife and gun attacks.

Through a collaboration with CPI, GC were able to ensure the most effective route from initial designs, through to the production of working prototypes, and ultimately a commercial product.

15



Expanding our capabilities

Medicines manufacturing

CPI will play a pivotal role in supporting the acceleration of the UK's pharmaceutical and fine chemical industry through a state-of-the-art £56 million Medicines Manufacturing Innovation Centre.

The Medicines Manufacturing Innovation Centre, which will be based in Renfrewshire, Scotland, is a collaboration between CPI, University of Strathclyde, UK Research and Innovation, Scottish Enterprise, and founding industry partners, AstraZeneca and GSK.

A unique facility offering transformative solutions in small molecule and fine chemical manufacturing, the cutting-edge centre, led by Managing Director, Dr Dave Tudor, will ensure the UK is a technology and innovation leader. With a collaborative innovation culture at its heart, the Medicines Manufacturing Innovation Centre will operate as a flexible and adaptable building, enabling industry, academia, healthcare providers and regulators to work together to address challenges along the medicines supply chain.



Formulation

CPI maintained its position at the vanguard of next generation innovation throughout 2018/19, with the National Formulation Centre helping partners overcome innovation challenges. Formulation involves the creation of multi-component, often multi-phase products, which are abundant across markets such as healthcare, food and drink and personal care.

The centre, a cutting-edge innovation facility based at NETPark, in County Durham, has used its world-class laboratories and accompanying expertise to support partners' goals, providing assistance across measurement, high-throughput formulation, chemistry and dispersions, process chemistry, process technology, complex particles, nanomaterials and composites.

Officially opened in March 2018, the centre is guiding companies through the steps needed to take next generation formulated products to market, creating an environment of innovation that allows partners to be more efficient in the use of resources to generate further value for the UK formulation industry.

The facility has already enabled the delivery of a number of high-value projects, such as work to develop new, environmentally-friendlier food packaging to cut plastic pollution, and Government Faraday Challenge projects to improve the performance of electric vehicle batteries.

The centre has also supported CPI's creation of a new system aimed at driving efficient learning for complex particle products. Working alongside its academic partners – the Universities of Edinburgh and Sheffield – CPI has developed a novel, accessible Digital Twin, which provides extensive innovation capabilities to overcome the challenges of powder mixing and granulation for solid products.

Healthcare photonics

March 2019 marked another significant chapter in CPI's prominence as a valued innovation partner with the opening of the National Healthcare Photonics Centre to assist companies looking to develop new light-based healthcare treatments.

The state-of-the-art facility is supporting the scale-up and commercialisation of medtech products, acting as a hub for businesses of all sizes and academic partners to work on innovative methods of diagnosing disease, imaging systems – including endoscopy – and light-based treatments.

Helping SMEs drive forward innovative products and services at reduced risk and with increased capital efficiencies, it is also supporting large companies to undertake more disruptive innovation in the healthcare market.

Providing space for work across two floors, the centre includes a suite of specialist laboratories capable of carrying out optical system development and testing, laser system applications development, bio-materials handling and testing, ionising radiation imaging and testing, 3D printing, electronics development and pilot manufacturing work.

Supported by a £7.9m grant from the Government's Local Growth Deal, through the North East Local Enterprise Partnership (LEP), the cutting-edge facility, based at NETPark, in Sedgefield, County Durham, was officially opened in a ceremony led by CPI Chief Executive, Nigel Perry MBE FREng, CPI Healthcare Photonics Lead, Dr Tom Harvey, and Alan Welby, North East LEP Innovation Director.



The Internet of Things

CPI strengthened its standing in the printable electronics sphere after opening a new, cutting-edge facility to help partners exploit opportunities across the Internet of Things.

The facility, based in Newton Aycliffe, County Durham, holds the key to companies being able to develop prototypes and rapidly scale up levels to test manufacturing quantities.

Able to support the advancement of smart label and tag technology, which allows everyday physical objects to wirelessly communicate and exchange data across the internet, the centre has the capacity to create rolls of thin, flexible inlays containing multiple electronic components that can be converted into labels or embedded into smart products or wearable goods.

This technology is already prevalent in devices enabling remote monitoring of heating and domestic appliances from smartphones, while it also holds great potential in the healthcare sector, where patients can be prompted to take medication via a smartphone reminder.

This proficiency has helped attract new clients, with Silent Sensors, Datatecnics Corporation and HP1 all now occupying space at the centre, where they are benefiting from state-of-the-art incubator space and first-hand access to CPI's technical expertise and cutting-edge equipment.

Timeline

20

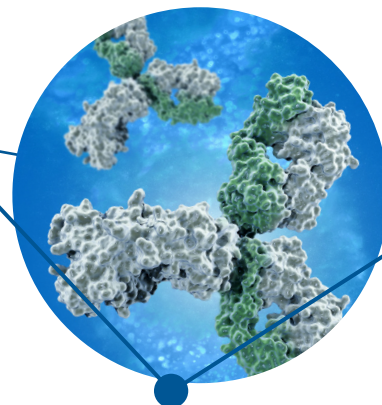


April 2018

New facility to exploit Internet of Things opportunities

April saw the opening of a new facility to help companies exploit opportunities using the Internet of Things. The printable electronics centre, in Newton Aycliffe, County Durham, has the potential to support a number of developments, including self-monitoring packaging capable of tracking sensitive medicines in the healthcare sector.

May



New project to enhance nanomedicine development

CPI announced a new collaborative programme to strengthen its nanoformulations capabilities and better develop next generation nanomedicines. The project focused upon the evaluation of a new microfluidic-based platform for the scale-up, process development and manufacture of nanoformulated medicines. Nanoformulations can enhance conventional drug properties through improved intracellular delivery and tissue targeting, therefore providing medicines and vaccines that are more effective and enabling new therapies for difficult-to-target sites.

New electronic materials for low-cost Internet of Things

As part the Necomada project, CPI created new ink and adhesive formulations aimed at reducing the cost of future Internet of Things devices.

June



Research hub aims to tackle spread of new diseases

CPI announced its involvement in the development of a new research hub aimed at delivering low-cost, high-quality vaccines to prevent Ebola and Zika outbreaks. Led by Imperial College London, the Future Vaccine Manufacturing Hub was established to address two key challenges.

The first was around designing a flexible modular production system to manufacture tens of thousands of vaccine doses in a matter of weeks. The second focussed upon improving and optimising existing manufacturing processes to improve vaccine stability and efficacy, while reducing storage and manufacture costs.

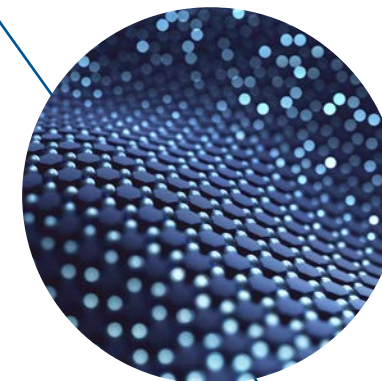
CPI develops high-quality surfactant manufacturing technique

Working as part of a consortium, CPI developed a new process for surfactant manufacturing that reduces infrastructure costs and improves efficiency, without impacting on quality. The collaboration included speciality chemical manufacturer Croda International Plc, technology designers NiTech Solutions and The University of Cambridge's Institute for Manufacturing. The project was part-funded by Innovate UK.

CPI honoured at Chemical Industries Association awards

The honour recognised CPI's services and support for partners around development, proof of concept and commercialisation. Judges were impressed by CPI's Impact Framework, which is used to measure, analyse and report the impact of its support across public and private projects.

21



July



CPI receives £107m government funding boost

CPI welcomed confirmation of a £107m Government funding package to help develop technologies for next generation manufacturing. The five-year commitment, delivered through the High Value Manufacturing Catapult programme, will allow CPI to continue its extensive track-record of helping industry bridge the gap between innovation and commercialisation and bring new products and processes to market.

Consortium work to improve airtight bonding in OLED lighting

Work was announced on improvements to airtight bonding in OLED lighting for aerospace and defence applications. The UltraWELD project, part-funded by Innovate UK, set out to develop photonic-based processes for highly dissimilar material joining, which is a common technique used to manufacture complex electro-optics.

August



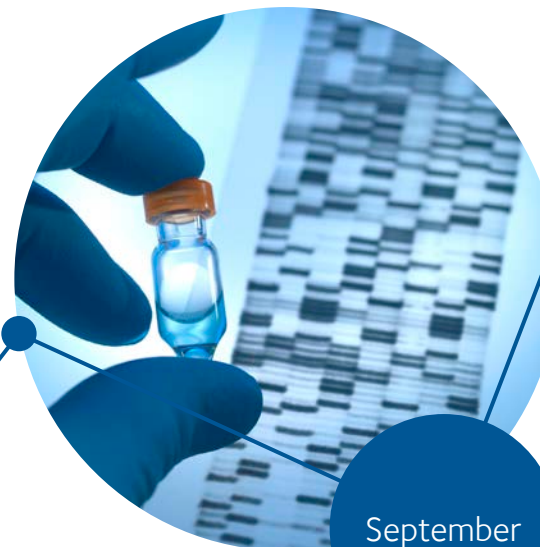
Ceremony celebrates official naming of CPI's The Coxon Building

CPI officially unveiled The Coxon Building, which will drive forward cutting-edge work in the consumer and healthcare sectors. Based at NETPark, in Sedgefield, County Durham, the facility was given its official name by former CPI board chairman Bob Coxon OBE in a special ceremony.

CPI drives forward electric vehicle work with OXIS Energy

An Innovate UK-Faraday Challenge-funded project to develop the next generation of batteries with the capability of extending electric vehicles' mileage range was announced in August. The Lithium Innovations for Future Electric vehicles (LIFE) project was focused on the development of Lithium-Sulfur battery chemistry, with CPI collaborating with lead partner OXIS Energy.

September



CPI supporting Cobra and GE Healthcare on gene therapy work

CPI announced it was working alongside Cobra Biologics and GE Healthcare Life Sciences to develop cost-effective regenerative medicines.

The three-way partnership, funded by a £570,000 Innovate UK grant, was founded with the aim of increasing the robustness and reducing the costs around manufacturing of adeno-associated virus vectors, used for emerging gene therapy treatments.

October



CPI supporting smart labelling project to cut food waste

CPI is supporting a smart labelling project to cut food waste and health risks across the perishable goods industry. Working with SMEs Intray Limited and Mexar Limited, this project has the potential to transform the food industry by providing real-time data throughout the supply chain journey.

CPI works with Pireta to develop new smart clothing

CPI revealed a collaboration with Pireta Limited around the introduction of next generation smart clothing. With its expertise in hybrid and stretchable electronics, CPI supported Pireta's work on a unique process to make durable, flexible interconnecting electrodes that avoid changing fabric feel and performance. Pireta's patent pending technology has the potential to enable truly wearable smart electronic systems via the attachment of copper within textile yarns.

November



CPI supports PowerDrive line to develop battery charging

Working as part of a consortium, CPI developed a new process for surfactant manufacturing that reduces infrastructure costs and improves efficiency, without impacting on quality. The collaboration included speciality chemical manufacturer Croda International Plc, technology designers NiTech Solutions and The University of Cambridge's Institute for Manufacturing. The project was part funded by Innovate UK.

Medicines Manufacturing Innovation Centre boss unveiled

Dr Dave Tudor was named as the Managing Director of the Medicines Manufacturing Innovation Centre. Supported by a £13 million investment from UK Research and Innovation – through the Industrial Strategy Challenge Fund – the facility also received funding totalling £15 million from Scottish Enterprise and £7 million from both GSK and AstraZeneca.

December



Supporting work to use spider toxins for crop safeguarding

CPI's role as a key partner in a major European collaboration using spiders' natural toxins to sustainably safeguard crop protection was revealed in December. Working alongside Newcastle University, CPI is providing expertise in fermentation and downstream processing development focussed on the production and formulation of biopesticides.

CPI working to cut plastic waste packaging pollution

The project will develop next generation packaging that continues to prolong the shelf-life of foodstuffs, made from biodegradable materials designed to degrade in a natural environment.

January – February



Pupils' museum ideas STEM from CPI support

CPI worked with schoolchildren from William Cassidi C of E Aided Primary School, in Stillington, near Stockton-on-Tees, to create museum artefacts using the world of STEM as inspiration. Introducing Year Six pupils to science, technology, engineering and mathematics (STEM), CPI's Analytical Scientist Emma Stewart and Apprentice Facilities Co-ordinator Aaron Parkinson supported four 25-minute sessions, which focused on areas such as high-performance liquid chromatography and resulted in pupils creating artefacts for their school's museum.

LiNaMan project working on next generation EV batteries

Working alongside LiNa Energy and Lancaster University, CPI supported the development of a robust, low-cost and high performance energy storage battery to replace existing lithium-ion (Li-ion) batteries.

March



National Healthcare Photonics Centre launch

In March 2019 CPI officially opened a new, state-of-the-art facility focused on the development of next generation light-based healthcare treatments.

The National Healthcare Photonics Centre will support the scale-up and commercialisation of medtech products, acting as a hub for businesses of all sizes and academic partners to work on innovative methods of diagnosing disease, imaging systems and light-based treatments.

Looking to the future

2018/19 has been a fantastic year for CPI and I am extremely proud of what has been achieved as we continue to establish ourselves as the preferred partner for innovation in the UK, improving manufacturing productivity across a range of markets in the UK and around the world.

CPI is a leading independent technology innovation centre and an invaluable and reliable partner for small businesses, universities and large corporates, helping them to drive their innovations forward and reduce the risk and cost associated with product development. As a founding member of the UK Government's High Value Manufacturing Catapult, our strategic aim is to ensure that every great invention gets the best opportunity to become a successfully marketing product or process. We achieve this by providing our customers with crucial access to innovation facilities and expertise, connecting them with the right experts, equipment, facilities, networks and funding.

We are continuing to build on our strong roots in the North East of the UK, opening new centres in Sedgefield and Newton Aycliffe with a focus on printed electronics, photonics and formulation. Expanding our capabilities and facilities means that CPI can help more companies to accelerate innovation to commercialisation.

As we look to the future, we will continue to support businesses within the innovation space. CPI's visibility in the UK's healthcare market will become more prominent. We will break ground at the state-of-the-art Medicines Manufacturing Innovation Centre in Glasgow in 2020. This collaborative project, which includes founding industry partners, AstraZeneca and GSK, will expand CPI's capabilities in healthcare, addressing challenges and maximising technology opportunities within the medicines supply chain.

We will continue to develop our excellent people. It is the skills and expertise of our workforce that makes CPI the organisation it is today and without them we would not be able to support businesses the way we do. On behalf of the Board I would like to thank everyone at CPI for the crucial role they are playing in the success of CPI and in improving manufacturing productivity in the UK.



We work with
Innovate UK

CATAPULT
High Value Manufacturing



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