HiBarFilm

HIGH BARRIER MONOMATERIAL FLEXIBLE FILMS FOR FOOD CONTACT APPLICATIONS

1st Open Day Workshop

Agenda

V2.0

Date: 29 June 2023

Location: Cambridge Belfry Hotel (QHotel),

Back Lane, Cambourne,

Cambridge CB23 6BW

Time: 09:00 – 17:00 (BST)

www.hibarfilm.co.uk

HiBarFilm2 is an Innovate UK project, reference: 10015317. Innovate UK is part of UK Research and Innovation.

Contents

HiBarFilm Project

The HiBarFilm2 Project is an Innovate UK funded project (Ref: 10015317) that started in March 2022 and is expected to run for 30 months. Haydale Composite Solutions Ltd is leading the consortium of eight companies - BASF, Bangor University, Cambridge Nanomaterials Technologies, Dunbia, Fre-Energy, Parkside Flexibles, and Wells Plastics - to develop the next generation of high barrier films for food packaging using functionalised nanomaterials ("HiBarFilm2 Consortium").

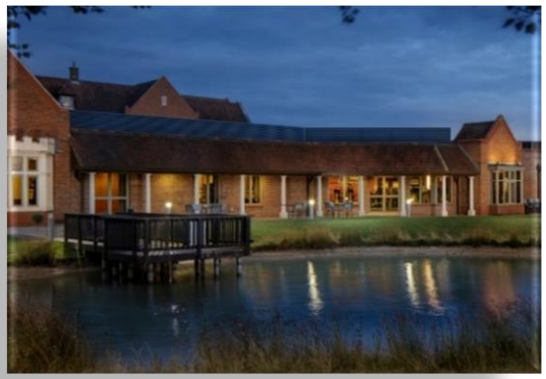
HiBarFilm2 has an ambitious objective to achieve the same barrier performance using a mono-materials polyolefin film as the currently used multilayer barrier films. The consortium aims to accomplish this using plasma functionalised nanomaterials to increase barrier performance in two main areas of focus; firstly by mixing the nanomaterials directly into the polyolefin prior to filming, adding barrier properties to the film itself – both polyolefin films and compostable plastics will be used to also address the issue with contamination of films with food waste such as fats and blood; and secondly, by dispersing the nanomaterials into a barrier coating which can be applied to the polyolefin substrate. The advantage being the two solutions can be combined to increase the barrier performance further. By manufacturing mono-material flexible films the recyclability of these materials will increase, and value will be added.

Project Partners

HiBarFilm Open Day 2023 Workshop – Venue

The 1st Open Day Workshop of the HiBarFilm2 Project will be a hybrid meeting, taking place at the:

Corpus Christi Room
Cambridge Belfry Hotel (QHotel)
Back Lane, Cambourne,
Cambridge CB23 6BW
UK
https://www.thecambridgebelfry.co.uk/



Free parking is offered to all its guests. Please enter your car registration at arrival, into a machine located at the reception desk.

HiBarFilm Open Day 2023 Workshop – Preliminary Agenda

*Please take notice that all times shown in the agenda are **BST***

08:30 Arrival, Registration and Refreshments

08:50 *Joining for online participants*

09:00 *Welcome to the HiBarFilm2 Open Day 2023*

Bojan Boskovic, Managing Director, Cambridge Nanomaterials Technology Ltd (CNT), UK

HiBarFilm Project Exploitation & Dissemination Manager & Open Day 2023 Organiser

Thomas Greeves, Site Manager, Haydale Composites Solutions Ltd.

HiBarFilm Project Coordination

09:10 **Gavin Lewis,** Innovation Lead - Smart Sustainable Plastics Packaging, Innovate UK

Title: Making Films and Flexible Packaging More Sustainable

The Smart Sustainable Plastic Packaging Challenge is funding a number of projects, alongside the HiBarFilm project, aiming to make film and flexible packaging more sustainable at either the product or system level, or both. This presentation will cover a high level overview of some of these projects.

09:40 **Thomas Greeves,** HiBarFilm Project Coordination, Haydale Composites Solutions Ltd.

Title: Applications of Functionalised Nanomaterials

Haydale are a global technology solutions company, passionate about creating the next generation of advanced materials to improve mechanical, thermal and electrical properties for our customers products. We bring together cutting-edge technology and engineering expertise alongside our patented HDPlas® functionalisation process which revolutionises repeatable performance and continued commercialisation of nanomaterials. Our world leading HDPlas® process has the potential to be a major spearhead in the drive to keep the UK at the forefront of world technology. We have established a secure, robust and sustainable supply chain to support the manufacture of advanced materials. This enables us to deliver repeatable, consistent and outstanding performance.

The key to repeatable performance and continued commercialisation of nanomaterials is functionalisation. Functionalisation underpins everything we do.

10:10 **Rob Elias**, Bangor University, UK

Title: A review of barrier testing approaches

The talk will review the main techniques used for barrier testing and will use case studies to illustrate some of the issues regarding barrier performance in packaging applications.

10:40 *Coffee break and networking*

11:10 **Tony Heslop**, BASF, UK

Title: The Chemical Industry and Its Importance in the transition to a Net Zero Future

The chemical industry provides many of the products that we take for granted today. It is innovation in the industry that will also enable the transition to a Net Zero future. At the same time, the industry is also responsible for significant greenhouse gas emissions and is difficult to abate.

This presentation will talk about the transition that the chemical industry needs to make between now and 2050 in order to overcome the worst impacts of the climate crisis. It will discuss the role of BASF within the HiBarFilm2 project and address why this project is important as part of journey to Net Zero.

11:40 **Julia Hewerdine,** DUNBIA, UK

Title: Dunbia – commitment to sustainability

Dunbia's leading position in the global food system supplying animal protein, both within the UK and exporting around the world, requires packaging that is safe, functional and fit for purpose.

Our commitment to reducing our impact on the environment and operating in a sustainable manner has driven us to significant science-based targets and the continuing ambition to be the most sustainable red-meat processor.

Through HiBarFilm project we are continually innovating to deliver safe food in a sustainable manner.

12:10 **Denise Nicholls,** Fre-energy, UK

Title: Evaluating decomposition and recyclability of novel materials to replace single-use plastics.

Fre-energy's scope of involvement in the HiBarFilm2 project is to design and build a unit capable of simulating the conditions inside a full-scale anaerobic digester to be used to assess the rate at which the various novel materials, produced by the other stakeholders, digest.

The small-scale reactor vessel, purpose-built by Fre-energy, enables a range of environmental regimes to be investigated under controlled real-time conditions to observe the biophysiochemical changes to the materials under development. Having established the baseline conditions, our presentation details the current and proposed experimental testing completed to date.

12:40 *Lunch & networking*

13:40 **Mark Shaw,** Parkside Flexibles, UK

Title: From 7 Sins to Packaging wins – How our range is turning the tables on sustainability

There's no doubt that packaging, especially plastic packaging, has been under the microscope in recent years, with the media shining a light on its effects on the environment. However, as a manufacturer of flexible packaging for over 40 years, Parkside views the argument through an experienced and discerning lens.

At Parkside, we recognise that when plastic is misused or mismanaged, it has the potential to devastate our environment, an environment that we care deeply about. We also appreciate that plastics are unique, innovative, and versatile materials that can contribute to protecting the environment when used responsibly. The key is to recognise that there is no silver bullet to sustainability, only a combination of well-designed strategies striving for a more sustainable future.

Responsible resourcing, best-fit applications, and effective waste management are just a handful of elements that contribute to a successful sustainable packaging strategy. However, at Parkside, we have noticed seven fundamental packaging sins that frequently hinder the sustainability of a packaging model. As innovators in sustainable, flexible packaging, we're here to help. We have devised our Seven Pillars of Sustainable Packaging to enable brand owners to turn these sins into packaging wins!

14:10 **Gary Ogden**, Wells Plastics, UK

Title: Compound development of single-material high-barrier polymeric film materials.

Single material high barrier film compounds will have much improved recyclability or biodegradability over multi-layer/material films. However, the challenge ahead is to develop the water and oxygen barrier properties possessed by multi-material layered films in a single material film without increasing unit weight or decreasing mechanical properties.

The approach taken is to incorporate nano-materials in anaerobically digestible biodegradable polymers and conventional polyethylene to improve the required properties

This presentation will discuss the technical aspects which must be considered in order to produce polymeric compounds of very different thermal and rheological properties incorporating a range of nano-materials to a high degree of dispersion to optimise film properties.

14:40 *Coffee break and networking*

15:00 **Ana Bankovic Cassidy,** Cambridge Nanomaterials Technology, UK

Title: Development of Circular Economy Eco-system and Innovation Management Strategy

Competitiveness, strategic autonomy and jobs depend on development of advanced materials circular economy. Steps towards the creation of the necessary environment needed for successful innovation management strategy, related to packaging applications will be discussed.

15:30 **James Elliot,** Cambridge University, UK *(Guest speaker)*

Title: Making plastics film packaging materials from plants

Plastics are one of the defining materials of our age, from clothing and packaging to vehicles and construction, and it would be hard to imagine modern living without them. However, the insatiable growth in their use together with the problems of disposal have given plastics a bad name in recent years. In this talk, I will outline our plan to rehabilitate the reputation of plastics, and address some of the major problems related to their production and recovery after use. This work is part of a project entitled "Smart Sustainable Plastic Packaging from Plants" which aims to supplant the widespread use of fossil-derived plastics with materials made from naturally derived sources, such as wood (cellulose) and plants (sugars). These materials will degrade more easily in the natural environment, and result in no additional carbon being returned to the biosphere. By assessing the impact of switching to cellulose and plant-derived sugars, and making better use of waste products from food and forestry industries, we will explore the trade-offs between the benefits of plastic packaging and the impacts of its production and disposal.

16:00 **Sam Davis,** Algreen, UK *(Guest speaker)*

Title: Algreen: Bringing aesthetic elements to sustainable packaging, through material innovation to optimise sales.

Our ability to tackle the plastic pollution problem will be one of the key factors utilised to define our era by future generations. Algreen strives to tackle this problem head on, utilising bio derived molecules to develop polymeric materials for the packaging market. These polymers are 100% biobased, removing the dependency on fossil fuels. Biobased has often been associated with below the quality of their fossil fuel counterparts. Algreen has developed a biobased film/coating, which produces natural iridescent colour without the requirement for pigment, dye or metal iridescent compounds. The "Rainbow" film/coating technique combines sustainability with aesthetic design via our unique material Innovation. This unique holographic innovation can drive packaging sales by incorporating "Eye Catching" elements. By using Algreen fully biobased holographic film/coating technique, this adoption into the packaging industry can assist in reducing the

environmental impact of industries such as disposable packaging whilst simultaneously improving product quality and end-user experience.

16:30 *Discussion*

Facilitated by: **Bojan Boskovic** Cambridge Nanomaterials Technology, UK

17:00 Closing remarks

Note It is planned that all presentations would be followed by Q&A discussion. The organisers reserve the right to change the programme or speakers should circumstances require. For any further enquires please do not hesitate to contact directly the **HiBarFilm2 Open Day 2023** organiser Dr Bojan Boskovic from Cambridge Nanomaterials Technology Ltd on info@hibarfilm.com.uk.

HiBarFilm Open Day 2023 Workshop – Speakers

Dr Bojan Boskovic *(Project Partner & Organiser)*
CEO,
Cambridge Nanomaterials Technology
14 Orchard Way
Lower Cambourne
Cambridge CB23 5BN - UK

Dr Bojan Boskovic is the Founder, Managing Director, and Principal Consultant of the company. He has more than 20 years of hands-on experience with carbon nanomaterials and composites from industry and academia in the UK and Europe. Previously, he worked as a R&D Manager at Nanocyl, one of leading carbon nanotube manufacturing companies in Europe. He also worked on carbon nanotube synthesis and applications as a Principal Engineer-Carbon Scientist at Meggitt Aircraft Braking Systems, as a Research Associate at the University of Cambridge, and as a Senior Specialist at Morgan Advanced Materials. During his PhD studies at the University of Surrey he invented low temperature synthesis method for production of carbon nanomaterials that has been used as a foundation patent for the start-up company Surrey Nanosystems. He was a member of the Steering and Review Group for the Mini-IGT in Nanotechnology that advised the UK Government on the first nanotechnology strategy policy document. Dr Boskovic was working as an advisor for the European Commission (EC) on Engineering and Upscaling Clustering and on setting up of the European Pilot Production Network (EPPN) and European Materials Charaterisation Cluster (EMCC). He has experience in exploitation and dissemination management on a number of FP7 and H2020 European projects, including UltraWire, NanoLeap, OYSTER, M3DLoC, Genesis and nTRACK. Also in UK Government InnovateUK funded projects, such as UltraMAT and GRAPHOSITE He is also a leader of two private membership based consortiums: Nano-Carbon Enhanced Materials (NCEM) and Advanced Materials for Additive Manufacturing (AMAM).

Gavin Lewis
Innovation Lead –
Smart Sustainable Plastics Packaging
Innovate UK
UK

Gavin Lewis is an Innovation Lead in UKRI – Innovate UK's Smart Sustainable Plastic Packaging (SSPP) Team and has a track record in leading innovation projects developing sustainable products, material

technologies and business models. Gavin has worked predominantly with polyolefin polymers and relevant performance-enhancing additives across a broad range of applications and polymer conversion technologies and is passionate about being part of a positive change around the way we use plastics.

Gavin looks after several of SSPP's large-scale Demonstrator projects that are aiming to deliver major advances in chemical recycling, the mainstreaming of reusable packaging for 'pre-filled' and 'refill' business models, and food-grade PP recycling. He also manages many of SSPP's Business-led R&D projects, from novel identification, sorting and tracking technologies to new recycling-friendly coatings and barrier materials.

Thomas Greaves
Site Manager
Haydale Composite Solutions
Unit 10 - Charnwood Business Park
North Road
Loughborough, LE11 1QJ
UK

Thomas Greaves joined Haydale Composite Solutions in October 2017. As Site Manager, Thomas is responsible and accountable for Business Development, Research and Development, Projects, Commercial Manufacture, Quality, Health and Safety and Finance. Previously as Technical Program Manager, Thomas was responsible for product development and sales growth initiatives across the Haydale portfolio, managing technical and commercial teams to deliver products to market in elastomers, composites, inks and coatings using nanotechnology.

Thomas is focused on driving Haydale's commitment to commercialising nano-enhanced products and is responsible for managing Haydale's supply chain with suppliers and customers in all key aspects and product areas

Dr Rob Elias
Research Director
Bangor University
Bangor, Wells
UK

Dr Rob Elias is the Director of the BioComposites Centre at Bangor University with a staff of 25 scientists. The Centre was established in 1989 to work with companies to develop new technologies based on sustainable materials such as wood. The Centre has state of the art facilities including pilot scale equipment for plastic packaging applications.

Rob has a major interest in the development of technologies that reduce global warming potential. He has an industrial and academic background; expertise includes wood-based panel production, biomass extraction, chemical composition and product development.

His current research interests include biorefining, the production of bioplastic products, extraction of value-added molecules from plant materials, recycling, cleaning and utilisation of waste plastics.

Tony Heslop,
Senior Sustainability Manager
BASF PLC
UK

Tony Heslop is Senior Sustainability Manager for BASF in the UK and Ireland. He is a Polymer Chemist by training and has worked in the chemical industry all his working life. His current role involves helping to support colleagues, customers, and other stakeholders to understand sustainability trends and drivers and

find solutions to their problems. This is done by bringing an expert insight into the corporate sustainability strategy of BASF, the world's largest chemical company.

Julia Hewerdine CSci FIFST GM.Inst.M
Group Food Safety & Quality Project Manager
Dawn Meats & Dunbia
UK

Julia Hewerdine leads food safety and quality related projects across the Dawn Meats Group in UK and Ireland. She has worked in the animal protein industry for over 20 years in roles as diverse as research, account management, technical management and development. She holds a Masters in Meat Science, is a Chartered Scientist and a Fellow of the IFST.

Denise Nicholls,
Managing Director
Fre-energy Ltd.
UK

Denise holds a WAMITAB qualification (Waste Management and Training Advisory Board) for the regulatory management of Anaerobic Digestion Food Waste Sites and is a Fellow of the Institute for Science and Food Technology. In recent years she has overseen the advance of Fre-energy into a highly respected operation, both in the installations of farm-based waste AD plants and having coordinated the successful completion of a number of Innovate UK funded projects.

Mark Shaw,
Technical Sales Manager
Parkside Flexibles,
Wakefield, England,
UK

Mark Shaw has worked in packaging for over 34 years and has been fundamental in the development and accreditation of Parkside's home compostable packing utilising his experience in inks, adhesives and substrates. Mark is also involved in the development of paper recyclable, plastic recyclable, easy open and re-closable flexible packaging.

Parkside is the UK leader in the development of compostable flexible films for food applications. At Parkside Mark is a leading their new product development working with brands to develop new technical solutions. Mark will talk about the market opportunities for compostable products and its development in the UK. In his talk Mark will look at material selection, testing and accreditation of their products.

Dr Gary Ogden,
Technical Manager
Wells Plastics,
Emerald Way,
Stone Business Park, Stone,
Staffordshire.
ST15 0SR, UK

Gary Ogden has been Technical Manager at Wells Plastics for over 14 years. He gained his first degree from UMIST followed by a PhD from Loughborough University and is a Fellow of The Institute of Materials, Minerals & Mining (IOM3) and a Chartered Scientist with the UK Science Council. He is Chairman of The Manchester Polymer Group (IOM3) and is currently chairman of the Society of Biodegradable Polymers.
He has over 25 years of experience in the field of the development and manufacture of specialty additive masterbatch and compounds for film, sheet and wire & cable applications. During this time, he has been responsible for the development of novel additive masterbatches to suit customer and market requirements, including an ever increasing demand for multi-component combination types, where potentially detrimental interactions are required to be extensively studied to produce optimum quality product.
He is greatly involved with the political and regulatory aspects of the polymer industry, being a technical lead at ASTM with regards to polymers that degrade on the environment and having been involved with the development of various standards from W&C for rolling stock to natural biodegradable environments, and providing expert evidence and advice to both UK and EU legislative bodies.

Dr Ana Bankovic Cassidy (Partner & Organiser)
Senior Innovation Consultant.
Cambridge Nanomaterials Technology Ltd.
14 Orchard Way, Cambourne
Cambridge CB23 5BN

Dr Ana Bankovic Cassidy is a Senior Innovation Consultant. She joined CNT team in February 2021.
Ana graduated from the Faculty of Physics, University of Belgrade Serbia, winning the award for the best BSc (Honors) Thesis of the year 2007. The main aim of her PhD study and further research was to identify and explain specific kinetic phenomena that occur in positron transport in electric and magnetic field due to non-conservative nature of positronium formation. Ana applied the basic phenomenology of charged particle swarms to study the interaction of positrons with biologically relevant molecules, in order to develop and establish a benchmark for Monte Carlo codes used in positron emission tomography (PET) modelling. Her research activities were undertaken in Centre for Non-Equilibrium Processes at the Institute of Physics in Belgrade, Serbia, a large interdisciplinary group with interests ranging from theoretical, numerical and experimental studies of low temperature plasmas, to studies of positron swarms and their applications, modelling particle detectors and conducting experiments at applying plasma physics methodologies to medicine and biological applications.
As a Visiting Researcher at the Open University, Milton Keynes in 2014/15, she worked on quantum chemistry treatment of positron interactions with atoms and molecules using the UKRmol quantum chemistry software.

Prof. James Elliott (*Guest speaker*)
Joint Head of Department of Materials Science and Metallurgy
University of Cambridge;
Cambridge
UK

Professor James Elliot is Joint Head of the Department of Materials Science & Metallurgy and Professor of Macromolecular Materials Science in the University of Cambridge. He leads an internationally recognized research group on polymeric membranes, carbon nanotube fibres and composite materials. As Principal Investigator on a NERC grant "S2UPPlant: Smart Sustainable Plastic Packaging from Plants" he directs a team working on the production and characterisation of biocompostable films based on cellulosic materials for plastic packaging. He also sits on the Executive Committee of the IoP Polymer Physics Group and is the Director of the EPSRC CDT in Computational Methods for Materials Science.

Dr. Samuel Davis (*Guest speaker*)
Algreen Ltd.
London
UK

Sam obtained his PhD from Imperial College London, developing polymeric materials and holographic sensors for colourimetric biomarker detection. Prior to his PhD Sam undertook a MSc in advanced chemical sciences at the University of Liverpool, focusing on the removal of toxic intermediates and optimising the processes within organic syntheses.

HiBarFilm Open Day 2023 Workshop – Project Partners

Haydale Composites Solutions Ltd.

Web: https://haydale.com/

Haydale is a global technology solutions company that has developed a patented plasma functionalisation process to allow graphene and other nanomaterials to be used in a wide range of applications from packaging, heating products and biomedical sensors to tyres, shoes, and protective coatings. The HDPlas method is a dry, clean, and environmentally friendlier process that unlocks the properties of advanced materials to give products improved mechanical strength and increased electrical and thermal conductivity. Haydale's expertise lies in the unique plasma functionalisation of nanomaterials using patented technology. Haydale's functionalisation hub is based in a purpose-built facility in Ammanford, South Wales, designed to handle and process volume nanomaterials for a wide range of applications. Due to their unique position, Haydale has access to a large library of nanomaterials (250+), which have been analysed using their fingerprinting process to assess the quality and potential property enhancements. These nanomaterials are then functionalised using plasma functionalisation to impart covalently bonded chemical groups and species onto the nanomaterial surface.

BASF

Web: www.basf.com

We create chemistry for a sustainable future - We combine economic success with environmental protection and social responsibility. Around 111,000 employees in the BASF Group contribute to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio comprises six segments: Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care and Agricultural Solutions. BASF generated sales of €78.6 billion in 2021.

Bangor University

Web: www.bc.bangor.ac.uk/

The BioComposites Centre aims to facilitate and undertake research for innovation using bio-materials in industry. The Centre was established with the specific remit to collaborate with and provide research services for businesses. Accordingly, a significant area of their research responds to end-user demand and

focuses on exploiting the functionality of new polymers. The Centre's work is targeted at developing bio-based materials in a wide variety of applications to reduce demand for fossil fuel-based polymers. Enhancement of barrier or permeation properties of polymers is essential across a wide range of industries. Therefore, one of the primary aims of the Centre's research is improving the barrier performance of single-layer substrates whilst simultaneously retaining and increasing recyclability. Most of the research is at Technology Readiness Level (TRL) 3, sometimes reaching 4-5 as potential component polymers are developed and undergo an LCA. All research projects are collaborative and linked to industry. The centre has competitively won over £2.7m of research projects linked to packaging and has been designated as a Key Enabling Technology (KET) centre, which carries out applied research (TRLs 3-8) in technologies deemed fundamental to the UK's future technological growth. The Centre has also won awards for projects in the food packaging sector such as the Green Life award for Bread4PLA, where PLA was polymerised from waste bread. The Centre works closely through the Bio-based and Biodegradable Industries Association (BBIA), the trade association for the biopolymer sector. Through this link the centre has responded to UK Government calls for evidence, for example around the use of LCA. Recent work funded via Innovate UK includes HDT BioPol (the development of Biobased coffee cup lids for the replacement of HIPS with Wells Plastics) and SafeBioPack, (an EPSRC (Engineering and Physical Sciences Research Council) project working with Tesco and Parkside Flexibles to develop of novel packaging products with Malaysia). The Centre has experience of pilot scale production and prototyping of new packaging formats with improved functional performance such as antimicrobial surfaces. It has also developed in-house test methods that help to screen the bio-degradation profiles of new materials in their early stages of development. The Centre aims to raise awareness of the recycling properties of different materials through the development of impact case studies that show the potential for increasing recycling rates of plastics whilst retaining the necessary properties for use in businesses.

Cambridge Nanomaterials Technologies Ltd.

Web: www.cnt-ltd.co.uk

Cambridge Nanomaterials Technology Ltd (CNT Ltd) is an innovation management and nanotechnology consulting company based in Cambridge, UK. The CNT Ltd helps companies, academic and government institutions to develop world-class innovative solutions for nanomaterials related R&D and IPR strategy, partnership, products, technologies, funding and markets. CNT Ltd is specialised in carbon nanomaterials R&D consulting and collaborative R&D project management, including exploitation and dissemination management, consortium and supply chain building. CNT has done a number of patent landscaping and market research analysis studies regarding production and use of various nanomaterials helping to link inventors and technology developers with end-users and investors. The CNT Ltd is a leader of two private consortiums: **Nano-Carbon Enhanced Materials (NCEM)** and the **Advanced Materials for Additive Manufacturing (AMAM)** with members coming from leading multinational companies and research institutions. Through both private consortiums NCEM and AMAM, as well as private and public contracts, CNT Ltd has established strong relations to the aerospace, automotive, construction, electronics, materials development, biomedical and chemical industry. In March 2019 CNT Ltd opened a sister company CNT Innovation based in Brussels, Belgium, with the aim to support and complement their work, especially in European related activities.

Dunbia

Web: https://dunbia.com/

Dunbia is one of Europe's leading food companies. Founded in 1976, Dunbia is a family business and the desire to create better food naturally is the driving force behind everything they do. A combination of organic

growth, strategic acquisition & entrepreneurial vision has seen Dunbia grow into a multi-site, multi-species operation, processing cattle & sheep for national and international markets. Headquartered in Northern Ireland with 12 sites throughout the UK, a division of Dawn Meats, they are the supplier of choice to a range of leading supermarket, food service and restaurant businesses, exporting to over 50 countries, their customers value their unquestionable commitment to sustainability and quality. Employing over 5,000 people across a wide range of high-tech and multi-skilled disciplines, Dunbia is at the cutting edge of new product development, winning numerous industry awards including Meat, Poultry and Seafood Manufacturing Company of the Year 2022, Northern Ireland Food & Drink Awards 2022 Winner, World Steak Challenge Winner and numerous Great Taste Awards.

Fre-Energy

Web: www.fre-energy.co.uk/

Fre-energy specialises in anaerobic digestion and associated technologies. An established, innovative designer of on-farm anaerobic digestion systems, based in north-east Wales, we pride ourselves in providing bespoke technological solutions for the management of on-farm wastes, tailoring our installations to meet the specific needs of each agricultural setting to complement our clients core farm business. Our aim is to create an on-farm circular economy where farm wastes are used to fuel the digester thereby producing useable energy for on-farm/local use and a high-quality nutrient-rich digestate used as a soil conditioner to optimise crop growth. We passionately believe that an on-farm AD facility is about environmentally positive and sustainable agriculture rather than a farm becoming a rural power station.

Parkside Flexibles

Web: www.parksideflex.com

Parkside is an innovative packaging solutions provider specialising in compostable, recyclable, paper-based, and innovative plastic flexible packaging solutions for consumer-packaged goods including food, personal & household care, and tobacco sectors. Established for over 40 years, the company is a global supplier with manufacturing sites in both the UK & Asia and is headquartered in Normanton, West Yorkshire.

Wells Plastics

Web: https://wellsplastics.com/

Wells Plastics is a specialist additive masterbatch and bespoke compound manufacturer based in the heart of the UK, with a strategy to continue to develop tailor made solutions and technically advanced masterbatches and compounds for the polymer industry. Established in 1984, Wells has become a major supplier to the polymer industry within the film, fibre, sheet, profile extrusion and moulding marketplaces. Recent significant investment and expansion, in response to the continued growth and demand for Wells Plastics products and services both locally and internationally, included the installation of two new state-of-the-art twin-screw compounding lines, creating extra capacity and functionality. This significant expansion was in response to the continued growth and demand for Wells Plastics products and services both locally and internationally. Wells has a wealth of experience in collaborative research and development having been involved in several IUK/EU projects, both as Lead and Collaboration Partners, in diverse applications such as food packaging, barrier compounds, agricultural films, high temperature biopolymer compounds and medical implants. The company is ISO9001/ISO14001 and has achieved a Silver EcoVadis rating.

HiBarFilm Open Day 2023 Workshop – External Participating Organisations

UKRI's Smart Sustainable Plastic Packaging (SSPP)

Web: www.ukcpn.co.uk/focus-area/smart-sustainable-plastic-packaging-sspp

UKRI's Smart Sustainable Plastic Packaging (SSPP) Challenge is the largest and most ambitious UK government investment to date in sustainable plastics packaging research and innovation. Since its inception in 2020, SSPP has deployed almost £60m of public funding – and leveraged over £149m of private money – to support bold, ambitious innovation to deliver a step change in the UK's ability to reduce, reuse and recycle plastic packaging waste.

The Co-op

Web: www.co-operative.coop

We're one of the world's largest consumer co-operatives, owned by millions of members. We're the UK's fifth biggest food retailer with more than 2,500 local, convenience and medium-sized stores.

We're also:

- the UK's number 1 funeral services provider
- a major general insurer
- a growing legal services business

As well as having clear financial and operational objectives and employing nearly 70,000 people, we're a recognised leader for our social goals and community-led programmes. We exist to meet members' needs and stand up for the things they believe in. So, the more successful we are, the more we can give back to you and your local community.

Algreen Ltd

Web: www.algreen.tech/

Algreen is a biotech company focusing on the development of sustainable and biodegradable solutions based on algal products.

Algreen is developing alternative products to replace plastics and harmful to the environment unsustainable fossil-based products used in the majority of industries such as cosmetics, packaging and labelling, fashion, agriculture and many more.

University of Cambridge

Department of Materials Science & Metallurgy
Web: www.msm.cam.ac.uk

The **Department of Materials Science and Metallurgy** is a major player in research and teaching of material science. Our work is closely linked with the needs of industry, government, and society in areas of material challenges such as energy, health, ICT and aerospace.

Our department, part of the School of Physical Sciences, hosts around 100 research fellows, postdoctoral scientists and visiting scientists, over 140 postgraduate students, and around 30 academic staff.

Pulpex

Website: www.pulpex.com

Pulpex is a proven, patented and scalable packaging technology company ready to be deployed globally and promising to herald in an exciting and greener future.

Novartis Pharma (CH)

Web: www.novartis.com

Novartis is reimagining medicine to improve and extend people's lives. As a leading global medicines company, we use innovative science and digital technologies to create transformative treatments in areas of great medical need. In our quest to find new medicines, we consistently rank among the world's top companies investing in research and development. Novartis products reach nearly 1 billion people globally and we are finding innovative ways to expand access to our latest treatments. About 125 000 people of more than 140 nationalities work at Novartis around the world.

University of Strathclyde - Computational Interfacial Engineering

Web: http://personal.strath.ac.uk/karen.johnston/

We model a range of materials including sustainable plastics, polymer thin films and composites, molecular crystals, solid-liquid interfaces and oxide materials. In these systems the interfacial properties are crucial in understanding and controlling the system, for example, heterogeneous crystal nucleation of polymer or small molecule systems. We enjoy collaborating with experimentalists and industrial partners and we apply multiscale simulations to gain knowlegde on how to improve materials and their properties. We have a broad interest in materials science and engineering, and have pursued some curiosity-driven science including our work on curdling of soy milk, which we also delivered as an outreach activity. If you are interested in talking to us and potentially collaborating please get in touch.

Haleon

Web: www.haleon.com

A consumer health company that puts people first, we exist to deliver better everyday health with humanity.

We are a world-leading consumer health company. Our leading brands are built on science, innovation and human understanding and are trusted by millions of consumers globally.

one • five

Web: www.one-five.com

one.five is a biomaterials research, development and scale-up company, providing circular, cleaner and tailor-made packaging solutions in record time and with measurable impact to the consumer packaged goods industry.

YIOTIS S.A.

Web: http://www.jotis.gr/en/

YIOTIS S.A. was founded in 1930 as the first infant and baby food producer in Greece. Today, the company remains 100% Greek and employs 377 employees developing a wide range of products including, baby food and infant formula, fortified products, confectionary and cooking mixes, baking products, chocolates, refrigerated RtE products, low Glycaemic Index desserts, powder mixes for instant desserts, syrups, glazes, toppings, dessert kits and many more. YIOTIS S.A. has played an integral role in the history and evolution of the Greek diet, and still continues to innovate. The company meets the needs of the whole family, with a rich variety of innovative products that make them the homemaker's "right hand" when it comes to cooking and baking at home. In addition to this, it has been steadily playing its part in strengthening the Greek economy by consistently implementing its investment plans. In 2012, the company invested in acquiring a new warehouse in Mandra, Attica, with a total area of 10,000 sq. m. and capacity for 9,000 pallet stacks. In 2015, YIOTIS S.A. continued its steady investment plan in Greece and completed the construction of its new factory in Agrinio, with a total area of 10,000 sq. m. In 2017 the construction of new company facilities was completed. These 1,350 sq. m. facilities house the "Hellenic Research and Innovation Center" (HRIC), which is a state-of-the-art Institute of food safety accredited according to ISO/IEC 17025 that offers high quality chemical, microbiological, molecular and consultation services to the food industry. At the same time, the company is dynamically strengthening its presence in foreign markets in all five continents. Since 1990 YIOTIS S.A. has participated in more than 20 research projects funded by the Greek Ministry for Development and the EU regarding new product development and food safety, environmental actions and development of industrial & analytical technologies.

Echo Packaging Limited

Web: www.echopackaging.co.uk

100 employees, The extruding and blowing of LDPE (virgin or post-consumer recycled); HDPE(virgin or post-consumer recycled); PVOH and PET to produce film into a reeled format. The flexographic printing (single sided and double sided) slitting, rewinding of LDPE; HDPE; PVOH and PET into a reeled format. The punching, forming, and sealing and the application of hot melt adhesive tape of LDPE; HDPE; PVOH and PET films (plain or printed) to produce bags for food and consumer products (contact and non-contact).

Ourobio

Web: www.ourobio.com

Ourobio is a young synthetic biology and circular economy company. We develop engineered microorganisms to turn industrial byproducts into low-footprint, performance-enhancing biopolymer additives.

Ourobio began as Transfoam, an iGEM research project at the University of Virginia in early 2019 and was spun out in March 2020. Our founders have been working on Ourobio since its inception and have aligned

our personal commitments to ocean sustainability and preservation of the outdoors with our company's commitments to industry and the environment.

In June of 2021, we started building our first rudimentary lab space on the Downtown Mall in Charlottesville, Virginia. In October 2022, we moved into a shared space in the Indiana Bioscience Research Institute in Indianapolis!

Bimbo Bakeries USA

Web: www.bimbobakeriesusa.com

Bimbo Bakeries USA is part of Grupo Bimbo, the world's largest baking company with operations in 32 countries. Bimbo Bakeries USA employs 20,000 associates across the U.S. in bakeries, sales centers, corporate offices and on sales routes to ensure our consumers have the freshest products to feed their families at every meal. But our associates come to work for much more – the chance to feed their own lives through exciting work that offers the opportunity to make a real difference in their professional and personal lives every day.

Queen Mary University of London

Web: www.qmul.ac.uk

Queen Mary University of London is a leading research-intensive university with a difference. Its history dates back to 1785 and beyond, with each of its four founding institutions established to provide "hope and opportunity" to under-represented members of society.

University of South Wales

Web: www.southwales.ac.uk

Founded by industry and the professions, the **University of South Wales**, with more than 30,000 students is one of Britain's most exciting new universities and a major player in higher education. It attracts a cosmopolitan mix of students from more than 120 countries and all backgrounds.

Within the UK, USW is unique in the breadth of its role, encompassing a modern university and two subsidiaries in Wales's national conservatoire, the Royal Welsh College of Music & Drama, and The College Merthyr Tydfil.

The University offers a full range of qualifications from further education level to degrees and PhD study. As a major university it delivers the full range of STEM subjects, from engineering and mathematics to computing and surveying, as well as being an experienced provider of teacher training courses.

The University is renowned for its partnerships with major employers, from British Airways to the National Health Service. Its relationship with employers as a leading university for careers is reflected in the high employment rate of its graduates, with 94% of students in employment or further study within six months of graduating.