

Biodegradable Soft Robots for Ocean Monitoring

Simona Aracri¹, Mohammed El-Sayed¹, Jamie O. Roberts^{1,2}, Francesco Giorgio-Serchi¹, Adam A. Stokes¹

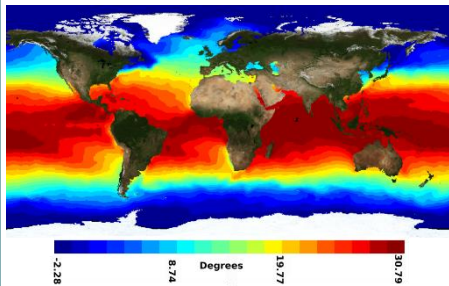
¹School of Engineering, Institute for Integrated Micro and Nano Systems, The University of Edinburgh, Scottish Microelectronics Centre

²Engineering and Physical Sciences Research Council (EPSRC) Centre for Doctoral Training (CDT) in Robotics and Autonomous Systems

Ocean Science and marine soft robotics can grow together towards a sustainable ocean monitoring network

Why

Climate Change



Pollution



by Stefan Leijon

How

Bio-inspiration

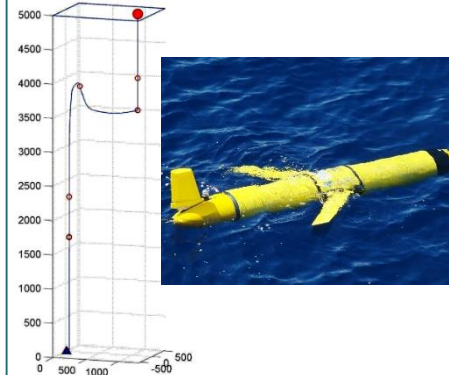


Soft robots



Environment

Moorings and AUV



Vessels



Off-Shore

Renewable



Ageing Industry



Challenges

Communication



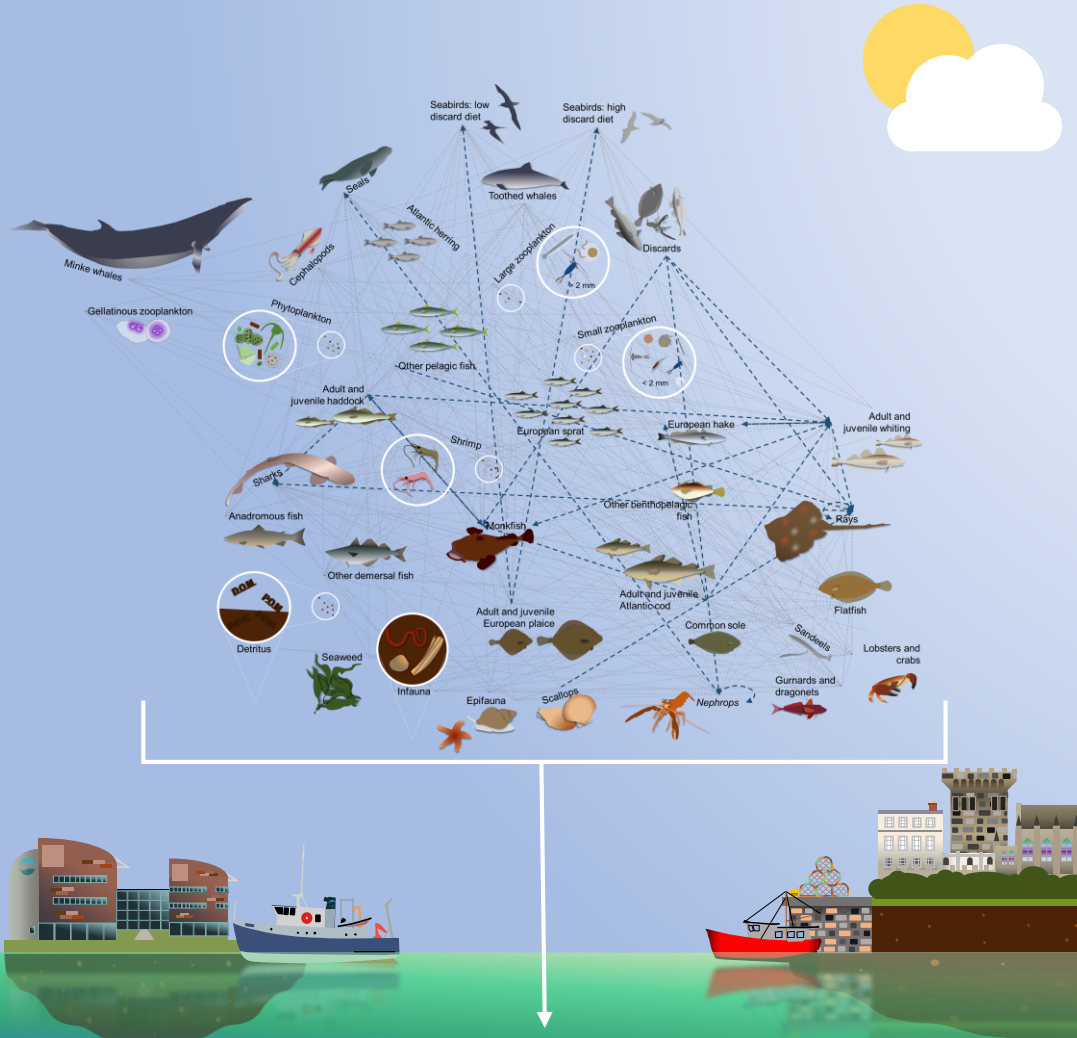
Innovative Material



CO-CREATING KNOWLEDGE FOR SUSTAINABLE FISHERIES MANAGEMENT: A CASE STUDY FOR THE IRISH SEA

Jacob W. Bentley¹, Natalia Serpetti¹, Clive Fox¹, David G. Reid², Sheila J.J. Heymans^{1,3}

WKIrish combined the knowledge of scientists, fishermen, industry leaders, and NGOs to co-create a food web model of the Irish Sea.



Co-created knowledge improved the models ability to simulate the dynamics of commercial stocks and is contributing towards the development of...




THE COASTAL CONUNDRUM

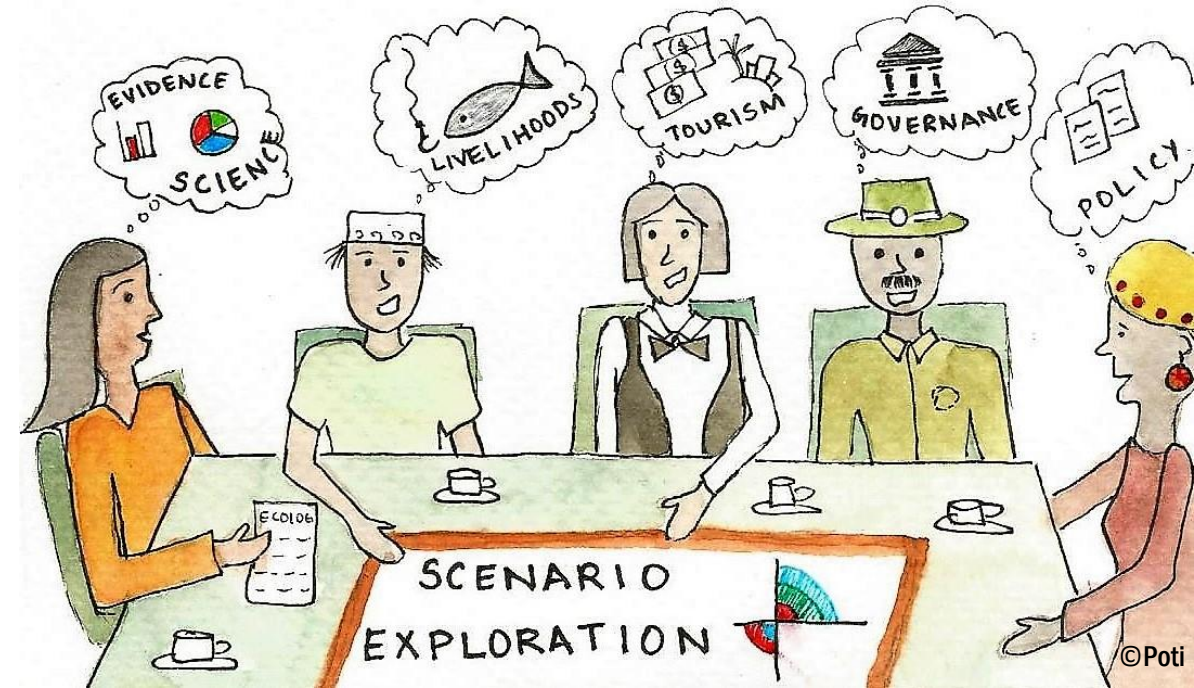
Conservation-development conflicts in rapidly developing tropical islands

- Meenakshi Shankar Poti



Tropical islands

Complex social-ecological systems with growing tensions between conservation & development



Making sense of the complexity

Co-creating sustainable futures through a multidimensional 'scenario thinking' approach

Biomonitoring of Atlantic semi-enclosed water areas using new approaches : *Zostera noltei* meadows



Accumulation capacity of 23 trace elements in *Zostera noltei* leaves was explored along a latitudinal climatic gradient (Mediterranean, semi-arid and arid climate) under different anthropogenic pressures.

Seagrass leaf element uptake relied on both differences in bioavailability and environmental conditions (climatic context, hydrological conditions and human impact).



Zostera noltei leaves are a powerful bioindicator of Cd, Mo, Sb, Ag, Zn, U, Al, Fe, Mn, Ba and Hg contamination in sediments.

Implementation of conservation measures is a major priority to halt the loss of one of the world's most threatened heritages facing environmental changes and degradation processes

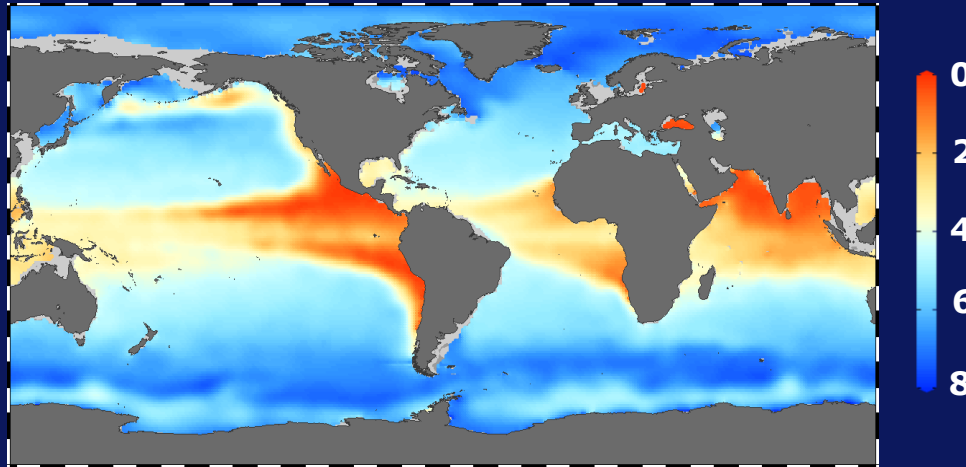


ANOXIC MICROBIAL OCEANS:

An unexplored carbon cycle

Saara Suominen, Gonzalo V. Gomez-Saez, Thorsten Dittmar, Jaap S. Sinninghe Damste, Laura Villanueva

SPREAD OF ANOXIA

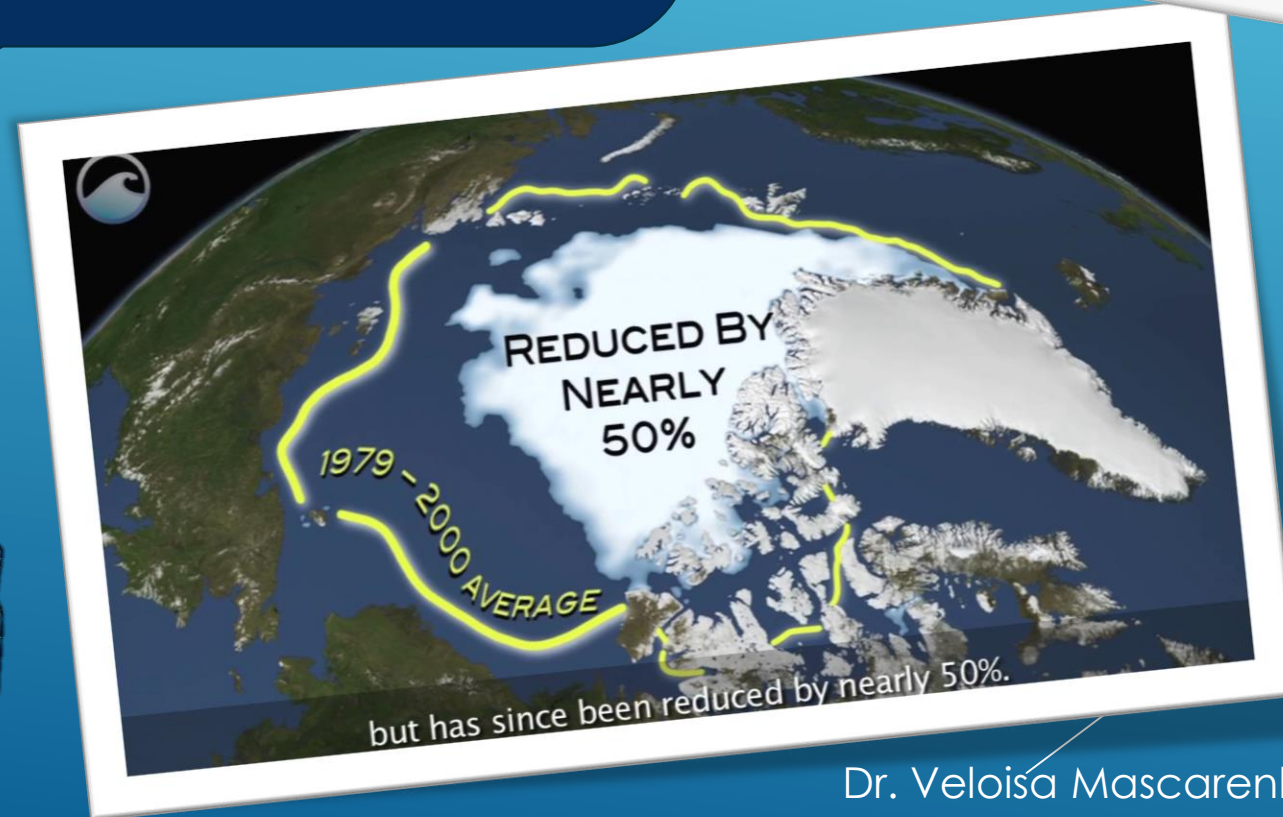


Oxygen (ml/l) 150 m depth

- Anoxic areas are spreading:
 1. Warming
 2. Nutrient inputs
- Very little is known about life there
- How will this affect the carbon cycle?

Increased glacial melt in the Arctic

- Greenland - 2nd largest Ice-Sheet in the world
- Mass loss quadrupled over last two decades
- Meltwater released contributes to 1/4 th of current sea-level rise
- Melting glaciers also release sediments into water
- Released sediments affect light availability and alter ecosystem functioning



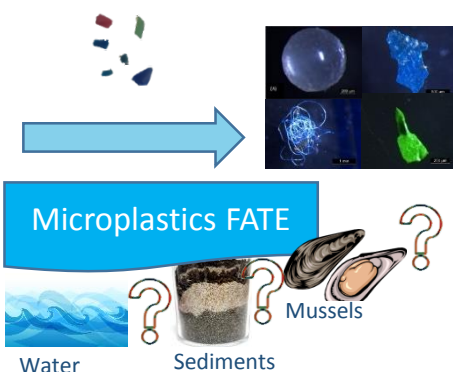
Assessment of wastewater treatment plant and coastal landfill as important microplastics pathways in the marine environment

Maria KAZOUR^{a,b}, Sarah TERKI^a, Khalef RABHI^a, Rachid AMARA^a

^a Univ. Littoral Côte d'Opale, CNRS, Univ. Lille, UMR 8187, LOG, Laboratoire d'Océanologie et de Géosciences, 32 Avenue Foch, Wimereux, France

^b CNRS-L, National Center for Marine Sciences, PO Box 534, Batroun, Lebanon

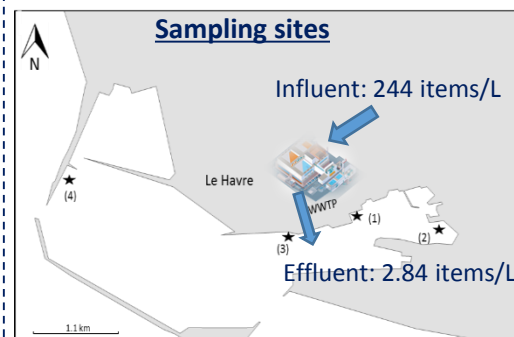
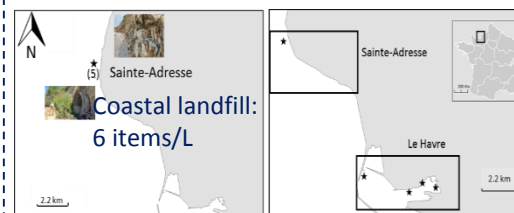
Wastewater treatment plant (WWTP) and coastal landfill



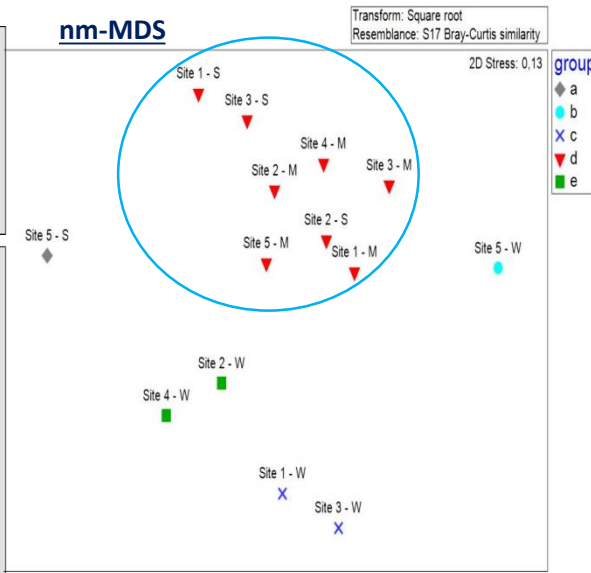
Microplastics (MPs) sources ?

Objectives

- The role of WWTP in MPs retention and input.
- WWTP MPs pathway in the marine environment along a distance gradient.
- The role of an abandoned coastal landfill in MPs input.



nm-MDS

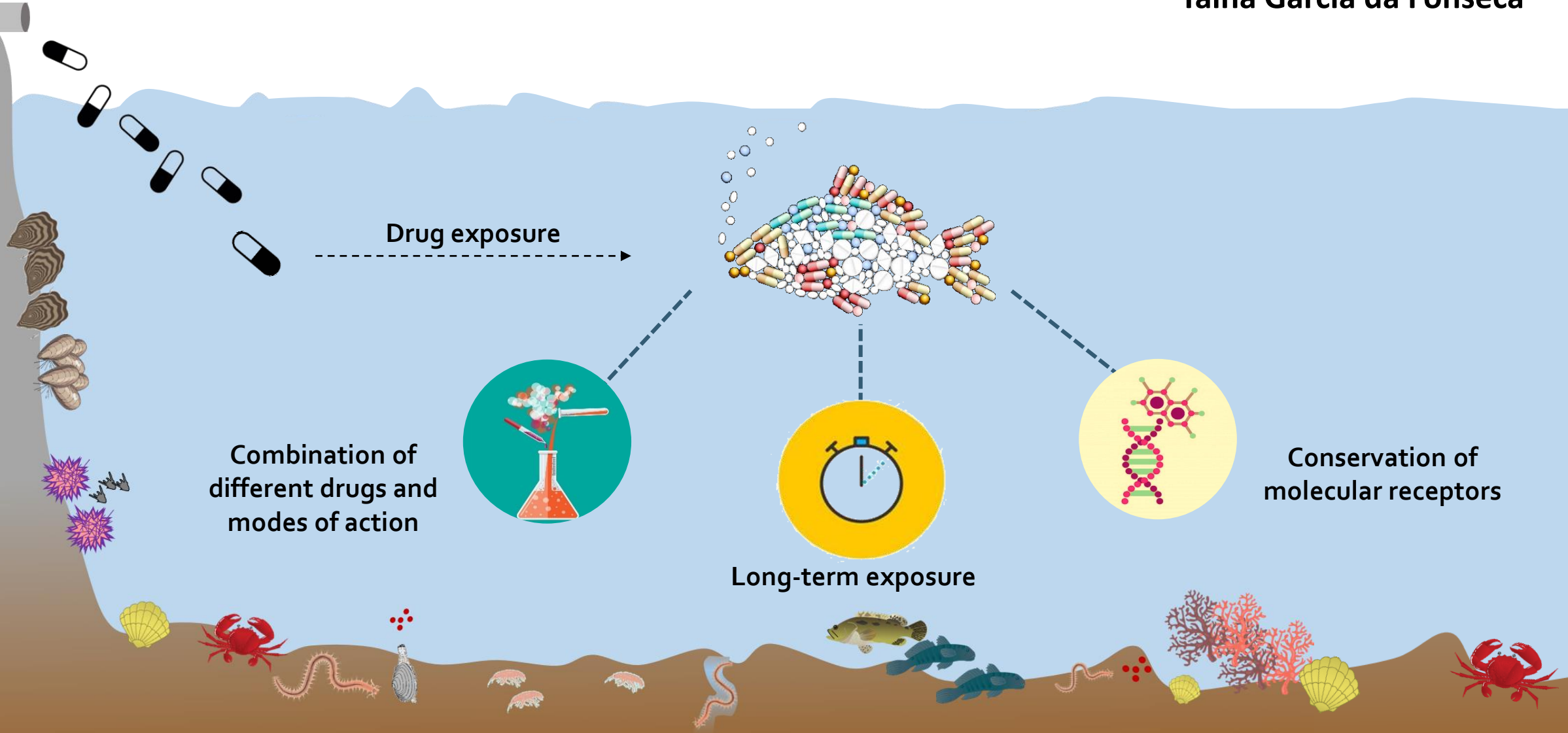


- ❖ This study is the first that assessed MPs dispersion in the coastal marine environment along a distance gradient from the WWTP effluent.
- ❖ The number of MPs in the surface water decreased with the increasing distance from the WWTP outflow.
- ❖ Mussels are prone to ingest small microplastics (< 200 μm) and show a polymer similarity to that of sediments.
- ❖ This study revealed the importance of coastal landfill in strong MPs abundances (2 to 4 times higher than those found near the WWTP effluent)



Occurrence of anticancer pharmaceuticals in the marine environment: An invisible pollution

Tainá Garcia da Fonseca



Can improvements to coastal environments improve the well-being of local communities?

Rebecca Shellock | PhD Researcher



@marinebecca



Before regeneration



After regeneration



Better health and vitality when living near the coast in Belgium

