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## ANDROMEDA Newsletter Issue No. 2

We are delighted to bring you ANDROMEDA's second project newsletter which covers our project activities from February 2022, to February 2023. This year saw the retrieval of our subsurface and deep sea microplastics samples from Norwegian and French coasts, a return to in-person conferences and meetings, the publication of key research findings across a range of scientific journals, and the first research cruise of 2023 in Vigo, on board the oceanographic vessel *Ángeles Alvariño*.

In this newsletter you will find the highlights of the year including links to papers, presentations, and other activities of interest.

### The ANDROMEDA team!

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



# Project Activities

## + Malta Project Meeting

*Kathrin Kopke, MaREI, the SFI Centre for Energy, Climate and Marine Research, UCC*

Our first in-person meeting of the ANDROMEDA project was held from the 30th - 31st May, 2022 in Malta thanks to a collaborative effort between the Institut Méditerranéen d'Océanologie, and the University of Malta.

Day 1 of our meeting gave our research partners an opportunity to update the consortium on individual work package progress, and plan for the year ahead. On day two we had the pleasure of joining our consortium partners on Rinella Bay to launch the ANDROMEDA citizen science smartphone app!

This day was attended by Minister for the Environment, Energy and Enterprise, Miriam Dalli, representatives from the Malta Tourism Authority, and a number of environmental NGOs, including Nature Trust (Malta), Zibel and Sharklab. The citizen science app was launched to participants from the St. Monica (B'kara) secondary school, with the students participating in the microplastics demonstrations and recording activities on the day!

Our UCC research partners are currently developing multilingual factsheets from participating regions, to support schools in their use of the ANDROMEDA smartphone app!



*(T-B) Beach sample, and Richard Sempéré and Natascha Schmidt, pictured at smartphone app launch event (Image Credits: Richard Sempéré & Amy Dozier)*





## ANDROMEDA RESEARCH PUBLICATIONS

April 2022

Nguyen, B. and Tufenkji, N., 2022. **Single-Particle Resolution Fluorescence Microscopy of Nanoplastics.** *Environmental Science & Technology*, 10, 6426–6435.

June 2022

Jenkins, T. *et al.*, 2022. **Current State of Microplastic Pollution Research Data: Trends in Availability and Sources of Open Data.** *Frontiers in Environmental Science*, 10:912107.

June 2022

Meyers, M. *et al.*, 2022. **Microplastic Detection and Identification by Nile Red Staining: Towards a Semi-Automated, Cost-effective, and Time Effective Technique.** *Science of the Total Environment*, Vol. 823, 153441.

June 2022

Ourgaud, M., *et al.*, 2022. **Identification and Quantification of Microplastics in the Marine Environment Using the Laser Direct Infrared (LDIR) Technique.** *Environmental Science & Technology*, 56, 14, 9999–10009.

July 2022

Primpke, S., *et al.*, 2022. **Monitoring of Microplastic Pollution in the Arctic: Recent Developments in Polymer Identification, Quality Assurance and Control (QA/QC), and Data Reporting.** *Arctic Science*.

August 2022

Roweczyk, L., *et al.*, 2022. **From Freshwaters to Bivalves: Microplastic Distribution Along the Saint-Lawrence River-to-Sea Continuum.** *Journal of Hazardous Materials*, Vol. 435 (128977).

November  
2022

Castro-Jiménez, J., *et al.*, 2022. **Effective Degradation of Organophosphate Ester Flame Retardants and Plasticizers in Coastal Sediments Under High Urban Pressure.** *Scientific Reports*, 12(1):20228.

January  
2023

Hakvåg, S, *et al.*, 2022. **Composition, Properties and Other Factors Influencing Plastics Biodegradability.** In *Biodegradability of Conventional Plastics: Opportunities, Challenges, and Misconceptions.* Elsevier ISBN 9780323898584.

January  
2023

Gondikas, A., Mattsson, K. and Hassellöv, M., 2023. **Methods for the Detection and Characterization of Boat Paint Microplastics in the Marine Environment.** *Frontiers in Environmental Chemistry*, 4:1090704.

Learn more at: [www.andromedaproject.net/publications](http://www.andromedaproject.net/publications)

## PROJECT ACTIVITIES

### + Hyperbaric Experiments

*Natascha Schmidt, Mediterranean Institute of Oceanography (MIO)/Norwegian Institute for Air Research (NILU)*

The ANDROMEDA project's hyperbaric experiments successfully began in February 2022 on board the research vessel "Pourquoi Pas?". As part of this field work, researchers collected water at 2000m depth and at the surface and placed it into glass bottles containing test materials (tyre wear particles - virgin/weathered crumb rubber) after filtration (0.7 m).

The deep-sea water samples were then exposed to 20 MPa pressure, while the surface water samples were kept at atmospheric pressure. All samples were kept in a 13°C temperature-controlled room, representing the water temperature at the surface and the deep-sea during the Mediterranean winter.

*Hyperbaric samples (Image Credit: Natascha Schmidt)*

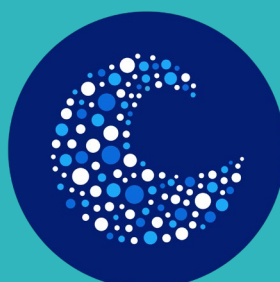
Samples were taken after 6h, 24h, 7 days and 14 days of exposure to atmospheric pressure and high hydrostatic pressure, respectively. In parallel to the effect of high hydrostatic pressure on chemical leaching from tire wear and crumb rubber particles, the effect of natural deep-sea and surface water prokaryotic assemblages was investigated by comparing biotic and abiotic (addition of HgCl<sub>2</sub>) test conditions. Samples were analyzed for dissolved organic carbon, prokaryotic abundance and tire-related compounds in leachates and particle extracts.

We have summarized an overview of state-of-the-art methods and main instruments available within the consortium. Learn more by clicking on the icons below!

Analysis Methods



Artificial Microplastic Degradation Methods



Instrument Availability



## PROJECT ACTIVITIES

### + Microlitter Device Testing

*Nelle Meyers, Flanders Research Institute for Agriculture, Fisheries and Food (ILVO), and Flanders Marine Institute (VLIZ)*

In April 2022, researcher Nelle Meyers participated in a multiday plastics sampling campaign with the *RV Simon Stevin* to test the new microplastics sampling device developed as part of the project by research partners at TalTech. These sampling activities took place in the Belgian part of the North sea and in the River Scheldt. Field activities were successful with subsequent samples undergoing further analysis to establish if the sampling methodology was suitable for capturing microplastics data.

### + ANDRO23 Research Cruise

*Centro Oceanográfico de Vigo, (Instituto Español de Oceanografía - IEO), Technical University of Tallinn (TalTech)*

The ANDRO23 microplastics sampling campaign was launched on February 16<sup>th</sup> 2023 in Vigo, and took place on aboard the oceanographic vessel *Ángeles Alvariño*. This campaign was led by the Spanish Institute of Oceanography together with scientists from the Technical University of Tallinn (Estonia).

The sampling activities undertaken during this cruise utilised the ferrybox system developed in 2022, with comparable sampling being undertaken using a manta trawl. These sampling activities were designed to plot the distribution and abundance of microplastics at different depths. You can learn more about ANDRO23 at the following [link!](#)

## PRESENTATIONS & EVENTS

### VLIZ Marine Science Day

Nelle Meyers  
2<sup>nd</sup> March 2022

### JPI Oceans Mid-Term Meeting

27<sup>th</sup> – 28<sup>th</sup> April 2022

### SETAC Europe 2022

Nelle Meyers  
16<sup>th</sup> May 2022

### SETAC Europe 2022

Eva Roubeau  
16<sup>th</sup> May 2022

### How to Engage With the Mission 'Restore our Ocean and Waters by 2030'

*Richard Sempere*  
13<sup>th</sup> – 14<sup>th</sup> May 2022

### 9<sup>th</sup> Norwegian Environmental Toxicology Workshop

Andy Booth  
8<sup>th</sup> – 10<sup>th</sup> June 2022

### Microplastic Workshop for Early Career Researchers

Andy Booth  
13<sup>th</sup> – 17<sup>th</sup> June 2022

### PlastPoll Workshop

Andy Booth  
31<sup>st</sup> August – 1<sup>st</sup> September 2022

### Science in the City Event

Alan Deidun  
30<sup>th</sup> September 2022

### Marine Environment Protection Seminar

Gustavo Blanco  
5<sup>th</sup>-6<sup>th</sup> October 2022

## PROJECT ACTIVITIES

### + Cost-Effectiveness of Different Microplastic Analysis Methods Survey and Workshops

*Nelle Meyers, Flanders Research Institute for Agriculture, Fisheries and Food (ILVO), and Flanders Marine Institute (VLIZ)*

Nelle Meyers launched an online survey in October 2022 on the cost-effectiveness of different microplastic analysis methods, which aimed to provide a useful starting point for researchers, policy-makers, and other stakeholders when choosing between different microplastic workflows that aim to achieve the same outcome. This survey work allowed Nelle to gain insight into which workflows provide the greatest value for money for particular samples, and also on key elements to which the outcome are sensitive.

Based on the results of these surveys, it was decided that two workshops would be undertaken in February and March of 2023 with focus groups from our JPI Oceans sister projects, researchers specialising in microplastics analysis, and policy makers.

These workshops aimed to collate feedback and input towards providing concrete and useful recommendations of monitoring strategies in terms of cost-effectivity to support researchers, policy makers, and other stakeholders working in the area of microplastics analysis and mitigation.



#### COST-EFFECTIVENESS OF MICROPLASTICS ANALYSIS METHODS WORKSHOP

Nelle Meyers



## PRESENTATIONS & EVENTS

### JPIO Management Meeting

Alan Deidun  
6<sup>th</sup> October 2022

### JPIO Communicators Online Meeting

Kathrin Kopke & Orla-Peach Power  
12<sup>th</sup> October 2022

### Encuentro Internacional do Lixo Mariño

Gustavo Blanco  
15<sup>th</sup> October 2022

### 12th Kobe University Brussels European Centre Symposium

Richard Sempéré  
16<sup>th</sup> October 2022

### 82<sup>nd</sup> LCA Discussion Forum

Andy Booth  
4<sup>th</sup> November 2022

### MICRO2022

Gustavo Blanco  
16<sup>th</sup> November 2022

### MICRO2022

Nelle Meyers  
16<sup>th</sup> November 2022

### MICRO2022

Gustavo Blanco  
17<sup>th</sup> November 2022

### MICRO2022

Gustavo Blanco  
17<sup>th</sup> November 2022



## PROJECT ACTIVITIES

### + JPI Oceans Communicators Workshop

*Kathrin Kopke & Orla-Peach Power, MaREI, the SFI Centre for Energy Climate and Marine Research (UCC)*

Our UCC partners Kathrin Kopke and Orla-Peach Power represented the ANDROMEDA project and consortium at a science-communication event in October 2022, organised by Jella Kandziora of JPI Oceans. This event was designed to highlight the communication and dissemination activities of the 6 projects funded under the *JPI Oceans - Joint Action Ecological Aspects of Microplastics* call (ANDROMEDA, RESPONSE, FACTS, Microplastix, HOTMIC, i-plastic), and to discuss potential joint communication activities in the final year of the projects.

This meeting has led to collaborations across social media platforms to promote dissemination and communication activities across all projects.

Kathrin Kopke presented on the work being undertaken across our project consortium and amplified in particular the development of our citizen science smartphone app launched in Malta in 2022, and the project's survey on cost effective methodologies for microplastics analysis from seawater.



## Media & Outreach

Jesus Gago talks about the problem of plastics in our oceans on the newspaper *"Faro de Vigo"*.



In this short article entitled *'Belgen forceren doorbraak in opsporing microplastics in zee: "Veel efficiënter in kaart te brengen'* researcher Nelle Meyers speaks with Michaël Torfs of *VRT News* and gives an overview of the current and future benefits to using a Nile red staining methodology in microplastics research.



Learn more about the ANDROMEDA cruise and hyperbaric experiments in this short article from the *Mediterranean Institute of Oceanology*.



In this video, Gustavo Blanco proposes research activities for school students related to microplastic in the ocean as part of the *"Ponteciencia"* education initiative from the Council of Pontevedra.



Andy Booth participated in an interview with *forskning.no* entitled *'Tørketrommelen slipper ut masse mikroplast'* to discuss research focusing on the release of microfibrils from clothing and their potential risks.



## PROJECT ACTIVITIES

### + JPI Oceans ASLO Session

*Institut Méditerranéen d'Océanologie,  
Université d'Aix-Marseille*

ANDROMEDA will participate in a special session entitled 'SS081: JPI Oceans Joint Action Ecological Aspects of Microplastics – What is needed to transfer the scientific findings into political knowledge for action?' as part of ASLO 2023 which will be held from 4-9 June in Palma de Mallorca, Spain.

This session was submitted in collaboration with the JPI Oceans secretariat and projects funded under their 2020 call including: ANDROMEDA, RESPONSE, FACTS, Microplastix, HOTMIC and i-plastic.

The purpose of this joint session is to present project outcomes to date and to discuss with the participants and specialists in the field, how these scientific results can help policy makers and other relevant stakeholders take action against the issue of marine plastic pollution.

You can learn more about the event [here!](#)

## Media & Outreach

Jesus Gago speaks to *Cerna Magazine* about the problem of plastic pollution in our oceans.



The *University of Malta Newpoint* published an article outlining the launch of the ANDROMEDA citizen science smartphone app.



Learn more about the ANDRO23 microplastics research campaign that took place in February 2023 in Vigo in this interview with Lucía Viñas.



Andy Booth joins *the Finding Genius Podcast* to discuss the ongoing problem of microplastics.



Research conducted within the ANDROMEDA project was included in this policy informing note which provides an overview of the research landscape and scientific information on marine litter and microplastics in Belgium.

**Devriese, L.I.; Janssen, C.R., 2022.** Beleidsinformerende Nota: Overzicht van het onderzoekslandschap en de wetenschappelijke informatie inzake (marien) zwerfvuil en microplastics in België. *VLIZ Beleidsinformerende Nota's, 2022\_001.* Vlaams Instituut voor de Zee (VLIZ): Oostende. 57pp.



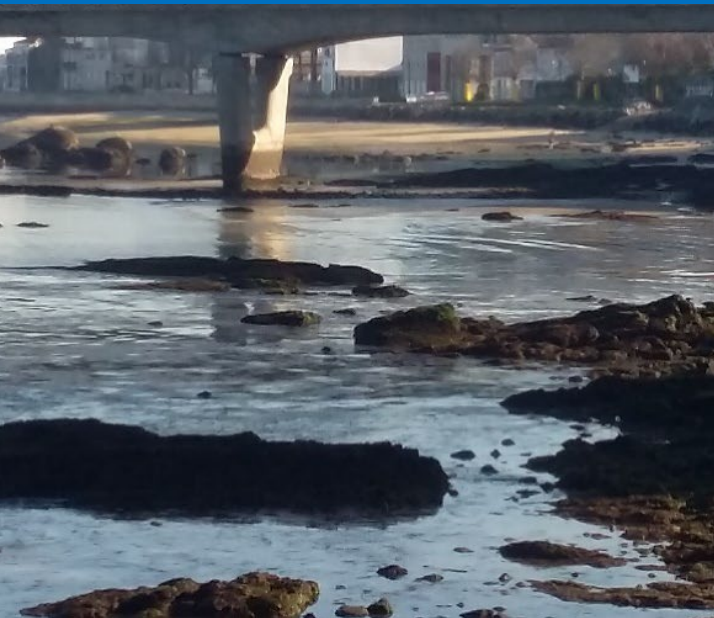


Image Credit: Gustavo Blanco Heras

## PROJECT ACTIVITIES

### + Vigo Estuary Sampling Activities

*Gustavo Blanco Heras, Spanish Institute of Oceanography*

As part of the ANDROMEDA project, field sampling activities were performed in the area of the Vigo Estuary from March 23rd-24<sup>th</sup>, 2022.

The objective of this sampling activity was to obtain mussels, sea water, and sediments for tyre wear related compounds analysis from two distinct sampling points. Point one (Figure 1 and 3) is influenced by continuous high traffic from the pier where cars from the nearby Citroen factory are stored before shipping, while Point Two (Figure 2) is located on a small beach in a residential area.

At each sampling point, six mussel samples, one seawater sample (two replicates), and one sediment sample were taken. For each mussel, the inner water was extracted and refrigerated, with mussel tissue then being separated from the shell and frozen. Samples retrieved as part of this field activity were sent to *Helmholtz Center for Environmental Research – UFZ* under refrigerated conditions for further analysis.





## PROJECT ACTIVITIES

### + Smartphone App Launch

*Alan Deidun, Adam Gauci, Johann Galdies & Alessio Marrone, University of Malta*

ANDROMEDA partners have been developing a citizen science smartphone app that will allow members of the public to help scientists collect valuable information on microplastics, by participating in local beach sampling activities. The app itself, uses artificial intelligence to analyse photos of microplastics taken by the app user, and learns to identify them over time.

The app was officially launched in May of 2022 in Malta at Rinella Bay and was attended by schoolchildren, environmental NGOs and the Minister for the Environment, Energy and Enterprise, Miriam Dalli.

The University of Malta has organised and participated in a number of public outreach events, and educational workshops and demonstrations over the last 12 months to promote the ANDROMEDA smartphone app, and other innovative tools that are being used to address the ongoing threat of microplastics in our marine environment. The most recent event was held at the *Malta National Aquarium*, where almost 200 year 7 students had the opportunity to learn about methods for extracting microplastics from beach sand, and how hand-held NIR spectrometers can be used to quantify microplastics.

You can watch the highlights from the app launch in this short video!



*Minister for the Environment, Energy and Enterprise, Miriam Dalli and students at smartphone app launch in Malta (Image Credits: Adam Gauci & Amy Dozier).*





Red paint sheet fragments  
(Image Credit: Olga Carretero)

## UPCOMING FOR ANDROMEDA

### + Environmental Pollution – JPI Oceans Special Issue

JPI Oceans have secured a special issue with the journal of *Environmental Pollution* that will focus on the issue of microplastics and nanoplastics in our natural environment, and will present research findings from the six projects funded under the *JPI Oceans - Joint Action Ecological Aspects of Microplastics* call in 2020.

### + JPI Oceans Final Project Conference

JPI Oceans will host a final project event in County Galway, Ireland from the 14<sup>th</sup> – 15<sup>th</sup> September this year to showcase the results and outcomes of the six projects funded under the *JPI Oceans - Joint Action Ecological Aspects of Microplastics*.

### + Esploro Public Outreach Event

Partners at the University of Malta will host a public outreach event with 50-100 students as part of *European Maritime Day* at the *Esplora Interactive Science Centre* in Malta on the 16<sup>th</sup> May 2023. As part of this event, students will be invited to use the ANDROMEDA smartphone application and hand-held spectrometer and will learn how these tools are being used to address the broader issue of microplastics in our marine environment.

## CONNECT WITH US



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[andromedaproject.net](https://andromedaproject.net)

ANDROMEDA is funded by JPI Oceans through support by the following national funding agencies: Belgium: the Belgian Federal Science Policy Office (BELSPO), France: The National Research Agency (ANR), Estonia: Ministry of the Environment of the Estonian Republic (MoE) and the Estonian Research Council (ETag); Germany: Federal Ministry of Education and Research (BMBF), Ireland: Marine Institute, and the Dept of Housing, Planning, and Local Government (DHPLG); Malta: Malta Council for Science and Technology (MCST); Norway: The Research Council of Norway (RCN); Spain: Spanish State Research Agency (AEI); Sweden: the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS).