

CAMBRIDGE CENTRE FOR CIRCULAR ECONOMY APPROACHES TO ELIMINATE PLASTIC WASTE**PROGRAMME FORUM #1**

Location: Maxwell Centre, JJ Thomson Avenue, Cambridge CB3 0HE

Date: 14 February 2019

Time: 14:00 – 17:30, with networking drinks till 18:30

Registration Required For This Event

I. Welcome

Dr Peter Hedges, Head of University Research Office, University of Cambridge

II. Introduction to the UKRI Programme

Dr Nick Cooper, Senior Portfolio Manager (Circular Economy) - Manufacturing the Future, Engineering and Physical Sciences Research Council (EPSRC)

III. Introduction to the Cambridge Centre for Circular Economy Approaches to Eliminate Plastic Waste

Programme Overview: Prof Erwin Reisner, Department of Chemistry

Work Package 1: Sustainable feedstocks and materials, Prof Paul Dupree, Department of Biochemistry

Work Package 2: Manufacturing and recycling processes, Dr Adrian Fisher, Department of Chemical Engineering and Biotechnology

Work Package 3: Tracking plastics material flows, Dr Ronan Daly, Department of Engineering & Dr David Aldridge, Department of Zoology

Work Package 4: Waste and management, Dr Brigitte Steger, Faculty of Asian and Middle Eastern Studies

Coffee / Tea Break**IV. Cambridge Cleantech**

Stephen Bates, Chairman, Cambridge Cleantech Waste Management & Recycling SIG

V. The Cambridgeshire and Peterborough Waste Partnership (RECAP)

Dr Bryony Rothwell, RECAP Partnership Manager, Cambridgeshire County Council

VI. Resources and Waste Strategy for England

Tom Pye, Team Leader, Resources & Waste Strategy at Department for Environment, Food and Rural Affairs (DEFRA)

VII. Quick Fire University of Cambridge PhD and Post-Doctoral Researcher Talks**VIII. UK Circular Plastics Network**

Dr Sally Beken, Knowledge Transfer Manager, Polymers, Innovate UK Knowledge Transfer Network

IX. How to Get Involved and Next Steps

Prof Erwin Reisner, Department of Chemistry

Post Meeting Networking and Drinks

CAMBRIDGE CENTRE FOR CIRCULAR ECONOMY APPROACHES TO ELIMINATE PLASTIC WASTE

The Cambridge Centre for Circular Economy Approaches to Eliminate Plastic Waste is a UKRI funded programme. The Centre acts as a nucleus for a global network of partners and coordinates a range of research projects, workshops and a forum to tackle contemporary challenges from the manufacturing of more sustainable materials to driving innovations in plastic recycling.

Between January 2019 and July 2020, the Centre will support a series of research projects and workshops to support multi-disciplinary engagement on the following themes:

- Sustainable feedstocks and materials
- Manufacturing and recycling processes
- Tracking plastics material flows
- Waste and management

ABOUT THE TEAM

The activities of the Centre are managed by a multi-disciplinary team of academics:

PROF ERWIN REISNER (PRINCIPAL INVESTIGATOR)

DEPARTMENT OF CHEMISTRY

My laboratory has recently demonstrated the feasibility of solar reforming of natural biomass (lignocellulose) and synthetic organic polymers (plastics) to generate clean hydrogen and a mixture of organic products. This ambient-temperature technology stands out as it only requires a suitable photocatalyst, water, sunlight and a suitable substrate such as waste plastics. My laboratory's long-term goal is to combine renewable energy generation and sustainable chemical synthesis with environmental remediation to tackle the two contemporary global challenges of plastic and energy.

Erwin Reisner is the Professor of Energy and Sustainability

<http://www-reisner.ch.cam.ac.uk/>

Email: er376@cam.ac.uk

DR DAVID ALDRIDGE

DEPARTMENT OF ZOOLOGY

I am a freshwater ecologist with a strongly applied focus in environmental management. I lead the Aquatic Ecology Group which focuses on the sustainable management of global freshwater ecosystems. I work closely with the UK water industry and in 2015 I published the first review on microplastics in fresh water. I have a specific research interest in developing tools for testing and characterising microplastic pollution, and also on the use of biological systems for the effective removal and monitoring from freshwater outfalls.

David Aldridge is a Senior Lecturer in Aquatic Ecology

<https://www.zoo.cam.ac.uk/directory/david-aldridge>

Email: da113@cam.ac.uk

PROF JEREMY BAUMBERG, FRS

DEPARTMENT OF PHYSICS

My research focuses on materials sustainability and the nano-assembly and scale-up of functional materials. Activities include low cost instrumentation via 3D printing, deformable materials, polymer-nanoparticle composites, and molecular sensing. One of my projects in the area of plastic waste and sustainability focuses on building scientific instruments cheaply using plastic waste to make plastic parts with 3D printers. This approach could make a big difference in developing countries. The aim is to create high-value locally-produced components using low-value waste, to enable a cost model for technology development and entrepreneurship.

Jeremy Baumberg is Professor of Nanoscience

<https://www.np.phy.cam.ac.uk/>

Email: jjb12@cam.ac.uk

DR JONATHAN CULLEN**DEPARTMENT OF ENGINEERING**

I lead the Resource Efficiency Collective, in the Engineering Department. My work focuses on understanding the consequences of materials production including plastics. I was a co-author of the book *Sustainable Materials: with both eyes open*, which pioneered the concept of material efficiency for energy-intensive industries, including plastics manufacture. This work includes understanding the global production and recycling rates for plastics. My approach is to apply engineering rigour and evidence based analysis to the current circular economy debate, and suggest physical circularity metrics for use with materials.

Jonathan Cullen is a University Lecturer in Energy, Transport and Urban Infrastructure

<http://reffiency.eng.cam.ac.uk/>

Email: jmc99@cam.ac.uk

DR RONAN DALY**DEPARTMENT OF ENGINEERING**

My research focuses on understanding fluids, colloids and interfaces to support the development of the next generation of production processes for personalised medicine, biosensing, functional coatings and inkjet printing. We tackle the complex fluid flow and functional material challenges and deliver the science to enable scale-up to real manufacturing. I have a particular interest in technologies that allow us to label and track plastic, with a view to measuring the success of trying to move to a circular economy by tracking the full use to re-use or recycling path.

Ronan Daly is a University Lecturer in the Science and Technology of Manufacturing

<https://www.ifm.eng.cam.ac.uk/research/fiam/>

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PROF PAUL DUPREE**DEPARTMENT OF BIOCHEMISTRY**

I have a specific interest in sustainable applications of plant carbohydrates. Specifically, woody plant materials, the most abundant biological material on earth, are used for paper and card packaging but there is potential to improve the properties and widen the applications. In addition to fundamental research on plant biochemistry I have worked on applications including the development of low-calorie plant carbohydrate ingredients that replace sugar in food, and enzymatic modification of plant material to improve plant material utility for applications ranging from building materials to transport fuels.

Paul Dupree is Professor of Plant Biochemistry and Cell Biology

<https://www.bioc.cam.ac.uk/dupree>

Email: pd101@cam.ac.uk

PROF JAMES ELLIOTT**DEPARTMENT MATERIAL SCIENCE & METALLURGY**

I lead a research group studying polymeric membranes, carbon nanotube fibres and composite materials. My work frequently employs state-of-the-art computational modelling to complement experimental studies. I have a particular interest in the controlled synthesis of new polymer architectures, combined with advanced microstructural characterisation (including modelling) to generate a new class of materials which are easy to recycle by design, and degrade in a predictable and controllable fashion to reduce impact on the environment.

James Elliot is Professor of Macromolecular Materials Science

<https://www.mml.msm.cam.ac.uk/>

Email: jae1001@cam.ac.uk

DR ADRIAN FISHER**DEPARTMENT CHEMICAL ENGINEERING AND BIOTECHNOLOGY**

I lead the Electrochemistry and Microengineering Group. I have a specific interest in using enzymatic biodegradation to degrade plastic waste into products that have the potential to be used to power microbial fuel cells for the generation of electricity. This research builds on an existing programme of research into microbial fuel cells and biophotovoltaics and their integration with biodigesters and bioremediation reactors for waste treatment generating electricity, hydrogen and biomass.

Adrian Fisher is a Reader in Electrochemistry

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I am the Director of the Circular Economy Centre at the Judge Business School, with interests ranging from corporate to entrepreneurial finance. In the area of circular models and economy my research focuses on how organisations in different sectors across the value chain can integrate disruptive technology and design business models that are based on longevity, renewability, reuse, repair, upgrade, refurbishment, serviceability, capacity sharing, and dematerialisation. I aim to support both companies and governing bodies to see practical business cases and business models in action.

Khaled Soufani is Director of the Circular Economy Centre and the Executive MBA Programme

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My work focuses on the cultural history and anthropology of daily life, including notions of cleanliness and waste disposal. I am interested in how the use and disposal of plastic are embedded in the everyday lives of consumers. I ask how people's plastic use and recycling habits are influenced by the legal and procedural systems of waste collection/recycling and their values, lifestyles and understanding of natural and social environments. Comparing the UK, Japan and Uruguay, I use a variety of qualitative research methods to examine what factors influence citizens to eliminate household plastic waste, such as time, costs, hygiene, convenience and propriety.

Brigitte Steger is a Senior Lecturer in Japanese Studies

<https://www.ames.cam.ac.uk/people/dr-brigitte-steger>

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CENTRES SUPPORTING OUR ACTIVITIES

In addition to the academic team, the Centre for Circular Economy Approaches to Eliminate Plastic Waste is supported by the following groups which are providing support for its activities:

ENERGY@CAMBRIDGE IRC

We are a University wide Interdisciplinary Research Centre linking the activities of researchers across 30 departments and faculties working on all aspects of energy-related research. Our aim is to leverage the University's expertise to tackle technical and intellectual challenges in energy, integrating science, technology and policy research. We co-ordinate the activities of the Cambridge Centre in Circular Economy Approaches to Eliminate Plastic Waste and provide support for the development of new collaborations and partnerships.

Email: Isabelle.deWouters@admin.cam.ac.uk

<https://www.energy.cam.ac.uk/>

CENTRE FOR CIRCULAR ECONOMY

We focus on circular economy, circular business models and their application, as well as the policy and business contexts within which they operate. The Centre's research proposition involves deep engagement in order to achieve impact via interaction with organisations and enterprises, and their management challenges. We are supporting the Cambridge Centre in Circular Economy Approaches to Eliminate Plastic Waste to deliver business impact through its research activities and the Forum.

Email: lara.allen@centreforglobalequality.org

<https://centreforglobalequality.org/>

CENTRE FOR GLOBAL EQUALITY (CGE)

CGE works to evolve innovative solutions to global challenges with a focus on problems that undermine the wellbeing of the poorer half of the world's population. We facilitate collaboration between business, government, academia and civil society, drawing particularly on capacity in the University of Cambridge and companies in the Cambridge Cluster. We support the Cambridge Centre in Circular Economy Approaches to Eliminate Plastic Waste by enabling inclusive innovation to enhance the impact of the Centre's activities in low and middle income countries.

Email: lara.allen@centreforglobalequality.org

<https://centreforglobalequality.org/>

CENTRE FOR SCIENCE AND POLICY (CSAP)

CSaP works to improve public policy by creating opportunities for public policy professionals and academics to learn from each other. Through our activities we help researchers from all disciplines to contribute more effectively to society. We are working with the Cambridge Centre in Circular Economy Approaches to Eliminate Plastic Waste to help them explore the policy implications of their research and facilitate their engagement with policy makers.

Email: Nicola.buckley@csap.cam.ac.uk

<http://www.csap.cam.ac.uk/>

CAMBRIDGE INSTITUTE SUSTAINABILITY LEADERSHIP (CISL)

CISL is a globally influential Institute developing leadership and solutions for a sustainable economy. We believe the economy can be 'rewired', through focused collaboration between business, government and finance institutions, to deliver positive outcomes for people and environment. For over 3 decades we have built the leadership capacity and capabilities of individuals and organisations, and created industry-leading collaborations, to catalyse change and accelerate the path to a sustainable economy. We are working with the Cambridge Centre in Circular Economy Approaches to Eliminate Plastic Waste to explore and communicate the implications for business and policy.

Email: Beverley.Cornaby@cisl.cam.ac.uk

<https://www.cisl.cam.ac.uk/>

BRITISH ANTARCTIC SURVEY (BAS) - AURORA INNOVATION CENTRE

At BAS's Aurora Innovation Centre we focus on creating new connections that lead to cross-disciplinary breakthroughs, addressing issues of global importance and helping society adapt to a changing world. We support partnerships focused on research and entrepreneurial activity in a range of areas including environmental stewardship. BAS has a specific interest in reducing and mitigating ocean plastic pollution. We have partnered with the Cambridge Centre in Circular Economy Approaches to Eliminate Plastic Waste to support impact through venture training activities.

Email: beatrix@bas.ac.uk

<https://www.bas.ac.uk/aurora/>

FOUNDING PROJECT PARTNERS

The Cambridge Centre for Circular Economy Approaches to Eliminate Plastic Waste was established in partnership with:

Cambridge Cleantech <http://www.cambridgecleantech.org.uk/>

The Cambridgeshire and Peterborough Waste Partnership (RECAP) <https://www.recap.co.uk/about-recap/>

QUICK FIRE UNIVERSITY OF CAMBRIDGE PHD AND POST-DOCTORAL RESEARCHER TALKS

Dr Patrick O'Hare, Department of Social Anthropology

Email: po260@cam.ac.uk

Title: Plastics out of place? Rematerialising waste in anthropology

Dr Curie Park, Institute for Manufacturing

Email: cp538@cam.ac.uk

Title: Systematic Creative Waste innovation for Circular Economy Entrepreneurship and the Restorative Future

Dr Pratheeba Vimalnath, Institute for Manufacturing

Email: pv302@cam.ac.uk

Title: Why Intellectual Property (IP) matters for sustainability transitions and circular economy?

Taylor Uekert, Department of Chemistry

Email: tmu22@cam.ac.uk

Title: Plastic waste as a feedstock for solar-driven hydrogen generation

Denis Niedenzu, Department of Engineering

Email: dtn23@cam.ac.uk

Title: Transforming from single use plastic packaging to multiple use of plastic packaging

Lucia Corsini, Institute for Manufacturing

Email: lc500@cam.ac.uk

Title: Upcycling plastic waste into valuable building materials in rural Kenya

Sarah Foster, Department of Physiology, Development and Neuroscience

Email: skf25@cam.ac.uk

Title: Monitoring plastic pollution with drone-based multispectral imaging

CONTACTS

To get involved in this new activity visit our website https://www.energy.cam.ac.uk/Plastic_Waste

Or email: energy@admin.cam.ac.uk



DR BRYONY ROTHWELL (RECAP PARTNERSHIPS MANAGER, CAMBRIDGESHIRE COUNTRY COUNCIL)

I have a background of working in Local Government for over 20 years, which started in the Environmental Department at Hertfordshire County Council as a Public Rights of Way Officer. After 5 years working in Public Highways, I moved across to the Waste Management Team. I work as the Programme Manager for the Hertfordshire Waste PFI Programme running a negotiated procurement for a long term waste treatment solution.

I currently work with the 5 District Councils, Peterborough City Council and Cambridgeshire County Council to develop and broaden the joint waste working in the two tier area. This involved securing and operating joint contracts, promoting and campaigning to improve the public's engagement with the waste hierarchy as well as driving the strategic direction of the Waste Partnership.

Email: Bryony.Rothwell@cambridgeshire.gov.uk



TOM PYE (TEAM LEADER, RESOURCES & WASTE AT THE DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS (DEFRA))

I lead the team responsible for delivering and implementing the Government's Resources and Waste Strategy, and coordinating domestic policy on eliminating plastic waste. I previously worked in the Defra Chief Scientific Advisor's office where I led work to improve scientific capability across the Defra-group. Before joining Defra I worked at the Department for International Development (DFID) where my role focused on evaluating the impact of UK overseas development assistance.

Prior to joining the civil service I studied for a BSc in Environmental Science at the University of Birmingham, including a year in industry at the Cawthron Research Institute in New Zealand, and for an MSc in Environmental Monitoring, Modelling and Management at King's College London, where my dissertation explored population dynamics under environmental change.

Email: Tom.Pye@defra.gov.uk



STEPHEN BATES (CHAIRMAN, CAMBRIDGE CLEANTECH WASTE MANAGEMENT & RECYCLING SPECIAL INTEREST GROUP)

I am a behaviour change communications expert and co-founder of EnviroComms, working in the global waste management, sanitation and economic development sectors. Since 2003, I have supported over 150 local authorities across the UK in supporting the introduction of kerbside recycling as well as promoting other positive, waste related behaviours. It's estimated that over half of UK households have in some way been influenced by the work me and the EnviroComms team.

I have also worked in over 20 countries working on internationally financed projects supporting waste sector reform in post-conflict, low income and emerging economic regions through the development of public participation and awareness policies and supportive measures. I am a regular contributor to thought leadership programmes and am the Chair of the Waste Management Special Interest Group at Cambridge Cleantech.

Email: stephenb@envirocomms.com



DR SALLY BEKEN (KNOWLEDGE TRANSFER MANAGER, POLYMERS, INNOVATE UK, KNOWLEDGE TRANSFER NETWORK)

I lead the UK Circular Plastics Network which is funded by UKRI. I hold a doctorate in polymer technology, and sustainability is core to both my work and home life. My technical expertise ranges from fundamental polymerisation and depolymerisation to developing polymer formulations to meet Kyoto protocol requirements to reduce the hole in the ozone layer. I am a keen personal and business based re- and up-cycler, and can't stand waste. I have nearly 30 years' experience of R&D and innovation in the polymer industry and have been networking in the UK polymer sector for over 20 years. I am passionate about bringing together the right

individuals and organisations in the circular economy space. I facilitate running workshops and events to build collaborations to access public funding for both companies and academia. I love informing stakeholders of future initiatives that can help them capitalise on innovations to reduce our waste plastic.

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