



Image Credit: Chiara Gambardella (CNR-IAS)

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# RESPONSE

## Project Newsletter Issue No: 1

This first phase of our RESPONSE project has seen our researchers participate in various microplastic awareness raising campaigns with international NGOs, collaborative field sampling events, while simultaneously publishing papers and reports on the impacts of plastic pollution in our marine environments.

In this newsletter you will find an overview of our researcher’s key activities to date from the field, to the lab.

### The RESPONSE team!



The **RESPONSE** project is supported through the Joint Programming Initiative: Healthy and Productive Seas and Oceans (JPI Oceans).

## OBJECTIVES

**GAIN NEW KNOWLEDGE** on the spatial and temporal distribution of microplastics and nanoplastics in marine ecosystems

**CHARACTERISE ECOLOGICAL THRESHOLDS** for specific features of microplastics that can affect their ingestion and toxicity in marine organisms

**INVESTIGATE THE ECOTOXICOLOGICAL HAZARD** of still unexplored particles such as nanoplastics and biodegradable polymers

**PROVIDE A QUANTITATIVE MODEL** for assessing the potential impact of MPs in the marine environment, considering the environmental impact of multiple stressors

**SET UP AN ANALYTICAL SMART HUB** that will share innovative technologies and application expertise for analytical needs, along with contributing to methodological improvement and training

**INCREASE PUBLIC UNDERSTANDING** of the ecological risk of microplastics and nanoplastics and increase public action

Image Credit: Chiara Gambardella (CNR-IAS)

## About RESPONSE

The RESPONSE project brings together 14 partner institutions from across Europe with expertise in oceanography, environmental chemistry, ecotoxicology, experimental ecology and modelling to answer key research questions about the fate and biological effects of microplastics and nanoplastics in marine ecosystems.

We will be identifying possible accumulation zones in European coastal ecosystems by studying hydrological transport dynamics; analysing the abundance and type of micro- and nanoplastics found in marine species by sampling representative marine animals; identifying how plastic particles, along with other environmental stressors, affect the health of species and food webs; and synthesising this research into a Weight of Evidence model.



## RESPONSE AT-A-GLANCE



**Funded  
Through JPI  
Oceans**



**12 National  
Funding  
Agencies**



**14 Research  
Partners  
Across  
Europe**



**8  
Interconnected  
Work Packages**



**7 Published  
Reports and  
Papers**

## RESPONSE WORK PACKAGES

1. Monitoring Microplastics in European Coastal Areas
2. Biological Fate of Microplastics and Nanoplastics
3. Biomarkers in Ecological Risk of Microplastics
4. Bioassays in the Ecological Risk of Microplastics & Nanoplastics
5. Effects of Microplastics on Ecological Functioning
6. Weight of Evidence (WOE) Model for Microplastics
7. Smart Hub of Analytical Facilities
8. Communication and Dissemination



## + A Joint Activity Between JPI Oceans RESPONSE and FACTS Consortia

Rodrigo Almeda, University of Las Palmas de Gran Canaria (ULPGC), and National Institute of Aquatic Resources (DTU)

A key factor in obtaining comparable data in microplastic pollution research is the harmonization of sampling and analytical techniques. JPI-Oceans RESPONSE partners (Örebro University, University of Antwerp ECOSPHERE, University of Bordeaux, Tallinn University of Technology, University of Vigo and Danish Technical University-DTU) in collaboration with the lead partner of JPI-Oceans FACTS consortia (Aalborg University, AAU) are conducting a joint action to sample microplastics and their associated pollutants using a new plastic-free pump-filter system (“UFO” developed by AAU) and common analytical protocols.

The goal of this collaboration between the two JPI-Oceans consortia is to estimate the abundance and composition of microplastics > 10 um and their associated pollutants (plastic additives and absorbed organic pollutants) in coastal waters using common methodologies for comparable and reliable results.

This collaboration is being co-ordinated by Dr. Rodrigo Almeda (JPI-Oceans RESPONSE) and Dr. Alvis Viatello (JPI-Oceans FACTS). More than 60 samples from coastal waters in five different EU countries have been successfully collected and the analysis of both microplastics and associated pollutants will be conducted in the following months. Microplastics will be analyzed by Micro-FTIR using a common protocol for sample preparation.

Pollutants associated with microplastics, including organophosphate flame-retardants, bisphenols, polybrominated diphenyl ethers, metals, PAHs and PCBs will be analyzed in the University of Las Palmas de Gran Canaria (ULPGC).



”

“ Knowing only the type of plastic polymer and its concentration in surface waters is not enough to evaluate the impact of marine MPs in the ecosystems; we need a better estimate that includes the type and concentration of plastic additives and associated pollutants in coastal waters, since these play a driving role in the toxicity of plastic pollution on biota.



Researcher Anna Rotander pictured with UFO pump during microplastic sampling in Sweden (Image Credit: Anna Rotander).

## + A Joint Activity Between JPI Oceans RESPONSE and FACTS Consortia

...continued from page 5

“Knowing only the type of plastic polymer and its concentration in surface waters is not enough to evaluate the impact of marine MPs in the ecosystems; we need a better estimate that includes the type and concentration of plastic additives and associated pollutants in coastal waters, since these play a driving role in the toxicity of plastic pollution on biota”, says Dr. Almeda.

As an example of this collaboration, Dr. Vianello (AAU) and PhD candidate Gunaalan Kuddithamby (DTU) joined a sampling campaign in Vigo coordinated by Dr. Leticia Vidal-Liñán (University of Vigo) in July 2021. Samples were collected at three different locations identified as being potentially affected by microplastic pollution at different levels. The first location (polluted site) was chosen because of its vicinity to the outlet of a submarine pipe transporting

wastewater from the Wastewater Treatment Plant of Vigo .

The second location represented an intermediate situation, still affected by potential urban sources of microplastics, but distant from potential wastewater upwelling. Finally, the third location was selected in proximity to the Cies Islands (a protected Spanish National Park) as a control site.

The ongoing joint activities between JPI-Oceans consortia stresses positive inter-project collaborations between these two groups, building the baseline for harmonized analytical approaches and, therefore, comparable and reliable results. This will ultimately lead to a better understanding of microplastic pollution in European waters.

## + *Mytilus trossulus* Experiments

Natalja Buhhalko, Tallinn University of Technology

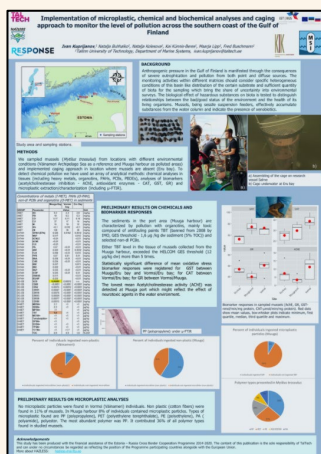
An initial experiment on the effects of microplastics in sediments on mussels was conducted in 2021 by researchers at the Tallinn University of Technology. Cages containing *Mytilus trossulus* mussel specimens were put into two coastal areas along the Gulf of Finland (Eru Bay and Narva Bay), noted for their different anthropogenic impacts.

Mussels were selected in this research as 'being sessile suspension feeders, [they] effectively accumulate substances from the water column and indicate the presence of xenobiotics' (Kuprijanov et al., 2021).

While data analysis is currently ongoing on those samples that have been retrieved, the results from preliminary microplastic analyses were presented as part of *The Gulf of Finland Science Days 2021* held between 29-30 November, during their scheduled poster session.



Researchers assemble cages containing *Mytilus trossulus* mussel specimens on the research vessel Salme (Image Credit: Kuprijanov et al., 2021).



Kuprijanov, I., Buhhalko, N., Kolesova, N., Kõnnis-Beres, K., Maarja Lipp, M. & Buschmann, F., 2021. *Implementation of microplastic, chemical and biochemical analyses and caging approach to monitor the level of pollution across the southern coast of the Gulf of Finland.*

[LEARN MORE](#)

## + REMAR II EVENT

Beatriz Noya-Mariño & Olalla Alonso, ECOTOX Research Team, Universidade de Vigo

The ECOTOX research team from the Universidade de Vigo participated in a Conference on November 25th in Vigo (Galicia, Spain), organized by the [Amigos Association](#) where they gave a talk on a topic associated with the RE-MAR II Project.

The RE-MAR II Project aims to reduce marine waste in the Marine Protected Area of the Galician Rías Baixas by fostering environmental stewardship through participatory actions, and by collaborating with the fishing sector in an open and inclusive manner that is accessible to all, particularly those with different abilities as they are often the promoters of REMAR II actions.

Participation in the event was highly rewarding both in terms of communicating science as well as on a personal level as it allowed Beatriz and Olalla to promote the RESPONSE project's activities along with its overall aims and objectives to an attentive audience on the day.

## New Team Member!



*Filipe Laranjeiro*

For more than 10 years, at the University of Aveiro and the University of Vigo, I studied endocrine disruption in gastropod species, as I was particularly interested in the imposex phenomenon and in other deleterious effects. This work has been subsequently reflected in both my Masters & PhD thesis, along with several scientific publications. From my previous time spent with the ECOTOX group, I also acquired a strong background in marine ecotoxicology, both on laboratory bioassays and field monitoring.

After my PhD, I sought to diversify my professional career and started working at IBM, where I developed extensive skills in the fields of data science and process automation.

But now, I'm very excited to be returning to a home that I know well, and take up a position under the supervision of Professor Ricardo Beiras, and apply all my knowledge to the RESPONSE project and produce novel ecotoxicological knowledge in the field of microplastics.



Beatriz Noya-Mariño and Olalla Alonso participating in the REMAR II event (Image Credit: Olalla Alonso).



## + Beach Sampling Activities

Natalja Buhhalko, Tallinn University of Technology

A sampling campaign of stranded beach macroplastics was organized from 1<sup>st</sup> to 10<sup>th</sup> of October 2021 and was participated in by the microplastics team from Tallinn University of Technology along with their friends, relatives, and even dogs! The type of macroplastics collected were first identified using FTIR, before being shredded and sent to Dr Francesca Garaventa (CNR-IAS) for further micronization.

Now micronization is almost completed and Francesca Garaventa's team will provide microplastic particles of different size and polymer type to other partners.

The micronized microplastics samples will be used for lixiviates experiments with small organisms by many laboratories throughout the project.



Image credit: Natalja Buhhalko

## + Marine Litter Collection at A Lanzada Beach

Olalla Alonso, and Sara López-Ibáñez, ECOTOX Research Team, Universidade de Vigo

In January, our RESPONSE partners from the ECOTOX Research Group at Universidade de Vigo accompanied staff from the Spanish Ministry for the Ecological Transition and the Demographic Challenge (MITECO), to the magnificent beach of A Lanzada in Galicia, where they spent the day learning from the ministry and carrying out their own marine litter beach collection.

The samples collected as part of this event contained mostly plastic litter and debris (see below) and are currently undergoing further analysis.



Location of the marine litter collection site and collected plastic samples (Image credit: Beatriz Noya-Mariño).



## PLASTIC AWARENESS CAMPAIGNS

### + *Difendiamo Il Mare* Campaign with Greenpeace Italy

#### Polytechnic University of Marche

RESPONSE research partner Stefania Gorbi of the Polytechnic University of Marche participated in the fourth '*Difendiamo il Mare*' expedition in June as part of a collaborative campaign with CNR-IAS of Genoa, DISTAV, University of Genoa, and Greenpeace Italy.

This expedition was undertaken to highlight the impacts of climate change and plastic pollution on marine ecosystems and coastal communities.

### + Marevivo 'Adopt A Beach' Campaign

#### Polytechnic University of Marche

Our RESPONSE partners at the Polytechnic University of Marche participated in awareness raising campaigns with the non-profit Marevivo to deepen scientific studies on the environmental fate and the risk of microplastics for marine organisms.

As part of UNIVPM's actions, they have adopted [Trave Beach, Conero Promontory in Ancona](#).

Researchers from Polytechnic University of Marche participating in field activities along the Conero coast (top) and in collaboration with Greenpeace in 2021 (bottom) (Image Credit: UNIVPM)



## + Marine Litter in the Gulf of Finland

Natalja Buhhalko, Tallinn  
University of Technology

In this video which addresses the issue of marine litter in the Gulf of Finland, RESPONSE researcher Natalja Buhhalko discusses the prevalence of microplastics in benthic and pelagic fish, and how microplastic additives and chemicals can affect the hormonal system as well as the broader health of marine species.

Click icon to view:



## + Keep The Planet Awareness Campaign

Stefania Gorbi, Alessandro Nardi, & Francesco Regoli,  
Polytechnic University of Marche

Our research partners at UNIVPM participated in plastic and microplastic pollution awareness raising campaigns in collaboration with Greenpeace and Alessandro Nicoletti of *Keep the Planet*. As part of this campaign, Alessandro produced a number of informative documentaries which highlight the various methods and instruments researchers and scientists use for data collection, the risks plastic pollution pose to our health and our ecosystems, and the role of RESPONSE in addressing these risks.



## + UFO Pump Testing in Belgium and the Netherlands

Mathilde Falcou-Préfol,  
University of Antwerp,  
ECOSPHERE

In the Spring of 2021, our research partners at the University of Antwerp, ECOSPHERE had the chance to test a UFO pump filter system at three locations along the Scheldt estuary (Belgium and the Netherlands).

The samples collected as part of these activities are being processed to obtain data on microplastics pollution in the water compartment.

The results will be further related to the data obtained on various species organs presenting different feeding behaviour, having different habitats and at different levels in the trophic level sampled from the same locations.



Image credit: Mathilde Falcou-Préfol



Keep up to date with all our project activities by subscribing to our newsletter!!



Researchers from CNR-IAS on board the World Wildlife Fund's 'Blue Panda' research vessel as part of their scheduled citizen science activities (Image Credit: CNR-IAS)



## + National Research Council - Institute for the Study of Anthropic Impacts and Sustainability in the Marine Environment

### Blue Panda Week

CNR-IAS were on board the World Wildlife Fund's 'Blue Panda' research vessel on the 28th of June for their 'Plastic Free Day' citizen science event, analysing and sorting microplastic samples that were collected from the Bay of Paraggi using innovative mini-manta nets that were pulled by kayaks!



### The Microplastic Hunters Project

Our RESPONSE project partners at CNR-IAS, along with members of the Outdoor Portofino CRABS Team undertook their first monitoring and clean-up activities as part of the "Micro Plastic Hunters" project in the waters of the Marine Protected Area of Portofino and Cala dell'Oro last summer.

The microplastic samples collected as part of these field activities are now with researchers at CNR-IAS where they will undergo further laboratory analysis.



## MEDIA & OUTREACH

As part of the RESPONSE project our partners have participated in a number of podcasts, interviews, and documentaries to discuss the important topic of microplastics and their impact in our environment.

You can learn more about these activities by clicking on the icons below each item!

### + Wise and Shine Podcast

#### Kati Lind, Tallinn University of Technology

In the fourth episode of the Wise And Shine podcast series, RESPONSE researcher Kati Lind, of the Institute of Marine Systems of Tallinn University of Technology discusses the impacts of plastic pollution on Estonian coastlines.



### + ETV Interview

#### Ivan Kuprijanov, Tallinn University of Technology

Following the recent publication of the United Nations' second World Ocean Assessment (WOAII), RESPONSE researcher Ivan Kuprijanov of the Institute of Marine Systems, Tallinn University of Technology, joined ETV to discuss the implications of this report in relation to the Baltic Sea region.



## PUBLICATIONS

Gorbi, S., Pittura, L., Nardi, A., Ventura, L. and Regoli, F., 2021. *Difendiamo il Mare Campaign 2020 Promossa da Greenpeace Italia: Microplastiche e microfibre in pesci e invertebrati campionati nel Tirreno centro-settentrionale. Report Finale.*

[LEARN MORE](#)

Guilhermino, L., Martins, A., Cunha, S. and Fernandes, J.O., 2021. Long-term adverse effects of microplastics on *Daphnia magna* reproduction and population growth rate at increased water temperature and light intensity: Combined effects of stressors and interactions. *Science of the Total Environment*. Vol. 784, 147082.

[LEARN MORE](#)

Vital, S. A., Cardoso, C., Avio, C., Pittura, L., Regoli, F., & Bebianno, M. J. (2021). Do microplastic contaminated seafood consumption pose a potential risk to human health?. *Marine Pollution Bulletin*, 171, 112769.

[LEARN MORE](#)

## PUBLICATIONS

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Beiras, R. and Schönemann, A.M., 2020. Currently Monitored Microplastics Pose Negligible Ecological Risk To The global Ocean. *Scientific Reports* 10, 22281.

[LEARN MORE](#)

Cormier, B., Gambardella, C., Tato, T., Perdriat, Q., Costa, E., Veclin, C., Le Bihanic, F., Grassl, B., Dubocq, F., Kärman, A., Van Arkel, L., Lemoine, S., Lagarde, F., Morin, B., Garaventa, F., Faimali, M., Cousin, X., Bégout M.L., Beiras, R. and Cachot, J., 2021. Chemicals Sorbed to Environmental Microplastics are Toxic to Early Life Stages of Aquatic Organisms. *Ecotoxicology and Environmental Safety*, Vol(28), 111665.

[LEARN MORE](#)

Gonçalves, J.M. and Bebianno, M.J., 2021. Nanoplastics Impact on Marine Biota: A Review. *Environmental Pollution*, Vol (273), 116426

[LEARN MORE](#)

Mazzoli, C. and Gorbi, F., 2021. *Plastic Litter in the Adriatic Basin*.

[LEARN MORE](#)

### + Estonian Museum of Natural History Podcast

Natalja Buhhalko, Tallinn University of Technology

RESPONSE researcher Natalja Bukhalko, of the Institute of Marine Systems of Tallinn University of Technology, participated in a podcast with biologist Katerina Pesotski and zoologist Lennart Lennuk for the Estonian Museum of Natural History. In this podcast Natalia discusses the issue of microplastics and the impact of marine plastic pollution in the Baltic Sea region.

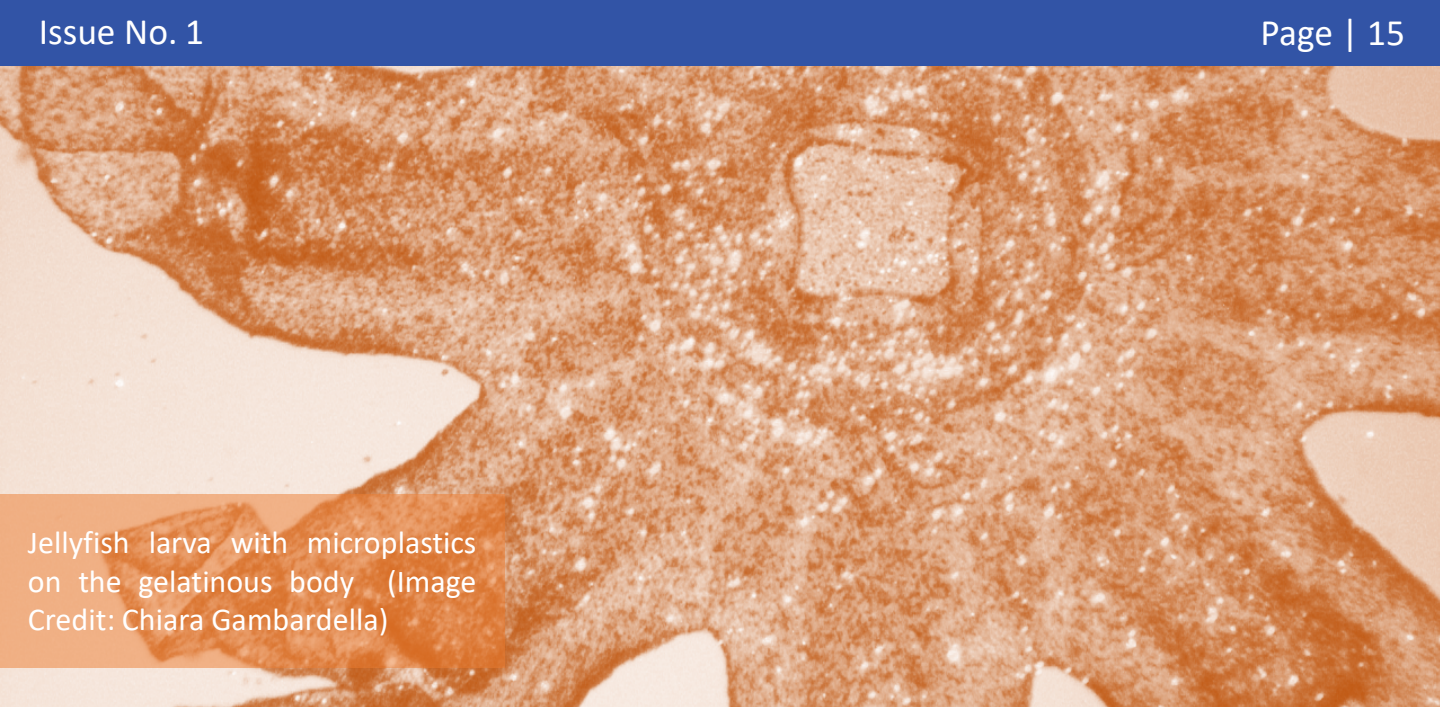


### + World Water Day Documentary

Stefania Gorbi, Alessandro Nardi, & Lucia Pittura, Polytechnic University of Marche

As part of World Water Day 2021, Prof. Stefania Gorbi, Dr. Alessandro Nardi, and Lucia Pittura (UNIVPM), participated in a video documentary produced by *Lac Studio Films*, where they discussed their deep passion for the sea and what led them to pursue a career in researching the impacts of pollution on the marine environment.





Jellyfish larva with microplastics on the gelatinous body (Image Credit: Chiara Gambardella)

## WHAT'S NEXT FOR RESPONSE

### + Sampling Collaborations

The University of Algarve Centre for Marine and Environmental Research will shortly be sending the ECOTOX team at University of Vigo lixiviates from plastics that they have been collecting along the Portuguese coast to carry out the corresponding bioassays.

### + Joint Publication

Partners from the ECOTOX lab at Universidade de Vigo, the University of Bordeaux, the National Institute of Aquatic Resources (DTU) Section for Ocean and Arctic, in collaboration with the Universidad de Las Palmas de Gran Canaria, are currently planning a joint scientific article on standardized protocol for bioassaying lixiviates.

### + Plastic Micronization

Micronization of plastic samples taken as part of the TalTech stranded beach macroplastics campaign is almost complete thanks to Dr Francesca Garaventa and her team at CNR-IAS. The micronization process will result in microplastic particles of different size and polymer type that will be sent to other RESPONSE partners to support work across the project!

## Follow us for more!



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[response-jpioceans.eu/](https://response-jpioceans.eu/)

Response is funded by the Joint Programming Initiative for Healthy Oceans and Seas (**JPI Oceans**) through support from the following national funding agencies: Belgium - The Belgian Science Policy Office (**BELSP0**); Denmark - The Innovation Fund Denmark (**IFD**); Estonia - The Ministry of the Environment of the Estonian Republic (**MoE**) and the Estonian Research Council (**ETAgz**); Germany - The Federal Ministry of Education and Research (**BMBF**); Ireland - The Marine Institute (**MI**) and the Department of Housing, Planning and Local Government (**DHPLG**); Italy - The Ministry of Education, University and Research (**MIUR**); Norway - The Research Council of Norway (**RCN**); Portugal - The Science & Technology Foundation (**FCT**); Spain - The Spanish State Research Agency (**AEI**); Sweden - The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (**FORMAS**).