

# Plastics in the Ocean: Challenges and Solutions



Report of a BAS-CCI workshop held on 7<sup>th</sup> March 2018  
at Aurora Innovation Centre at the British Antarctic Survey, Cambridge

Report compiled and edited by Rachel Cavanagh and Claire Waluda



**British  
Antarctic Survey**  
NATURAL ENVIRONMENT RESEARCH COUNCIL



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## **Plastics in the Ocean: Challenges and Solutions - Panel Discussion: Regulatory and Policy Solutions**

**Aurora Cambridge  
British Antarctic Survey  
7 March 2018**

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With around eight million tonnes of plastic entering our oceans each year, recent estimates suggest that there will be more plastic than fish in the sea by 2050. Its presence on shorelines, in surface waters and in the deep ocean, poses a significant threat to global marine ecosystems, even in the remote Polar Regions. Due to their breakdown in the environment, plastics can interact with marine life both physically and chemically. Physically, larger plastics can cause entanglements and obstructions and in their smallest form they can be easily consumed by organisms at the base of the food chain. Chemically, plastics have been shown to readily absorb other toxic pollutants in the ocean and are often manufactured with additives which can increase their toxicity. This has implications for marine life, including commercial fish and shellfish species which ultimately may pose a threat to human health.

Marine sampling efforts, increasing media awareness through series like BBC Blue Planet II and scientific research on the damaging effects of plastics in the ocean have highlighted the extent of the problem, have led to direct action by governments and industry to restrict the use of specific plastic items such as microbeads, bags, cotton buds and straws, and have catalysed ambitious commitments in the UK and beyond to phase out the use of non-essential plastics (e.g. the UK and Vanuatu are leading the Commonwealth Clean Ocean Alliance). Much relevant research and progress is underway, but effectively addressing ocean plastic pollution requires a multi-disciplinary approach with engagement from a range of sectors. The aim of this event was to bring together representatives from business, non-governmental organisations (NGO), science and policy sectors to collectively explore solutions for reducing and mitigating ocean plastic pollution.

Through presentations, panel discussions and innovation showcases this workshop aimed to:

- Facilitate knowledge exchange in order to identify/highlight gaps and future actions required;
- Generate solutions-driven networking to identify opportunities for collaboration.

The morning session (see Appendix for the full agenda), which took the form of invited presentations highlighting the key issues and how business, NGOs and the science community are responding, is summarised in Part 1 of this report. The lunchtime “Solutions Showcase” provided an opportunity for short presentations and demonstrations on avoiding single-use plastic; reducing marine plastic pollution; and general underpinning of solutions. The afternoon session took the form of an expert panel discussion focused on regulatory and policy solutions and is summarised in Part 2 of this report.

## **PART 1**

### **1.1. Welcome and Introduction**

#### ***Overview & outline of the workshop – Professor Jane Francis, Director, British Antarctic Survey (BAS)***

Plastics are found around the world including at both poles - no environment is still “pristine”. Plastic pollution is a truly “global” issue, recently highlighted by Blue Planet II and Sir David Attenborough. Scientists at BAS have been dealing with the effects of plastics on wildlife in Antarctica over the last three decades, including removing plastics entangled around marine mammals (particularly Antarctic fur seals) and seabirds, and assessing levels of plastic ingested by albatrosses and regurgitated to feed their chicks. The purpose of this meeting is for us to collectively explore solutions to address this growing global problem.

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#### ***Zero plastic waste – Professor Duncan Wingham, Executive Chair, Natural Environment Research Council (NERC)***

Plastics play a vital role in our lives: they combine low cost with high versatility and functionality – for example as packaging to contain and protect perishable or valuable products. However, plastic waste is a growing environmental, social and economic issue. Business, consumers and government recognise it is now time to re-invent the UK plastics economy to create a more productive system where plastics never become waste and where the UK is well-placed to exploit the economic opportunities a circular economy for plastics can bring. To achieve this NERC, in partnership with Research Councils across UK Research and Innovation (UKRI), is working with leading businesses from across the plastics supply chain to bring the best research and innovation to bear on solutions to move to zero plastic waste. This includes looking at potential £ multi-million funding through the UK Industrial Strategy Challenge Fund.

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### **1.2. Issues & Innovation Solutions – Chair, Professor Hans Jensen, UK Water Industry Research (UKWIR)**

#### ***Marine litter: are there solutions to this global environmental problem? - Richard Thompson, University of Plymouth***

Marine debris is a growing environmental problem. It is widely distributed at the sea surface, on the sea bed and on shorelines. Around 75% of this litter is plastic, with other materials such as glass and metal representing only a small proportion. Around 700 species are known to encounter marine litter, with many reports of physical harm resulting from entanglement in and ingestion of plastic. It is widely acknowledged that plastic litter does not belong in the ocean. It is also clear that the numerous societal benefits that are derived from everyday use of plastics can be achieved without the need for release of plastic waste to the environment. Around 8% of world oil production is currently used to make plastic items and there is recognition that we need to change the way we produce, use and dispose of plastic items. In this regard a solution to two major environmental

problems, our non-sustainable use of fossil carbon (to produce plastics) and the accumulation of marine litter probably lie in utilizing end-of-life plastics as a raw material for new production.

Q&A:

Q) What is the international appetite to address the plastic problem given that this is a global issue?

A) Yes, there is international interest, for example there is the UKRI Global Challenges Research Fund to look at this internationally. The situation varies greatly in different countries and regions. For example, in the Far East, the use of plastic per citizen is low but the waste management is low. In the USA, the waste produced per capita is high but management is better. Europe, the USA and other developed nations are huge contributors to global plastic litter and as such have a responsibility to address the wider problem. From the UK perspective, we need to focus in detail on our system not least because, with over 2.7 million tonnes of plastic waste exported to China and Hong Kong since 2012, we are part of the global problem.

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***SKY Ocean Rescue and the business transformation commitment on single-use plastic - Giles Harvey, Director of Products and Supply, SKY Ocean Rescue***

The SKY Ocean Rescue Campaign was launched in January 2017 and aims to raise awareness and engage the public to avoid single-use plastics. Main aims: (1) Remove all single-use plastic from the business by 2020 (the first Financial Times Stock Exchange 100 Index (FTSE100) company to make such a commitment); (2) Invest in an innovation fund to help companies find new solutions that will help turn off the “plastic tap”; (3) Work with the World Wide Fund for Nature (WWF) to safeguard Marine Protected Areas across Europe’s oceans. The priority is to remove single use plastic or replace it. Recycling is only an option if it can be 100% audited and accounted for. Thousands of tonnes of plastic will be removed over the next few years. Achieving this business transformation commitment spans a global supply chain starting with the logistics of component deliveries into factories through to how products are delivered to customers.

Q&A:

Q1) Given that criteria for purchasing new innovations are challenging, and there is a race for the best price, how is SKY approaching this? Is SKY taking this into account? How do you score economic costs compared to sustainable costs?

A) Quality comes before cost. There has been a change in evaluation criteria, with questions such as “Is this a company we want to work with?” and “Are they ethically sound?” These sorts of questions are being asked first before thinking about cost.

Q2) What insights do you have into logistical challenges?

A) Our logistics partner has been in discussions with our supply chain partners to look for alternative solutions. We also have to take account of the cultural differences in different regions, where the thinking may not be as mature on these issues. However, we are making good progress across the supply chain including China where we are working with our packaging suppliers on new solutions to protecting our products.

Q3) Have you come across examples of any unintended consequences so far e.g. something that seems “good” but turns out to be “bad” such as some uses of biodegradable plastics?

A) We haven’t done anything that we regret. Regarding biodegradable plastic, we have avoided that as a solution because we want to keep it simple for our customers and remove any possibility for confusion. Our premium products do use plastic to protect them, but we are confident we can find alternative single use plastic free solutions for all of our products. Indeed, we have launched three new products in the last six months that do not contain any single use plastic in the packaging.

Q4) How can commercial entities can get a good “score” or some kind of recognition for good practice and how might this be approached by other businesses? Is there a certification scheme?

A) We think this is a good idea, but we are not currently aware of any. It would be good to have something similar to the Marine Stewardship Council certification. There is nothing specific with regard to plastic although we do have the Economy for the Common Good (ECG), which measures not just plastic but numerous environmental and human wellbeing considerations. Good environmental practice = good business practice.

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***Bioaccumulation and biological effects of micro- and nano-plastics – Professor Tamara Galloway, Exeter University***

Contamination of the aquatic environment with microplastics is a conservation issue of high concern. This presentation provided an overview of our research into the ecotoxicology of micro- and nano- plastics, and their surface interactions in natural waters, using state of the art bio-imaging approaches. This is critically important for understanding environmental fate and behaviour, including biofouling, aggregation and movement through organisms following ingestion, all of which can influence the toxicity of microplastics to cells and tissues. This knowledge forms a basis for toxicological risk assessment and offers the exciting potential for positive intervention e.g. through manipulating aggregation via selective biomolecule binding, or through improved design of biodegradable or recyclable plastic.

Q&A:

Q1) Do different types and sizes of microplastics interact differently with marine organisms?

A) Yes, they do interact differently and we are in the process of investigating this further.

Q2: Are there any similar investigations on humans? Are plastics causing tumours?

A) We don’t have evidence of plastics causing harm to humans or causing tumours, but we are planning to investigate this further.



***Are there marine plastics solutions in many sectors? - Rowan Byrne, Mott McDonald***

Mott McDonald (MM) is a global management, engineering and development consultancy with ~16,000 employees - across many sectors - including environmental scientists and ecologists. We are working with our clients and other stakeholders to help address the issue of marine plastic pollution. Our teams are focusing on solutions and pooling resources while supporting public awareness and our clients' evolving needs in managing their own plastic footprint. There is a huge opportunity for innovative and collective thinking. A multi-sectoral approach can help create solutions. We need to think about where solutions may lie, but also how connections can be made to bring the ideas to fruition by partnerships between industry and science. Some solutions are in plain sight – e.g. waste water screening shows what is being brought in from the catchment/sewage system (thus providing data) and can be used to intercept and remove objects of varying sizes. There are infrastructure costs and challenges but this is a “quick win” in terms of being able to intercept plastics before they have a chance to enter the system. We are taking this to clients e.g. water companies. Internally, we are introducing commitments to reduce single use plastics such as “Plastic Month”. We are asking our employees for solutions as well as looking at supply chain and incorporating clients.

Note: there is an upcoming conference held by MM & Tideway London: “Marine Plastics – can we already solve it?” (17th May 2018) which involves industry experts and entrepreneurs discussing practical responses to plastic pollution including: products and services; innovation and technology; and research and development.

Q&A:

Q) How hard is it to engage senior executives and achieve uptake of the issues throughout your organisation?

A) Big wheels move slowly! We do get asked if there is a financial return but there is also acceptance that we need to do the “right thing”. The issue has gained a lot of traction since our first plastic conference last year. Yes, it’s a challenge but we are making progress.

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***Industry working together with all stakeholders to prevent litter and waste entering our oceans - Barry Turner, British Plastics Federation (BPF)***

This presentation summarised some of the ways in which industry has pledged to work together to identify changes that need to be made and best practice interventions that need to be implemented to stop the flow of litter and waste into our oceans. Marine litter is a global problem, but 88-95% of plastic in the ocean comes from just 10 rivers. The problem in the developing world arises from the lack of waste management systems but in the developed world from the careless disposal of packaging and the ‘on the go’ society. Additionally, waste lost at sea from fishing or transportation is a global issue. A BPF Marine Litter Event was held in February 2018, and brought together global experts. The main outcome was a pledge on marine litter: to undertake collaborative action to reduce waste entering the oceans. Ongoing activities include workshops, campaigns and actions – e.g. London’s For Fish’s Sake (#FFS) littering campaign; Operation Clean Sweep (an industry led initiative to ensure plastic flakes, pellet and powders are contained within sites); Waste Free Oceans:

a project in collaboration with fishermen and brand owners to collect and upcycle ocean plastics into new products. The invitation was issued to join the platform, show leadership and make a difference.

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***Presentations of Solution Showcase exhibitors***

The following gave 90-second pitch presentations:

**Category: AVOIDING SINGLE-USE PLASTIC - Solutions which improve material recovery and recycling/upcycling**

Recycling Technologies - Elena Parisi  
BeeBee Wraps - Kath Austin  
Fungal-based Biodegradable Packaging – Elena Loche  
Flute Upcycling - David Chandler  
Pyreg - Mike Weaver  
CamCattle - Angelika von Heimendahl  
RECOUP – Stuart Foster  
Surfdome – pre-recorded presentation

**Category: UNDERPINNING SOLUTIONS - Sharing knowledge and utilising existing data streams to monitor and reduce plastic pollution**

Cambridge Institute for Sustainability Leadership - Beverley Cornaby  
Knowledge Exchange Microplastics Network - Alice Horton  
IOTIC Labs – Ali Nicholl  
Open University - Blue Planet II - Pallavi Anand  
“Manual for packaging-free business” - Blanca Racionero Gómez  
Envirocomms – Stephen Bates  
NOCS – Richard Lampitt, Katsiaryna Parbotsava

**Category: REDUCING MARINE PLASTIC POLLUTION - Clean-up schemes**

SeaBin Project - Sergio Halpern  
Waste Free Oceans – pre-recorded presentation  
SeaVax / Cleaner Ocean Foundation Ltd – pre-recorded presentation

Following the presentations, the winners of the Solutions Showcase Competition were announced:

**Winner:** Sergio Halpin, Seabin Project

**Runner-up:** Elena Loche, Fungal-based Biodegradable Packaging

## **PART 2 - Panel Discussion: Regulatory and Policy Solutions – Chair, Daniel Steadman, Fauna & Flora International (FFI)**

During the afternoon session each panellist gave a short presentation (summarised below) outlining their perspectives and highlighting specific challenges and potential solutions. This was followed by Q&A and discussion.

### ***Expert Panel***

- Panel Chair - Daniel Steadman, FFI - DS
- Dustin Benton, Green Alliance - DB
- Jane Skelton, Sainsbury's - JS
- Ruth Fletcher, UN Environment World Conservation Monitoring Centre (UNEP-WCMC) - RF
- Peter Skelton, WRAP - PS
- Professor Richard Thompson, University of Plymouth – RT

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### ***Introduction – Dr Rachel Cavanagh, BAS***

The British Antarctic Survey (BAS) and Cambridge Conservation Initiative (CCI) are convening a series of short workshops focused on science-policy interactions within topical conservation and management issues. Each of the topics is an issue faced in the Polar Regions but is also of global relevance and reaches beyond traditional disciplinary boundaries. By bringing together the Cambridge academic and conservation communities, and involving decision-makers from the outset, we aim to provide a forum for gathering and sharing expertise on these key issues. This afternoon session forms the second workshop in this ongoing series.

Key questions to help frame the panel discussion include:

- What are the knowledge gaps that prevent decision makers from taking action on plastics? Is the existing science accessible and being used effectively?
- What are the processes that will drive political and economic change on this issue?
- What are the priority solutions for different country contexts (recognising that there is not a “one size fits all” solution)?
- How can the different sectors work together to drive change?

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### ***Panel presentations***

***Daniel Steadman, FFI – The science-policy interface and marine plastics pollution: towards a broader model of change***

#### ***Case study – UK microbeads ban***

Microplastics are found in many products such as face scrubs, toothpastes, deodorants, domestic and industrial-strength cleaners. They can be considered the first ‘solved’ global plastics issue. Drivers of the microbead policy change in the UK included scientific guidance and an existing legal framework that the government could work with. Scientific evidence influenced the microbeads ban with industry and media playing key roles. It was necessary to go beyond the science-policy



interface, to a more comprehensive: science-policy-media-industry-NGO interface. Alliances are necessary to address countries and businesses on the issue of microbeads.

*Key drivers for the policy change:*

- Strong scientific evidence base for presence and risk in marine environments;
- Evidence of public concern – based on NGO campaigns;
- Strong media pressure on the issue;
- Precedent of bans elsewhere e.g. USA;
- Industry precedent (voluntary bans and demonstrable alternatives);
- Industry appetite for a level playing field;
- Political context.

*Lessons learned:*

- Value of **collaboration** across all sectors of the stakeholder chain;
- Importance of “**low hanging-fruit**” (i.e. microbeads are plastic waste with an obvious solution – they are not essential to the product’s efficacy) as basis for global lessons and action;
- Accepting the “**chaos of change**” when an issue reaches critical mass, but avoiding misuse or misinterpretation of evidence base;
- Keeping **balance** between celebrating good practice/genuine ambition and overcoming short-term thinking/lack of leadership;
- Looking for solutions that embrace science, can be facilitated by policy, encourage business innovation and genuinely **change a system**.

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***Jane Skelton, Sainsburys – brief presentation (unable to stay for the Q&A)***

Retailers can work well within regulations, with policy solutions that are in place. E.g. Sainsburys is used to working towards reductions in unhealthy substances, like sugar and salt. However, in the case of addressing plastic waste, it is necessary for the whole supply chain to change and not just individual retailers. Changes in the supply chain can lead to industry-wide changes. Retailers working together and across the supply chain is what drives significant change.

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***Dustin Benton, Green Alliance – The politics of marine plastics (or, why good policy is hard to make)***

*Plastic politics*

Plastic litter taps into what is generally considered to be a “sacred” value of nature, the deep tradition of leaving nature untouched. This can often transcend politics and, for example, the use of striking images, e.g. birds with plastic in their stomachs, tends to have this effect. The plastic problem is seen as a tangible issue in a way that climate, ocean acidification and overfishing are not, with public opinion (84% of those polled) in favour of banning all but essential plastic use. The Conservative Party has a track record of (and pride in) its overseas marine protection decisions. On

the politics of green plastics (and other issues), Michael Gove has become a UK “environmental champion.” Stopping plastic pollution is popular (even populist).

*Challenges and solutions:*

There are many proposed solutions to solve plastic pollution with the use of technology. However, not all of these are necessarily “good” solutions. E.g. floating buoys, while worthy of consideration (and symbolic of the issue, therefore popular), would only remove 2% of all the plastics in the ocean. Most plastic fragments into smaller pieces when it gets into the ocean where it becomes widespread and difficult to contain. Furthermore there are data gaps (the ocean is vast), it is difficult to track plastic in the ocean, and difficult to hold specific people/organisations responsible. That said, policymakers do need to be able to operate despite uncertainty. There is a need to focus politicians on where to take action, for example, Green Alliance have identified five clear policies to cut plastic pollution by two thirds:

1. *Deposit return for beverage litter;*
2. *Enforcement of maritime waste bans (and don't penalise fishermen who bring litter to shore);*
3. *Push the industry's own plastic pellet solution: Operation Clean Sweep;*
4. *Use sand traps (or better fabrics) to minimise the number of fibres getting into the water column;*
5. *Extend the microbeads ban beyond just wash off products to all products.*

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***Ruth Fletcher, UNEP-WCMC - Policy drivers at the international level: plastic***

*Is there an appetite for dealing with the plastics issue internationally?*

The United Nations Environment Assembly (UNEA) (universal membership of all 193 UN Member States) provides a ground-breaking platform for leadership on global environmental policy, and its focus in 2017 was plastic. The UNEA has a Resolution (UNEA 1 1/6) on marine plastic debris and microplastics that encourages governments and the private sector to promote the more resource-efficient use and sound management of plastics and microplastics. Furthermore, the UNEA encourages alternatives to plastic packaging and deposit refund systems; and encourages product manufacturers and others to consider the life cycle and environmental impacts of products containing microbeads and compostable polymers (UNEA 2). The UN Sustainable Development Goals (SDG) also refer to plastics and SDG 14 includes the following: by 2025, to prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

*Challenges:*

- Approximately 80% of marine plastic pollution originates on land. To address this, strong, coordinated international action is needed.
  - The Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities is the only global intergovernmental mechanism directly addressing the connectivity between terrestrial, freshwater, coastal and marine ecosystems.
- Many developing countries are net receivers of plastic and many have limited capacity and funds to deal with end-of-life plastic.
- Many different options are available – it can be difficult for governments to know which route is the best one for them to take.

- The agreed indicator for marine plastic litter under SDG Target 14.1 is 'Floating Plastic Debris Density'. Internationally established methodologies or standards are not yet available for this indicator. Plastics on the beach are currently used as a proxy indicator.
  - The challenge for the scientific community is to ensure methodologies are consistent so that indicators of targets can be used.

*Solutions:*

- Individual countries can have great impacts on their environmental waste control and regulation, e.g.:
  - In Kenya, plastic is being converted into logs for construction.
  - Fewer plastic bags have been found on UK beaches since the plastic bag tax.
- Solutions come from making science easily accessible so people can challenge governments. They also come from peer pressure between countries. Governments need to be seen doing something that isn't just anecdotal. Sharing success stories can inspire change.

*Question:*

Is the current focus helping? Much of this seems to focus on the state of the environment and indicators of this. Would it be more useful to measure aspects earlier in the process, e.g. the drivers of the problem; the underlying pressures? What is the success of existing measures to reduce plastic use?

***Peter Skelton, WRAP – Collaborative action for transforming the UK plastics packaging system***

*Vision:* a world where plastic is valued and never pollutes the environment.

*Aim:* to transform our linear system into a circular system

*Challenges:*

- We need to reduce our visible and easily littered waste. We need plastic to be a high quality resource that can all be turned back into packaging: i.e. packaging designed for life and for end of life.
- We need global, national and corporate targets to align. When global targets, national vehicles of change, and corporate goals align, then real change can happen.

*Solutions:*

- The UK government are driving forward plastic reduction and are currently reviewing plastics packaging legislation. The microbeads ban (see above) is a good example of elimination. Once in place, we can export this circular system elsewhere.
- Solutions cannot be achieved through legislation alone. There must also be social movements and pressures. E.g. peer pressure not to buy plastic bags. Businesses can act quickly to reduce plastic if they are sufficiently motivated.
- Consumers are vital to achieving circularity by understanding the value of plastic, and also to know what to do with it.

**Richard Thompson, University of Plymouth** (presentation summarised above in Part 1)

We must seize this chance, capitalising on the “*Blue Planet effect*”: this is a moment in time, we don’t want to miss this opportunity to move towards changing our relationship with plastic. There is a risk that the media and the public will become desensitised to the issue of plastics in the oceans, so we must act now.

*Challenges:*

- Ocean plastics are the “tip of the iceberg” in terms of the linear use of resources – we need to move towards a circular economy.
- We have reached a point where there is far greater alignment across sectors - we are clear about the problem. We have a palette of solutions on which we have broad agreement. Where we have less agreement is regarding the hierarchy i.e. the relative importance of the different solutions. This is where we need more dialogue. We need collective focus on the most appropriate actions. How do we, collectively, make the most of opportunities such as the Industrial Strategies Challenge Fund?

*Solutions:*

This is a solvable problem, industry are engaged but they can’t tackle it alone. Industry strategy must be industry-led but science-informed. We need a sound evidence base to:

- Inform the directions we follow (avoid tangents or “blind alleys”).
- Channel effort down the agreed priority paths – engage all sectors.

We need to focus on a few key actions rather than lots of scattered little actions.

*Question:*

How do we work together to find these paths and stay on them?

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*Panel discussion*

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*Tensions in the alignment of solutions and stakeholders*

Q: There is a tension in the area of solutions (bespoke vs consistent), between alignment and creation of standards vs celebrating leadership. We want to avoid an international “blame game” but at the same time we need to share knowledge. What are the panel’s thoughts on alignment of solutions and stakeholders, and on the tensions in this area?

- An element of blame is needed. Some people/companies/governments have disproportionate power to solve the issues, and as such they have disproportionate responsibility. There is a risk that too much is landing in the hands of consumers. The system from product design to waste collection is badly designed. Producers should be allocated responsibility – they should be required to pay more for producing non-renewables and less for producing renewables.
- In cases where there are obvious solutions, we need to push on these.
- We need both corporate policy alignment and government policy alignment.

### *Political leadership*

Q: While industry has been instrumental in bringing key stakeholders together, a key part of the wider issue concerns political leadership. Although political leadership is trying to drive change, there is a danger of it leading us in potentially “wrong” or less-effective directions (e.g. the “plastic-free aisles” campaign only addresses one part of the wider problem). There is a disconnect between what we buy and what is littered/leaking into the environment. To fix this, we need to look at the linkages between these. We need to focus on what is leaking into the environment. What are the panel’s thoughts on this?

- Agree - we need to look beyond ‘litter on the go’. This is an important aspect but there are bigger, wider problems. This is the time to rethink our relationship with plastic. The recent surge in attention on, and awareness of, ocean plastic pollution has significantly raised the profile of some of the issues, and we need to harness that, but we also need to recognise that the problem is much more systemic.
- Science can often seem complicated to governments (they don’t have the capacity to understand all the nuances). Only a third of the UK public recycle correctly so we need to make things easy for consumers. This will make it easier for producers to change. We need to simplify the messages and conduct holistic research. Those of us working at the interface have a key role in helping to simplify the message about plastics, simplifying also helps with prioritising action.

### *Priority setting*

Q: Can we use the prevalence of certain things in the ocean as a guide for what to address first?

- Current public demand/focus is on what is escaping into the ocean, we can harness this but we must also expand it, i.e. use the visible problem in the ocean as a starting point to tackling the wider problems both on land and in the ocean. We have to approach it incrementally.
- We need to calibrate our expectations of politicians. Both industries and science represent complexities to the politicians and they need to simplify it for the public. We need a strategy to make things less complex. Suggested 3-fold solution:
  - **Recycle** plastics: can easily be made profitable. We could get 100% of our plastic back.
  - **Stop doing certain things** (i.e. stop making certain products) e.g. straws: we can stop drinking using straws. These are easy things to solve.
  - **Change certain products** e.g. things like polystyrene. We need to find alternatives.

### *Product design*

Q: Plastic packaging is largely in the hands of product designers. How does the design industry align?

- Designers don’t necessarily need knowledge of materials, but businesses do need to be very clear with their design briefs. The consumer likes differentiated products. There should be a balance between product differentiation and recyclability. Recyclability guidance (developed in 2004) is not widely used. Good practice is not consistent. E.g. plastic bottles and trays: many are recyclable, but some are made from black plastic which is not recognised by optical sorting systems and thus less easily recycled.

- Businesses need to know what the unintended consequences of their actions are in order to get them to change.

Q: Is there any guidance for best practice?

- There is, but it is not consistent, there is a need to link up the chain so that those specifying the design know the impacts.
- Refer to the “essential requirements” for packaging which requires recyclability (European Union (EU) packaging and packaging waste directive). How do we implement this? How do we join this up? We need to unite the product designer with the end recycler to approve the design. There are examples:
  - The Japanese model requires the product manufacturer to own recycling/remanufacturing plants. They can only make money off these if they design their products to be cheap and easy to recycle or remanufacture.
  - The EU’s Ecodesign Directive (design regulation) provides consistent EU-wide rules for improving the environmental performance of products.
  - The French model is forcing brands to pay more for producing non-recyclable products.

Q: Is there any experience with certification schemes for plastics?

- A cross-sector stewardship council could be established. A certification scheme could be developed towards responsible labelling. If brands were worried about losing 5% market share, they would change.

Comment regarding the huge amount of effort required to change systems that are in place in individual businesses, etc. We need a centralised place for clear guidance on this issue. Reference to the above comment on the stewardship council suggestion: this might lead onto standards and certification.

### *Commercial viability of recycling*

Q: There are some good solutions and major brands are changing, but there are concerns about the commercial viability of recycling. How do we de-couple the price element (price of oil) from the importance of recycling?

- We can easily cut the cost of recycling. It should be much cheaper to recycle things than to extract and use virgin oil derived products. At the moment we contaminate recycling and make it expensive (e.g. by colouring plastic) but we can address this. By removing certain substances, it can be cheaper and easier to recycle.

### *The role of consumers and public engagement*

Q: How can we engage consumers more? The public are currently driving this conversation towards change. How do we best engage all communities?

- The time to act is now but we do have to be careful with campaign targeting. Public engagement is fundamental but we need strong and clear messages. Messages mustn’t confuse the consumer.
- The strong clear messages we can give at the moment include:



- “don’t litter, dispose of it properly”;
- “recycle more” (e.g. currently only 57% of plastic bottles are recycled);
- “RRR” – remember, there is reduce and reuse before we get to recycle. All consumers can reduce plastic now.
- We are not yet in a place where we can have an effective public campaign on recycling as the system needs fixing first.
- Consumer power is actually quite low. Brands have forced plastics on us. E.g. we didn’t ask for microbeads in our products or plastic rods in our cotton buds. But we do have citizen power in the form of politics, writing to MPs, writing to brands, etc to demand change. These are collective action problems that citizen power can help to solve. This can push councils, governments and companies in the right direction. But we also need to think about the bigger picture.
- Social media can be very effective.

#### *The role of science/academia in evaluating solutions:*

- UNEP-WCMC do a lot of work in the science-policy space including collecting case studies and positive lessons learned. Good news stories sharing “what can work” has been shown to be effective and there is huge potential to do more of this.
- The onus is on scientists to share solutions and to consider whether they are replicable in different contexts. Plea for simplicity of the information we share (while also dealing with the complexity).
- There is a great opportunity to find solutions in the design of plastics and in recycling, for example, potential opportunities via the Industrial Strategy Challenge Fund.

#### *Export of plastic*

Q: What is being done in countries with little capacity to change? What do the panel think about the UK exporting 2/3 of our plastic to countries with poor waste management systems? Does the Chinese ban on UK plastics present an opportunity for us to look at our plastic export?

- We need to address our own collection systems in the UK, and be careful about where we send our plastic. We produce a lot, but export it. China will no longer take it but we send it to Vietnam and India who have their own huge problems. This is a serious responsibility issue. Addressing this should be a priority. We can solve these problems.

#### *The power of supermarkets*

Comment about the idea that supermarkets could use their own power to call for homogenous products, such as bottles, but with differentiated labels. Supermarkets have a lot of power and should use it.

- Scientists can help with this. It is not until people are told about issues that they demand products that align with their values. People engage much more if things affect them e.g. the concern about microplastics getting into their food.

- People don't always want a great deal of choice, they want supermarkets to censor and decide which products are good or bad on their behalf *before* they end up on the shelf. This comment was related to research carried out by Asda.
- Companies need some freedom to innovate, not just to always respond to top-down demands.
- Every citizen should have the ability to recycle plastic that they buy.

Finally, there was a call from audience members to continue driving change and keep the momentum up after this meeting.

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*Take home messages from each panellist*

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**DS** – The importance of the science-policy interface. All sectors within it need to learn to keep things simple. We need to use our collective effort to both find and evaluate solutions. We need harmonisation of approaches, but not a “one size fits all” model.

**DB** – Things that are not fundamental consumer choices e.g. marine litter, materials used in fabric design, and plastic pellets are important. How do we help industry solve these?

**RF** – There is a great deal of valuable research, knowledge, initiatives, innovation etc out there - our collective brainpower should be harnessed to find effective solutions.

**PS** - We have the power to drive change. We need legislation to align with design outcomes.

**RT** – There is no single solution. But there are achievable solutions. Reduction is paramount and is the ‘low-hanging fruit’. Changing product design is next: designing for life and for end of life. The time is now: let's not miss this opportunity. Scientists need to provide reliable, objective evidence, their role should not be to campaign, but the onus is on them to communicate clearly.

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***Common themes/summary points***

- We need to rethink our relationship with plastic, end our “throw-away society”, reduce our reliance on single-use plastic and move towards a more circular economy;
- Plastic needs to be designed for life and for end of life. “Safe by design” plastics;
- Change to whole supply chain – not just individual companies piecemeal;
- Clarity and simplification of messages for politicians and the public;
- We need all sectors to be engaged: science-policy-media-industry-NGO interface;
- UK progress has been highlighted but we also need strong coordinated international action;
- The time to act is now.

### ***Next steps/ways forward***

- Continue to establish a strong evidence base, consistent methodologies and indicators;
  - Collection and sharing of good news stories, lessons learned, best practice;
  - An independent research centre to focus on evidence towards finding solutions;
  - A framework to share and translate best practice e.g. a dedicated plastics stewardship council – good practice guidelines (both for the UK and international – recognising that there is not a “one size fits all” solution), certification scheme;
  - Address the hierarchy issue – identify collective priorities: solutions that embrace science, can be facilitated by policy, encourage business innovation and genuinely change the system.
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### ***Summary***

Marine plastic pollution is a tangible problem requiring a coherent set of solutions and it is clear that the time to act is now. It is essential that we rethink our relationship with plastic, end the existing “throw-away” culture and move away from a linear system towards a circular economy. This meeting has demonstrated the value of cross-sectoral engagement and collaboration. It is clear that tackling the issue can only be achieved by moving beyond the traditional science-policy interface to a network of scientists, industry representatives (from large to small-scale), non-governmental organisations and policy makers working together towards solutions that embrace science, can be facilitated by policy, encourage business innovation and that will genuinely change the system.

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### ***Acknowledgements***

We thank the British Antarctic Survey, Cambridge Conservation Initiative and Cambridge Cleantech; the workshop organising committee: Elizabeth Allen, Sarah Berry, Rachel Cavanagh, Fiona Danks, Abigail Entwistle, Victoria Fowler, Nicola Frost, Penny Goodearl, Susie Grant, Alison Harvey, Kirstie Jones-Williams, Clara Manno, Pilvi Muschitiello, Matthew Polaine, Beatrix Schlarb-Ridley and Claire Waluda; the invited speakers, Solution Showcase innovators and the expert panel and chair; the BAS Plastics Group; Danielle Buss, Anthony Else, Caitlin Frankish, Francis Grandfield and Ceclia Liszka for rapporteuring; and Anna Belcher, Hannah Cubaynes, Lianne Harrison, Kayleigh Jones, Billy Mills and Jake Opher for all their help with the event. Photo credit: John Dickens.

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# Plastics in the Ocean: Challenges and Solutions

Aurora Innovation Centre at British Antarctic Survey, CB3 0ET

Wednesday 7 <sup>th</sup> March 2018		09.00 – 17.30
<b>09:00</b>		<b>Registration and refreshments</b>
09:30-09:35	Prof Dame Jane Francis	Welcome and introduction to BAS Overview and outline of the workshop
09:35-09:50	Prof Duncan Wingham, CEO NERC	Zero Plastic Waste
	<b>Chair: Prof Hans Jensen, UKWIR</b>	<b>Issues and Innovation Solutions</b>
09:55-10:20	Prof Richard Thompson, University of Plymouth	Marine litter: are there solutions to this global environmental problem?
10:20-10:45	Giles Harvey, SKY Ocean Rescue	Sky Ocean Rescue and the business transformation commitment on single-use plastic
10:45-11:10	Prof Tamara Galloway, Exeter University	Bioaccumulation and biological effects of micro- and nano-plastics
Coffee Break	11:10-11:35	
11:35-12:00	Rowan Byrne, Mott MacDonald	Are there marine plastics solutions in many sectors?
12:00-12:25	Barry Turner, British Plastics Federation	Industry working together with all stakeholders to prevent litter and waste entering our oceans
12:25-13:00	Solutions Show Case	Quick-fire presentations of Solutions Show Case, followed by announcement of Competition Winner
Lunch Buffet	13:00-14:25	Lunch Buffet with Solutions Show Case Exhibition: 1. Avoiding single use plastic 2. Reducing marine plastic pollution 3. General underpinning of solutions
	<b>Chair: Daniel Steadman, Fauna &amp; Flora International</b>	<b>Panel Discussion: Regulatory and Policy Solutions – part of the BAS-CCI Science-Policy Challenges workshop series</b>
14:30-14:35	Introduction to BAS-CCI Series - Dr Rachel Cavanagh, British Antarctic Survey	
14:35-14:45	Daniel Steadman, Fauna & Flora International	
14:45-14:55	Dustin Benton, Green Alliance	
14:55-15:05	Ruth Fletcher, UNEP-WCMC	
15:05-15:15	Peter Skelton, WRAP	
15:15-15:20	Prof Richard Thompson, University of Plymouth	
15:20-16:00	PANEL DISCUSSION – including questions from the audience	
16:00-16:10	Panel Concluding Remarks	
16:10-16:20	Overall Conclusions - Dr Beatrix Schlarb-Ridley, British Antarctic Survey	
<b>16:20-17:30</b>		<b>Reception – Drinks and Networking</b>
<b>17:30</b>		<b>Close</b>

## Plastics in the Ocean: Challenges and Solutions

### Speakers – Biographies and Abstracts

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Speaker: Professor Dame Jane Francis: [janefr@bas.ac.uk](mailto:janefr@bas.ac.uk)



Jane Francis is Director of the British Antarctic Survey, based in Cambridge. A geologist by training from the University of Southampton, she was a NERC Postdoctoral Fellow in London, palaeobotanist at the British Antarctic Survey, Australian Research Fellow at the University of Adelaide, a Royal Society Leverhulme Trust Senior Research Fellow and Professor of Palaeoclimatology at the University of Leeds, where she was also Dean of the Faculty of Environment. Her research interests include ancient climates and fossil plants from the Arctic and Antarctica, used to decipher ancient polar climates of the past. She was awarded the Polar Medal for her contribution to British polar research and was appointed as Dame Commander of the Order of St Michael and St George for services to UK polar science and diplomacy.

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Speaker: Professor Duncan Wingham: [hqpo@nerc.ac.uk](mailto:hqpo@nerc.ac.uk)



Duncan received a B.Sc. from the University of Leeds in 1979, and a Ph.D from the University of Bath in 1984, both in physics. He joined University College London in 1986, where he held lecturing posts at the Mullard Space Science Laboratory and the Department of Electronic and Electrical Engineering.

He was appointed as a Chair in the Department of Space and Climate Physics in 1996, and was Head of the Department of Earth Sciences at UCL from 2005 to 2010.

He was founder and Director of the NERC Centre for Polar Observation and Modelling (CPOM) from 2000 to 2005 which, among other things, discovered the widespread mass loss from the West Antarctic Ice Sheet and its origin in accelerated ocean melting.

He was Chairman of the Science and Innovation Board of NERC and, since 2000, the Lead Investigator of the ESA CryoSat and CryoSat-2 satellite missions.

Duncan became Chief Executive of the natural Environment Research Council on 1st January 2012.

**Title:** Zero Plastic Waste

**Abstract:** Plastics play a vital role in our lives; however, the waste is a growing environmental, social and economic issue. The UK can lead solutions (materials for the future, tackling issues around litter and recycling through e.g. circular economy, behaviour change) and benefit from the economic opportunities these solutions bring. To achieve this NERC, in partnership with Research Councils across UK Research and Innovation, are working with key businesses and charities to bring the best research and innovation to bear on solutions to move to zero plastic waste, seeking to release £10s-of-millions of Industrial Strategy Challenges Fund investment to address industry need.

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Chair: Professor Hans Jensen: [Hans.Jensen@ukwir.org.uk](mailto:Hans.Jensen@ukwir.org.uk)



Professor Hans Jensen is Chief Executive of UKWIR Ltd which develops and procures a common research programme on behalf of UK water operators addressing *one voice* issues. Hans started his career as a geologist working on earthquake and geothermal energy research, before spending over 20 years in the power industry within a range of strategic, project and operational roles. His most recent positions have been Head of Environment and Head of Research and Innovation at RWE. Hans is a Board member of the Global Water Research Coalition, a visiting professor at UWE and a member of the NERC Strategic Advisory Board.

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Speaker: Professor Richard C Thompson: [R.C.Thompson@plymouth.ac.uk](mailto:R.C.Thompson@plymouth.ac.uk)



Richard Thompson is Professor of Marine Biology at Plymouth University.

Much of his work over the last decade has focused on marine debris with numerous publications and significant research funding on this topic. He was a co-author of the European Union Marine

Strategy Framework Directive text on marine litter. He has been a member of numerous international working groups on marine litter including GESAMP, NCEAS, UNEP, UNIRP. In 2014 he presented his research to the US Secretary of State, John Kerry, at his Our Ocean meeting in Washington. He has also presented to OECD nations and G7 nations. Recent work by his team directly informed the UK Government decision to introduce legislation on the use of microplastics in cosmetics. He has recently been working with G7 nations on the monitoring of marine litter. In 2017 Thompson received the Marsh Award for Marine and Freshwater Conservation for his work on plastics; and was recognised in the New Year Honours List, with an OBE for services to Marine Science.

**Title:** Marine litter: are there solutions to this global environmental problem?

**Abstract:**

Marine debris is a growing environmental problem. It is widely distributed at the sea surface, on the sea bed and on shorelines. Around 75% of this litter is plastic, with other materials such as glass and metal representing only a small proportion of litter in the oceans. Around 700 species are known to encounter marine litter, with many reports of physical harm resulting from entanglement in and ingestion of plastic.

It is widely acknowledged that plastic litter does not belong in the ocean. It is also clear that the numerous societal benefits that are derived from everyday use of plastics can be achieved without the need for emissions of plastic waste to the environment. Around 8% of world oil production is currently used to make plastic items and there is recognition that we need to change the way we produce, use and dispose of plastic items. In this regard a solution to two major environmental problems, our non-sustainable use of fossil carbon (to produce plastics) and the accumulation marine litter probably lie in utilizing end-of-life plastics as a raw material for new production.



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Speaker: Giles Harvey: [giles.harvey@sky.uk](mailto:giles.harvey@sky.uk)



Giles joined Sky in 2012 and heads up the UK Supply Chain and is responsible for the supply of Sky designed products to Sky Italia and Sky Deutschland. He is responsible for the end to end supply chain for both Sky's in house designed & manufactured products and third party supplied products. His role encompasses sourcing, manufacturing, planning, logistics, repair and recycling. The team's primary focus has been on TV & broadband products for the UK, however the scope of the team's activities now includes Spain, Sky Mobile and the next generation of Sky Q products for all three of Sky's territories. Before Sky, Giles worked at a number of retailers in supply chain roles including Sainsbury's, Dixon's as well as Carphone Warehouse where he was Group Supply Chain Director.

**Title:** Sky Ocean Rescue and the business transformation commitment on single-use plastic

**Abstract:**

Giles Harvey, Director of Products and Supply, will present the work behind the Sky Ocean Rescue Campaign which launched in January 2017. Giles will also share his experience so far of driving the business transformation commitment to take all single-use plastic out of the Sky's products and supply by 2020. As the first FTSE100 company to make such a commitment, it will be interesting to hear what it takes for business to take action on plastic waste.

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Speaker: Professor Tamara Galloway: [t.s.galloway@exeter.ac.uk](mailto:t.s.galloway@exeter.ac.uk)



Tamara is Professor for Ecotoxicology at the University of Exeter. Her research focuses on marine pollution, the human health effects of pollutants and the sustainable development of novel materials and substances, including work on leadership of projects such as 'Microplastics and marine mammals', 'The impact of microplastics on zooplankton', 'Investigating microplastic contamination in coastal waters' and 'Bioavailability and biological effects of microscopic plastic debris in the ocean'.

**Title:** Bioaccumulation and biological effects of micro- and nano-plastics

**Abstract:**

Contamination of the aquatic environment with microplastics is a conservation issue of high concern. This presentation provides an overview of our research into the ecotoxicology of micro- and nano- plastics, and their surface interactions in natural waters, using state of the art bio-imaging approaches. This is critically important for understanding environmental fate and behaviour, including biofouling, aggregation and movement through organisms following ingestion, all of which can influence the toxicity of microplastics to cells and tissues. This knowledge forms a basis for toxicological risk assessment and offers the exciting potential for positive intervention e.g. through manipulating aggregation via selective biomolecule binding, or through improved design of biodegradable or recyclable plastic.

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Speaker: Rowan Byrne: [rowan.byrne@mottmac.com](mailto:rowan.byrne@mottmac.com)



A Fellow of the Royal Society of Biology and successful marine biologist with over 21 years proven environmental management and consultancy experience in marine conservation species and habitats having worked in over 17 different countries. His experience is wide ranging from deep sea climate change research to EIA assessments in global infrastructural projects along with due diligence and technical witness legal work. His main passion is environmental enhancement and leaving the environment in a better shape than when he found it.

Rowan is the Principal Marine Environmental Scientist for Mott MacDonald as well as Marine Plastics lead. In his spare time Rowan enjoys drumming, restoring classic cars, antique hunting along with mountain biking and golf, and he has also worked with Disney on Pirates of the Caribbean and met Johnny Depp.

**Title:** Are there marine plastics solutions in many sectors?

**Abstract:**

The question above is one that Rowan has asked himself repeatedly over the last number of years and he thinks that there indeed are many solutions. Through his talk Rowan aims to share his personal experiences and present possible avenues where innovation can pop up. Having worked in many diverse “wet” sectors, Rowan has learnt that innovation sometimes appears in the strangest of places, and he wants to illustrate where and how a multi-sectoral approach can help creating solutions. The aim of Rowan's talk is not only to get people thinking on where solutions may lie, but also how connections can be made to bring the ideas to fruition by partnerships between big industry and science.

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Speaker: Barry Turner: [bturner@bpf.co.uk](mailto:bturner@bpf.co.uk)



Barry has had a varied industrial career initially with the telecoms industry (BT), then Ford Motor company and Vickers. But for the majority of his career he has held senior appointments including as a mainboard director of a UK public quoted packaging company and as a mainboard director of and part owner of venture capital backed packaging companies.

Barry has also been chairman and CEO of trade bodies representing the packaging industry and just over two years ago he merged the membership of PAFA (the Packaging and Films Association) with the packaging members of the BPF (British Plastics Federation) and became the director responsible for that group.

**Title:** Industry working together with all stakeholders to prevent litter and waste entering our oceans

**Abstract:**

In his talk Barry will inform the audience on how industry has pledged to work together to identify changes that need to be made and best practice interventions that need to be implemented to stop the flow of litter and waste into our oceans.

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# Solutions Showcase

Co-hosted by Aurora Innovation Centre at British Antarctic Survey and Cambridge CleanTech, the lunch time showcase exhibits a range of exciting innovations at various levels of development. Ranging from brand new ideas to fully fledged businesses demonstrating high impact, innovative, scalable and feasible solutions to tackling plastic pollution.

**Our innovators are here to answer your questions so please use this opportunity to connect and be inspired to collaborate!**

## AVOIDING SINGLE-USE PLASTIC

Solutions which improve material recovery and recycling/upcycling

- **Recycling Technologies** - Elena Parisi
- **BeeBee Wraps** - Kath Austin
- **Fungal-based biodegradable Packaging** – Elena Loche
- **Flute Upcycling** - David Chandler
- **Pyreg** - Mike Weaver
- **CamCattle** - Angelika von Heimendahl
- **Cassandra Oil** – Carolina Carlsson
- **RECOUP** – Stuart Foster

## REDUCING MARINE PLASTIC POLLUTION

Clean-up schemes

- **SeaBin Project** - Sergio Halpern
- **Waste Free Oceans**

## UNDERPINNING SOLUTIONS

Sharing knowledge and utilising existing data streams to monitor and reduce plastic pollution

- **Cambridge Institute for Sustainability Leadership** - Beverley Cornaby
- **Knowledge Exchange Microplastics Network** - Alice Horton
- **IOTIC Labs** – Ali Nicholl
- **Open University - Blue Planet II** - Pallavi Anand
- **“Manual for packaging-free business”** - Blanca Racionero Gómez
- **Envirocomms** – Beth Baylay
- **NOCS** – Richard Lampitt, Katsiaryna Parbotsava

## AVOIDING SINGLE-USE PLASTIC

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Elena Parisi, Recycling Technologies: [elena.parisi@recyclingtechnologies.co.uk](mailto:elena.parisi@recyclingtechnologies.co.uk)



Elena Parisi joined Recycling Technologies a year ago as a director in the Commercial Leadership Program. Working closely with non-financial and financial directors on strategy, commercial and end-to-end technology transfer, she has a cross functional role where she assesses technology potential and develops business opportunities within engineering, commercial operations and finance. Elena has a background in Chemical Engineering, a Masters in Biochemical Engineering from University College London and is alumni of Oxford University's SAID Business school.

Founded in 2013, Recycling Technologies Ltd has been set up to contribute towards solving what it is believed to be one of the biggest challenges of our century. They have developed and patented a plastic recycling machine called the RT7000 which actively targets difficult to recycle plastic films, laminated plastics like crisp packets and pouches and black plastics. By recycling waste plastic back to oil (Plaxx®), this can be used in new plastic production, as fuel oils and as wax in industry. The RT7000 is modular and easily transported anywhere in the world where plastic waste accumulates. Their approach is to capture market opportunity by mass producing RT7000s and installing them worldwide, starting in the UK. Recycling Technologies are currently crowdfunding to expand, with a long term contract in place for the wax proportion of Plaxx® and a pipeline of interested waste site operators wanting to install an RT7000 and recycle more plastic.

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Kath Austin, BeeBee Wraps: [kath.austin@beebeewraps.com](mailto:kath.austin@beebeewraps.com)



Kath Austin is the CEO and founder of BeeBee Wraps. Formerly a successful charity fundraiser, Kath has had a lifelong passion for positive social impact. With a young family, Kath started a sideline project looking at ways to address the horrifying amount of single-use plastics the family was getting through. After 18 months of development the beautiful, reusable, beeswax food wrap went into production.



BeeBee Wraps are reusable beeswax food wraps used in place of plastic to keep food fresh. Being washable in cold water and biodegradable makes them the perfect alternative to single-use plastic. Using warm hands BeeBee Wraps are shaped around food and containers and will last a year! Our mission is to positively impact on plastic pollution by offering a credible alternative as well as encouraging behavioural change to create a lasting legacy of conscious consumption. It is estimated that based on anticipated 3 to 4 times weekly usage BeeBee Wraps has already saved the disposal of nearing 1.8 million pieces of single-use plastic.

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Elena Loche, Fungal-based Biodegradable Packaging: [eleloche@gmail.com](mailto:eleloche@gmail.com)



Elena obtained her PhD from the University of Cambridge (UK) in July 2017; before she studied Molecular Biotechnologies at the University of Bologna (IT). While in Cambridge she developed a strong interest in business and biotech, and was selected as one of the 100 top young leaders from 40+ countries to attend the GapSummit 2017, an intergenerational leadership summit in biotechnology. She is also a co-founder of the Addenbrooke's Graduate Forum and is currently working as Product Specialist in a biotech company called Abcam.


Our vision is a polystyrene-free planet. Polystyrene, also known as Styrofoam™, is a petroleum-based, non-renewable and non-recyclable plastic. On a global scale, 14 million metric tonnes of Styrofoam™ are produced each year and it is estimated that polystyrene takes over 500 years to decompose, making this plastic one of the most pervasive forms of trash pollution on our planet. Our idea is to produce a biodegradable biopolymer using fungal waste and to create a replacement for polystyrene-based packaging materials.

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David Chandler, Flute: [david.chandler@flutupcycling.com](mailto:david.chandler@flutupcycling.com)



David has spent the last 30 years in international sales, and until 2014 was EMEA sales director for FocusVision a worldwide leader in online market research technology. David leads the Flute sales drive to persuade companies to challenge their existing linear supply chains and adopt instead a circular economy model for all their office interiors. Flute make furniture for commercial use out of waste, and when it's no longer required, they take it back and upcycle it again and again forever. Flute - good for people, the planet and profits.

**Flute**  Flute manufacture interiors for offices made entirely from fibrous waste, things like paper, cardboard and wood. We are a circular economy company, meaning that when our furniture is no longer required, we take it back and make new furniture from it, again and again forever.

This means a huge reduction in carbon footprint, nothing imported from overseas, zero waste to landfill or incineration, no disposal costs and an environment that employees can be proud to work in. Flute is good for people, the planet and profits. Do come and have a chat at our FlutePro desk exhibition.



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Ms. Yasmin Palij. Pyreg: [y.palij@pyreg.de](mailto:y.palij@pyreg.de)



Ms. Palij has a M.sc. in Natural Resources Management and Development from the University of Applied Science TH Cologne, and currently works in the department of Research and Development at Pyreg. She is responsible for the management and organization of scientific investigations, collaboration with laboratories and executing bodies for field experiments regarding the effectiveness of the recycled-Phosphorus.

At the moment, Ms. Palij is working in the field of new value chain management of marine biomass from the Baltic Sea and its potential for activated carbon production.

**PYREG** Pyreg's up-cycling pyrolysis process of totally removing microplastics/microbeads from municipal sewage sludge yields a valuable mineralised, phosphorus rich, plant available fertiliser, renewable thermal energy and contributes to carbon capture. It also simultaneously eliminates pharmaceutical materials e.g. oestrogens and antibiotics detrimental to marine life.

As much as 730,000 tonnes each year of MICROPLASTICS has been estimated to be transferred to agricultural land in Europe and North America when the sludge is used as a fertiliser. A proportion through leaching/runoff will be taken by streams/rivers to the ocean. Using the Pyreg process at the wastewater treatment works is an eco-friendly, all-embracing solution.

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Angelika von Heimendahl, CamCattle: [camcattle@yahoo.co.uk](mailto:camcattle@yahoo.co.uk)



Liquid milk is sold to 90% in plastic bottles. The yearly consumption in the UK is about 7000 million liters. In co-operation with dairy companies and supermarkets a milk dispenser system can be developed using attractive glass bottles that are washed and refilled by the customers. The dispensers could also be installed as 'hole in the wall' set ups enabling 24h access to milk.



Milk dispensing machines have been developed in several countries and are currently mostly used for sales of raw milk from the producer's farm directly. The idea is to develop milk dispensing machines that work within the supermarket system. Alongside the dispensers attractive milk bottles can be designed that enable the consumer to use them directly from the

fridge on the table. The bottles are then washed in the household dishwasher and taken back to the supermarket to be refilled. This would not only save the production of millions of plastic bottles, but also mean that the glass bottles do not have to be returned to the dairies to be washed.



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Carolina Carlsson, Cassandra Oil: [Carolina.Carlsson@cassandraoil.com](mailto:Carolina.Carlsson@cassandraoil.com)



## CASSANDRA OIL

Cassandra Oil has developed an environmentally friendly and commercially viable technology to address hydrocarbon-rich waste, such as end-of-life plastics and used tyres. Our aim is to reduce landfill and enable near to 100% material recovery while producing a light crude oil. Other recovered materials like carbon black and gas are leveraged in other industries. The CASO process enables vast CO2 savings and runs continuously 24/7. The energy is created mechanically through friction and thereby separating it from traditional pyrolysis methods. Cassandra Oil offers an excellent alternative to incineration and as the oil can be used to make new products, that again can be broken down to oil, it provides a circular solution while keeping our environment clean.

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Stuart Foster, RECOUP: [rcav@bas.ac.uk](mailto:rcav@bas.ac.uk)



Stuart Foster is Chief Executive Officer at RECOUP, a cross sector membership based charity who have been leading, delivering and informing sustainable plastic resource use and recycling in the UK since 1990. He is also a director of EPRO, the European Association of Plastic Recycling and Recovery Organisations. Since 2000, Stuart has worked on a range of strategy, research and demonstration projects to co-ordinate the plastic value chain to improve resource use and develop plastics recycling activities.

He has previously worked within the waste and recycling sector for local government, the Environment Agency and the Waste and Resources Action Programme. He is a Fellow of the Chartered Institution of Wastes Management and has a degree in Environmental Sciences.



RECYCLING OF USED PLASTICS LIMITED

RECOUP is a national member based charity working in collaboration with a wide range of cross sector stakeholders from industry, government and environmental groups to promote and increase plastic resource efficiency and recycling. Since 1990, RECOUP has worked to improve the design, collection and recycling of plastics with a focus on packaging. This has included many activities including eco-design guidance, local authority collection reports, various out of home recycling initiatives, and a consumer facing education and engagement programme called Pledge 4 Plastics.

## REDUCING MARINE PLASTIC POLLUTION:

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Sergio Ruiz-Halpern, SeaBin: [sergio@seabinproject.com](mailto:sergio@seabinproject.com)



Sergio Ruiz-Halpern is a marine scientist interested in the effects of global change on our oceans. After receiving his PhD. Investigating the air-sea exchange of gases in a wide variety of environments (Mediterranean, subtropical, polar oceans) he focused on greenhouse gas emissions at the land-sea interface (rivers and coastal ocean). Spending many hours at sea he realized first-hand the and urgency of the plastic pollution problem in the world's oceans, and joined an at-the-time small start-up dedicated to cleaning the oceans of plastic, adding a solid scientific and educational dimension to the project.



The Seabin Project was born from a simple thought, "If we have rubbish bins on land, why not have them in the sea". After years of homemade development, a working prototype was showcased in a crowdfunding campaign that funded the market-ready model. Since then, the project has evolved, with the understanding that technology is only a partial solution, we have developed the "whole solution strategy" where education, community,

science, and constant innovation play a crucial role in our activities. We strive to generate long lasting impact beyond the product by empowering the younger generations, the future stewards of our planet.

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Waste Free Oceans: [contact@wastefreeoceans.org](mailto:contact@wastefreeoceans.org)



**Our mission is to collect and transform ocean plastic.**

Waste Free Oceans collects and transforms ocean plastic into new beautiful products. We

partner with recyclers, converters and brands to make optimal use of available resources and raise awareness on the issue of ocean plastic. Based in Brussels, we also operate in the Americas and Asia.

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## UNDERPINNING SOLUTIONS:

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Beverley Cornaby, CISL: [Beverley.Cornaby@cisl.cam.ac.uk](mailto:Beverley.Cornaby@cisl.cam.ac.uk)



Beverley leads in the development and delivery of customised programmes within CISL's Executive Education Team. Recent clients include Network Rail, Kingfisher, Jaguar Land Rover, and Beijing Municipal Government. Beverley is currently leading CISL's programme of work with clients who are looking at the issue of plastic packaging sustainability.

Before joining CISL, Beverley spent ten years working in the public sector, in local, regional and then national government, most recently working for the Sustainable Development Commission with a particular focus on education and health policy. Beverley holds a Postgraduate Certificate in Sustainable Business from the University of Cambridge and a BSc (hons) in Ecology and Conservation from University of Sussex. Beverley is the author of a number of government publications on sustainable schools and young people policy.



UNIVERSITY OF  
CAMBRIDGE  
INSTITUTE FOR  
SUSTAINABILITY LEADERSHIP

The University of Cambridge Institute for Sustainability Leadership (CISL) are convening an independent initiative that aims to develop an ambitious vision and roadmap to eliminate plastic packaging waste from drinks containers in the UK. It will convene stakeholders to take a broad-systems view to find sustainable solutions and will publish this roadmap and vision for sustainable change in the drinks sector in the summer of 2018. As part of this, CISL will be hosting a roadmapping workshop on 27<sup>th</sup> March 2018 in Cambridge.

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Alice Horton, KE Microplastics Network: [alihort@ceh.ac.uk](mailto:alihort@ceh.ac.uk)



Alice Horton is an ecotoxicologist at the Centre for Ecology and Hydrology, with an expertise in microplastic pollution. Her research focusses particularly on the sources, fate and ecological effects of microplastics within the freshwater environment. In addition to her research, she is a NERC Knowledge Exchange fellow and a regular contributor to stakeholder meetings and workshops addressing the issue of microplastics, presenting her work to government, industry, academics and charities.



The UK Microplastics network is funded by a NERC Knowledge Exchange fellowship, in response to the growing need for wider stakeholder understanding and involvement in the field of microplastics research. The aim of the network is to gather and distribute information and connect stakeholders, to more efficiently advance understanding of microplastics as a pollutant and develop strategies for tackling the issue through integrated working. It is fully inclusive and open to any interested parties, including academia, government, industry, charities, consultancies and more.

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Ali Nicholl, Iotic Labs: [ali.nicholl@iotic-labs.com](mailto:ali.nicholl@iotic-labs.com)



Ali is the Head of Engagement at Iotic Labs, working across customers, partners and Iotic Ecosystem. Ali is focused on the co-creation of transformative services and solutions, that meet genuine challenges today and are future resilient for undefined futures.

Ali is passionate about enabling and empowering individuals and organisations with secure interoperability. Amy Webb noted that “The future doesn’t simply arrive fully formed overnight, but emerges step by step”. The vast potential that can be unlocked by enabling things to share, discover and interact with one another must be married to clear understanding of benefits and the clarity that those first steps can be taken with confidence.



Iotic have created Iotic Space relating existing data silos with diverse data sources to create new insights and interactions. It offers an abstraction layer which allows secure public or private exchange focused on secure interoperability; agnostic to source, device and connectivity.

We enable innovators, academics and organisations to interoperate previously unrelated sources, securely sharing and collaborating, while maintaining a single source of the truth and meeting open data requirements. Key benefits are: productivity – the data is just there; security – policy-based access control and traceable data; and flexibility – adaptive with no need to wait for standards. Iotic Space already contains information about marine plastic sightings, and we encourage delegates to add their data to this.

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Pallavi Anand, Open University: [pallavi.anand@open.ac.uk](mailto:pallavi.anand@open.ac.uk)



Pallavi Anand is an ocean biogeochemist with a main research interest in investigating ocean biogeochemical dynamics at the Open University. Some of her current research involvements include: impact of ocean acidification on plankton shell; Caribbean coral reef ecosystems; climate influence on phytoplankton evolution; sensitivity of Indian summer monsoon precipitation during warm and abrupt climate intervals of the past; developing new biogeochemical tools for reconstructing past oceanic environment. She was one of the lead academic advisors on Blue Planet II, broadcasted on BBC one in 2017, responsible for shaping the scientific content of the programme in association with the BBC production team.



Open University will be displaying their [Oceans](#) poster that was produced to engage with general public to communicate and enhance awareness of key current and future challenges that our oceans face, including the issue of plastic pollution. We have posted around half million free copies of the poster in the UK and a large number of electronic copies worldwide.

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Blanca Racionero Gómez, “Manual for packaging-free business”: [blancaraci@gmail.com](mailto:blancaraci@gmail.com)



Blanca Racionero Gomez is an Environmental Engineer and Biotechnologist. Blanca has a broad interest in enhancing sustainable development to achieve social justice and environmental responsibility. She believes that raising awareness through education and social integration, as well as environmental remediation, management and policy making, are key to achieve a truly sustainable future.

**Plastic-free supply chains:** Do we want less plastics in the ocean? The answer is crystal clear, we should stop producing plastic waste and for that, businesses need to provide items free of plastic. Nowadays most of UK businesses do not become plastic-free due to fear of health and safety regulations. For the first time, we will create a business manual to demonstrate that it is legally possible to become **package-free**.

Blanca’s project will have a high impact helping to create a circular economy for plastics in a very simple and scalable way. Low investment, great positive impact. This project is easy, simple and feasible to implement. Sometimes we do need to apply more common sense than new technology or support systems.

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Stephen Bates, EnviroComms: [Stephen Bates](#)



Stephen is one of Europe’s most respected behavioural change specialists working in waste management. He is an accomplished, and highly effective International Environmental Communications, Public Affairs and Behavioural Change Expert with over 27 years of experience leading Communications, Stakeholder Engagement, Community Relations and Operations within the global Environmental, Sanitation Waste, Resource Recovery and Energy sectors.

A co-founder of communications agency EnviroComms, he is the strategic architect behind some of the most successful recycling awareness campaigns since 2003 having worked for over 130 local authorities across the UK and in over 21 countries internationally.



EnviroComms is a behavioural change communications consultancy working in the global waste management sector. They work with government institutions, municipalities and NGOs supporting positive change in the way people approach waste and recycling, developing initiatives that influence policy through the generation of demand for improved services.

EnviroComms recently developed a plastic marine litter awareness project in northern Cyprus engaging High School pupils to demonstrate the scale of the issues, which increased participation in local plastic recycling.



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Professor Richard Lampitt, NOCS: [r.lampitt@noc.ac.uk](mailto:r.lampitt@noc.ac.uk)



Richard is an observational biogeochemist with a main focus on the factors that control the downward flux of material from the top of the ocean into the interior and from there to the seabed. As a result of this conviction Richard is heavily involved in the establishment and management of a network of observatories around Europe and Chair the Assembly of Members of the European Research Infrastructure Consortium EMSO. He was, until it finished last year, coordinator of the FixO3 network, an EU programme which integrated European fixed point observatories. In addition he has responsibility for the sustained observatory on the Porcupine Abyssal Plain, the so called PAP site.

Richard has increasing interest in issues of direct societal concern and in particular the ways in which the oceans may be encouraged to remove anthropogenic carbon dioxide from the atmosphere and in pollutants such as microplastics which may have a significant effect on ecosystem structure and function.



**National Oceanography Centre**  
NATURAL ENVIRONMENT RESEARCH COUNCIL

NOC has recently started a microplastic research laboratory lead by Professor Richard Lampitt. The major analytical tool is FTIR capable of discriminating different sources of microplastics

with a dedicated postdoctoral researcher (Dr Katsiaryna Pabortsova). Professor Lampitt has a substantial EU H2020 contract (within AtlantOS) focussed on characterising microplastics in diverse environments in the Atlantic Ocean. This will look back over the past 25 years using archives of suspended and downward settling material and in sediment cores.

In addition, PhD and POGO students supervised by Dr Daniel Mayor, Dr Claire Evans and Professor Lampitt supported by the ISCF and the Environmental Agency focus on other areas of microplastics research.

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## Plastics in the Ocean: Challenges and Solutions

### Panel Discussion– Biographies

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Dr Rachel Cavanagh: [rcav@bas.ac.uk](mailto:rcav@bas.ac.uk)



Rachel Cavanagh works within the British Antarctic Survey's Ecosystem Programme and her research is focused on understanding and managing the effects of change on Southern Ocean ecosystems. She has >15 years' experience in coordinating international research programmes: previously the Executive Officer of the IUCN Species Survival Commission's Shark Specialist Group, she is currently the Executive Officer of the Integrating Climate and Ecosystem Dynamics in the Southern Ocean Programme (ICED), a regional programme of IMBeR (Integrated Marine Biosphere Research), and a member of Future Earth's Ocean Knowledge-Action Network Development Team. She is working with the Cambridge Conservation Initiative on a workshop series focused on Science-Policy Challenges in Polar Conservation and Management, including climate change and ocean plastic pollution. She has a degree in Zoology and a PhD in population ecology from the University of Liverpool.

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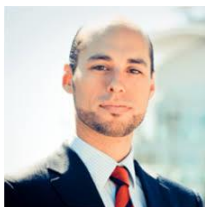
Daniel Steadman: [daniel.steadman@fauna-flora.org](mailto:daniel.steadman@fauna-flora.org)



microbeads ban.

Daniel Steadman currently works as Marine Technical Specialist in Fauna & Flora International's global Marine Team, helping local and regional staff and partner organisations to better document, analyse and promote the impact of their conservation work. He formerly worked as the organisation's Marine Plastics Projects Manager, forming part of the coalition of NGOs that successfully lobbied for the UK Government's

Dustin Benton: [dbenton@green-alliance.org.uk](mailto:dbenton@green-alliance.org.uk)



Dustin Benton joined Green Alliance in 2011, to lead their work in the Low Carbon Energy and Resource Stewardship themes. In this role, he was responsible for work on energy efficiency and renewables, the UK's electricity market, and CCS, as well as resource risk, critical materials, circular electronics and the Alliance for Circular Economy Solutions. In October 2016, he became acting policy director, with responsibility for leading the delivery of Green Alliance's policy programmes, for maximising the impact of its work on expert opinion, and for the management of its policy team. Before joining Green Alliance, Dustin worked for the Campaign to Protect Rural England where he led work on the relationship between landscape protection, climate change, and new energy infrastructure. He holds an MA in Political Thought and Theory from the University of Birmingham and an MA in International Relations and French from the University of St Andrews.

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Ruth Fletcher: [ruth.fletcher@unep-wcmc.org](mailto:ruth.fletcher@unep-wcmc.org)



Ruth Fletcher has worked with UNEP-WCMC since 2013 where she has been key to industry and marine focused work. Technical input on marine policy, spatial planning and ecosystem services are her key skills. As part of her business focussed role she communicated biodiversity data and risk management to a business audience, and identified the relevance of international biodiversity policy frameworks to this audience. Ruth's interdisciplinary background includes ecological economics supporting the centre's work on natural capital, blue economy and ecosystem services. Recently she has been leading a GEF funded project in understanding spatial planning for Areas Beyond National Jurisdiction (ABNJ). She also works on aspects of the Sustainable Development Goals and recently attended the UN Environment Assembly in Nairobi where the 2017 theme was Pollution with marine plastic featuring centre stage at the Clean Seas tent.

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Peter Skelton: [peter.skelton@wrap.org.uk](mailto:peter.skelton@wrap.org.uk)



Peter Skelton leads on WRAP's new UK Plastic initiative which is being launch in April 2018, in partnership with the Ellen MacArthur Foundation. He works with WRAP's strategic business partners in the UK and internationally to help deliver a shared vision on resource efficiency and waste prevention. He brings a strong combination of extensive knowledge on environmental issues from over 14 years at WRAP, with over 12 years' marketing and product development experience of working in the UK grocery and retail sector. Peter has worked on all four phases of WRAP's pioneering voluntary agreement, the Courtauld Commitment, working at a strategic and operational level with leading retailers and brands on packaging, food waste prevention, recycling and operational waste reduction. He has represented WRAP extensively in the UK, Europe and internationally on developing and promoting WRAP's work. Prior to joining WRAP in 2004 Peter held a variety of marketing and product development roles in the FMCG sector. Peter is a Chartered Waste Manager.

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Professor Richard C Thompson: [R.C.Thompson@plymouth.ac.uk](mailto:R.C.Thompson@plymouth.ac.uk)



Richard Thompson is Professor of Marine Biology at Plymouth University.

Much of his work over the last decade has focused on marine debris with numerous publications and significant research funding on this topic. He was a co-author of the European Union Marine Strategy Framework Directive text on marine litter. He has been a member of numerous international working groups on marine litter including GESAMP, NCEAS, UNEP, UNIRP. In 2014 he presented his research to the US Secretary of State, John Kerry, at his Our Ocean meeting in Washington. He has also presented to OECD nations and G7 nations. Recent work by his team directly informed the UK Government decision to introduce legislation on the use of microplastics in cosmetics. He has recently been working with G7 nations on the monitoring of marine litter. In 2017 Thompson received the Marsh Award for Marine and Freshwater Conservation for his work on plastics; and was recognised in the New Year Honours List, with an OBE for services to Marine Science.

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Dr Beatrix Schlarb-Ridley: [beatrix@bas.ac.uk](mailto:beatrix@bas.ac.uk)



Beatrix is Director of Innovation and Impact at BAS. She studied Biochemistry in Germany and then moved to Cambridge, where she obtained her MPhil and PhD in photosynthesis research. A protein biochemist by background with 20 years experience in fundamental and applied research, Beatrix's focus is on unlocking the potential of polar research for the benefit of society and industry.

She has driven the development of the Aurora Innovation Centre at BAS – a space not only with excellent conference and meeting facilities, but also exhibition spaces and an open-plan office for collaborators. Aurora aims to create a vibrant niche in the Cambridge ecosystem for excellent research and entrepreneurial activity in the areas of climate change, environmental stewardship and technologies for challenging environments, addressing issues of global importance and helping society adapt to a changing world.

## Organiser Background Information

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**British Antarctic Survey**  
NATURAL ENVIRONMENT RESEARCH COUNCIL

**British Antarctic Survey (BAS)**, an institute of the Natural Environment Research Council (NERC), delivers and enables world-leading interdisciplinary research in the Polar Regions. Its skilled science and support staff based in Cambridge, Antarctica and the Arctic, work together to deliver research that uses the Polar Regions to advance our understanding of Earth as a sustainable planet. Through its extensive logistic capability and know-how BAS facilitates access for the British and international science community to the UK polar research operation. Numerous national and international collaborations, combined with an excellent infrastructure help sustain a world leading position for the UK in Antarctic affairs. For more information visit [www.bas.ac.uk](http://www.bas.ac.uk)



The **Aurora Cambridge** innovation initiative creates a space within British Antarctic Survey where new ideas, out-of-the-box thinking and new connections can lead to cross-science breakthroughs and new partnerships. Co-sponsored by NERC and University of Cambridge, Aurora Cambridge aims to generate new academic, business and policy partnerships that focus on excellent research and entrepreneurial activity in the areas of climate change, environmental stewardship and technologies for challenging environments.

### Cambridge Conservation Initiative

The **Cambridge Conservation Initiative (CCI)** is a collaboration between the University of Cambridge and nine leading biodiversity conservation organisations based in and around the city of Cambridge, UK. By catalysing strategic partnerships between leaders in research, education, policy and practice CCI aims to transform the global understanding and conservation of biodiversity and, through this, secure a sustainable future for biodiversity and society. The CCI partners are BirdLife International, British Trust for Ornithology (BTO), Cambridge Conservation Forum (CCF), IUCN, Fauna & Flora International (FFI), RSPB, TRAFFIC, Tropical Biology Association (TBA), United Nations Environment World Conservation Monitoring Centre and the University of Cambridge. [www.cambridgeconservation.org](http://www.cambridgeconservation.org)



**Cambridge Cleantech** is a leading membership and business support body for a community of partners – including private companies, universities and public-sector organisations – that is driving the development of Europe’s fastest growing cleantech cluster.

Set up in 2011, Cambridge Cleantech provides commercial support to organisations that are developing and delivering goods and services in response to the global environmental and sustainability challenges we all face. From low carbon technologies and renewable energy to more environmentally friendly products, our members are driving innovation to safeguard our planet and its resources for generations to come.

## EVENT ORGANISING COMMITTEE

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### **British Antarctic Survey**

Sarah Berry  
Rachel Cavanagh  
Victoria Dawer-Fowler  
Penny Goodearl  
Susie Grant  
Kirstie Jones-Williams  
Clara Manno  
Pilvi Muschitiello  
Matthew Polaine  
Beatrix Schlarb-Ridley  
Claire Waluda

### **Cambridge Conservation Initiative, Executive Director's Office**

Elizabeth Allen

### **UN Environment World Conservation Monitoring Centre**

Fiona Danks

### **Fauna & Flora International**

Dilyana Mihaylova  
Nicola Frost

### **University of Cambridge Conservation Research Institute**

Alison Harvey

### **Cambridge Cleantech**

Sophie Meuwissen

# Plastics in the Ocean: Challenges and Solutions

## Delegates

Name	Organisation
Ali Nicholl	Iotic Labs
Alice Horton	Centre for Ecology and Hydrology
Alice Skehel	
Alison Robinson	Natural Environment Research Council
Amy Holland	Sky
Amy King	British Antarctic Survey
Ana Pereira-O'Callaghan	British Antarctic Survey
Anand Sojan	HapCyan startup
Andrew Donnelly	Galapagos Conservation Trust
Andrew Fleming	British Antarctic Survey
Angela Johnson	British Antarctic Survey
Angelika von Heimendahl	Camcattle
Anna Fee	University of Cambridge
Anna Morozova	MGIMO University Student
Anna Belcher	British Antarctic Survey
Anthony Baker	Satellite Vu
Anthony Else	UNEP-WCMC
Anya Doherty	University of Cambridge
Barry Turner	British Plastics Federation
Beatrix Schlarb-Ridley	British Antarctic Survey
Becca Davidson	
Berry Mulligan	
Beth Baylay	EnviroComms
Beverley Cornaby	CISL
Blanca Racionero Gomez	
Brendan Godley	University of Exeter
Bryony Meakins	JNCC
Caitlin Frankish	British Antarctic Survey
Carolina Carlsson	Cassandra Oil
Cath Waller	University of Hull
Cecilia Liscka	British Antarctic Survey
Charity Mae Apale	University of Cambridge
Charlotte Johnson	Natural England
Chelsie Maxwell	Staffordshire University
Chloé Orland	



Name	Organisation
Chris Rider	University of Cambridge
Christina Thiele	Southampton University
Clair Rush	The Deep
Claire Waluda	British Antarctic Survey
Claire Williams	Earthwatch
Clara Manno	British Antarctic Survey
Cordelia Roberts	
Daniel Parsons	University of Hull, Energy and Environment Institute
Daniel Steadman	Fauna & Flora International
Dannielle Green	Anglia Ruskin University
Danny Buss	British Antarctic Survey
David Chandler	Flute Upcycling
Deborah Yarrow	Natural Environment Research Council
Dilyana Mihaylova	Fauna & Flora International
Dora Lopresto	i-team
Duncan Wingham	Natural Environment Research Council
Dustin Benton	Green Alliance
Elaine Fitzcharles	British Antarctic Survey
Elena Loche	Abcam
Elena Parsi	Recycling Technologies
Elizabeth Allen	Cambridge Conservation Initiative
Emily Duncan	University of Exeter
Emma Bagnall	Innavisions Limited
Eugene Murphy	British Antarctic Survey
Fiona Danks	UNEP-WCMC
Flora Rendell-Bhatti	
Francis Grandfield	UNEP-WCMC
Freya Radford	
Gary Leeke	Cranfield University
Giles Harvey	Sky
Gina Battye	
Hannah Collins	Natural Environment Research Council
Hannah Cubaynes	British Antarctic Survey
Hans Jensen	UKWIR
Harry Alexander	The Royal Society
Hazel Akester	Fauna & Flora International
Hazel Thornton	UN Environment World Conservation Monitoring Centre
Heidi Kharbhii	Conversations for Change
Henry Burgess	British Antarctic Survey

Name	Organisation
Huw Griffiths	British Antarctic Survey
Imogen Napper	
Jacky Sutton-Adam	
Jake Opher	British Antarctic Survey
James Goddin	
Jane Francis	British Antarctic Survey
Jane Skelton	Sainsbury's
Jason Weeks	Joint Nature Conservation Committee
Jen Jones	Galapagos Conservation Trust
Jennifer Cocking	SAMS
Jenny Rowbottom	
Jessica Stead	Southampton University
Joe Jeffcoate	RSPB
Joseph Nolan	European Polar Board
Katarzyna Sokol	University of Cambridge
Kate Bedford	RECOUP
Kath Austin	BeeBee Wraps
Katherine Grayson	i-team
Kathy Gill	
Katie Reilly	Birmingham University
Katsiaryna Pabortsava	National Oceanography Centre
Katy Duke	The Deep
Katy Walker	
Kayleigh Jones	British Antarctic Survey
Kirstie Jones-Williams	British Antarctic Survey
Lara Funk	
Laura Kuurne	
Laura Mackenzie	Soil Association
Lianne Harrison	British Antarctic Survey
Liesl Shephard	Natural Environment Research Council
Lonneke Goddijn-Murphy	University of the Highlands and Islands
Louise Edge	Greenpeace UK
Lowenna Jones	
Luke Roberts	University of Bristol
Lydia Allen	
Lydia Tivenan	University of Essex
Marc Stanton	Clean Power Solutions
Marianne Matthews	Sky
Marissa Land	

Name	Organisation
Martin Garratt	Cambridge Cleantech
Matt Polaine	British Antarctic Survey
Matthew Pask	SEPA
Meg Hayward-Smith	Falmouth Marine Conservation
Michael Simmons	MPD Simmons
Mike Weaver	PYREG UK
Mildred Jeakins	EnviroComms
Naomi White	BEIS
Nicola Frost	Fauna & Flora International
Nikzad Falahati	i-team
Nisha DSouza	University of Cambridge
Oliver Green	
Pallavi Anand	The Open University
Parminder Kaur Heer	Institute for Manufacturing, University of Cambridge
Paul Bagnall	Innavisions Ltd
Paula Atherill	
Pei Rong Cheo	
Peter Skelton	WRAP
Phil Heads	Natural Environment Research Council
Pippa Heylings	Talking Transformation Ltd
Rachel Cavanagh	British Antarctic Survey
Richard Lampitt	National Oceanography Centre
Richard Thompson	University of Plymouth
Robert Bensted-Smith	
Rowan Byrne	Mott MacDonald
Ruth Fletcher	UNEP-WCMC
Sam Curran	SEPA
Sanae Chiba	UNEP-WCMC
Sarah Reakes	KISS communications
Sergio Ruiz Halpern	The Seabin Project
Shaheera Asante	
Shima Barakat	University of Cambridge
Siannon Steel	
Sophie Meuwissen	Cambridge Cleantech
Steph Rowbottom	
Stephen Bates	EnviroComms
Stephen Roberts	British Antarctic Survey
Steve King-Underwood	Cambridge Garden Studios
Steven Bennett	

Name	Organisation
Stuart Foster	RECOUP
Stuart Newble	Flute Upcycling
Sue Wells	The National Trust
Suzan Ziobro	Cambridge Judge Business School
Sylwia Orynek	
Tamara Galloway	Exeter University
Taylor Uekert	University of Cambridge
Timothy Moffat	British Antarctic Survey
Tracy Sutton	Root
Vicky Fowler	British Antarctic Survey
Yasmin Palij	PYREG
Yvonne Mather	