UNIVERSITÀ POLITECNICA DELLE MARCHE

EFFECT-BASED ASSESSMENT FOR CONTAMINANTS OF EMERGING CONCERN IN MARINE ECOSYSTEMS

Francesco Regoli
Department of Life and Environmental Sciences,
DiSVA

UNIVERSITÀ POLITECNICA DELLE MARCHE

EFFECT-BASED ASSESSMENT FOR CONTAMINANTS OF EMERGING CONCERN IN MARINE ECOSYSTEMS

Supervisor: Prof. Francesco Regoli

The Supervisor

Director of the Department of Life and Environmental Sciences (DiSVA).

Full Professor in Applied Biology - **Chair** of "Ecotoxicology" and of "Biological and Ecological Risk Assessment", **former Director** of the Master Degree Program in "Environmental Risk and Civil Protection".

Past **Editor-in-Chief** of *Marine Environmental Research* (2011-2021).

Delegate for Italian Ministry of University and Research MUR within Horizon **Missions** "**Restore our Ocean and Waters by 2030**".

Expert on marine pollution from **traditional** and **emerging pollutants** including pharmaceuticals and microplastics, impact of harbor and oil & gas exploitation activities, **ecological risk assessment**. He has been responsible for several projects at international and national level.

Author of more than **270 peer-reviewed publications** in international journals and book chapters, with an ***h*-index= 79**, i10-index= 202 with 23.266 citations (from Google Scholar, http://scholar.google.it/citations); *h*-index= 67, 16.780 citations (from Scopus). Orcid profile: https://orcid.org/0000-0001-6084-6188

Highly Cited Researcher in 2022 and 2023

Most recent Research Projects:

- National Responsible of the project "Ecotoxicological Effects of Microplastics in Marine Ecosystems (**EPHEMARE**)", 2015-2018, https://www.jpi-oceans.eu/archive/ephemare.html

- International Coordinator of the Project "Towards a risk-based assessment of microplastic pollution in marine ecosystems (**RESPONSE**)", 2020-23, https://www.response-jpioceans.eu/

- International Coordinator of the Project "Presence, behavior and risk assessment of pharmaceuticals in marine ecosystems **PHARMASEA**" 2021-24, https://www.pharmasea-aquatpoll.eu/

- Coordinator of the Research project "MicroPLASTICs in edible aquatic organisms: ecotoxicological effects, transfer of chemical and biological CONtaminants and susceptibility to bacteria biodegradation (**PLASTICON**)", 2021-2024, funded by Italian Ministry of Health

-Coordinator of the Research Project "Development of innovative technologies and circular economy to mitigate the impact of plastic pollution in rocky shores with elevated environmental value (**SOLVING**)", 2021-2024, https://www.solvingplasticpollution.eu/

-National Coordinator of the Activity "Zero pollution strategy for biodiversity protection" within the National Biodiversity Future Center, **NBFC**, 2022-2025, https://www.nbfc.it/

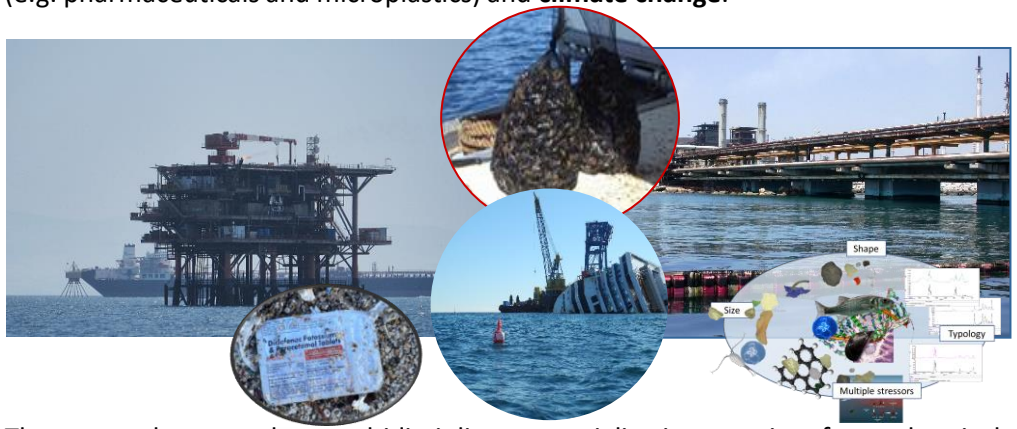
UNIVERSITÀ POLITECNICA DELLE MARCHE

EFFECT-BASED ASSESSMENT
FOR CONTAMINANTS OF EMERGING CONCERN IN MARINE ECOSYSTEMS

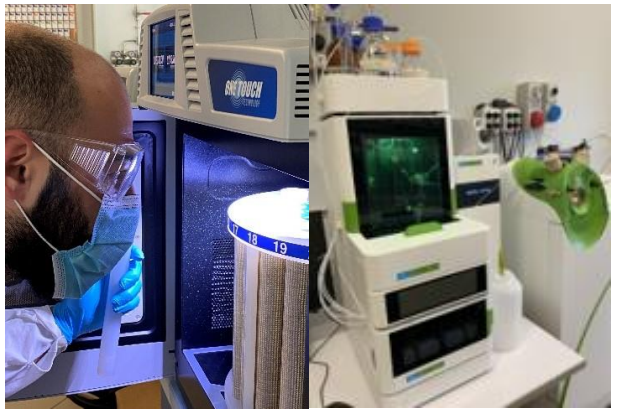
Supervisor: Prof. Francesco Regoli

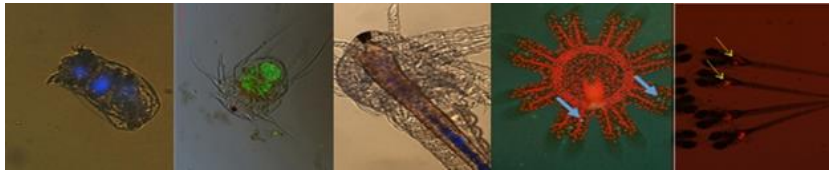
THE RESEARCH GROUP: ENVIRONMENTAL CHEMISTRY AND ECOTOXICOLOGY

The research group of Ecotoxicology and Environmental Chemistry of DiSVA, UNIVPM (https://www.disva.univpm.it/content/ecotoxicology-and-environmental-chemistry?language=en) has a strong vocation for the study of **ecotoxicology** and **marine pollution**. The Team has great experience in the use of marine organisms as bioindicators of **environmental stressors**, like **contaminants of emerging concern** (e.g. pharmaceuticals and microplastics) and **climate change**.



The research group has multidisciplinary specialization ranging from chemical characterization of environmental matrices and bioaccumulation, development and **application of health-tools** at molecular, cellular and organism level, ecotoxicological bioassays, procedures for weighted elaborations and **environmental risk assessment**.





The group has the availability of an **advanced Environmental Chemistry Laboratory** (with sophisticated ICP-MS; LC-MS/MS, GC-MS), a **laboratory for microplastics** extraction and characterization equipped with µFTIR spectrometer, fully equipped laboratories for **biomarker analyses**, biochemical and cellular alteration in model species including enzymatic determinations, aromatic metabolites, immunohistochemical, molecular and gene expression, genotoxicity analyses, batteries of main ecotoxicological bioassays.

The **"Aquarium Laboratory"** facility contains more than 100 experimental aquaria, with a total water volume of more than 25.000 L, allowing to maintain and investigate the impact of several stressors under controlled conditions for temperate, tropical and polar marine species.

https://orcid.org/0000-0001-6084-6188
https://orcid.org/0000-0002-4232-2652
https://orcid.org/0000-0003-0803-3846
https://orcid.org/0000-0002-9978-1411
https://orcid.org/0000-0002-0657-3681

Prof. Francesco Regoli
Prof. Stefania Gorbi
Prof. Maura Benedetti
Dr. Marica Mezzelani
Dr. Alessandro Nardi
Dr. Daniele Fattorini
Dr. Marta Di Carlo
Dr. Giuseppe d'Errico
Dr. Lucia Pittura
Carola Mazzoli
Michela Panni
Melissa Orsini
Veronica Vivani
Deborah Cesaroni
Federica Mongera
Andrea Carli
Valentina Tavolazzi

UNIVERSITÀ POLITECNICA DELLE MARCHE

EFFECT-BASED ASSESSMENT FOR CONTAMINANTS OF EMERGING CONCERN IN MARINE ECOSYSTEMS

Supervisor: Prof. Francesco Regoli

THE DEPARTMENT OF LIFE AND ENVIRONMENTAL SCIENCES (DiSVA)

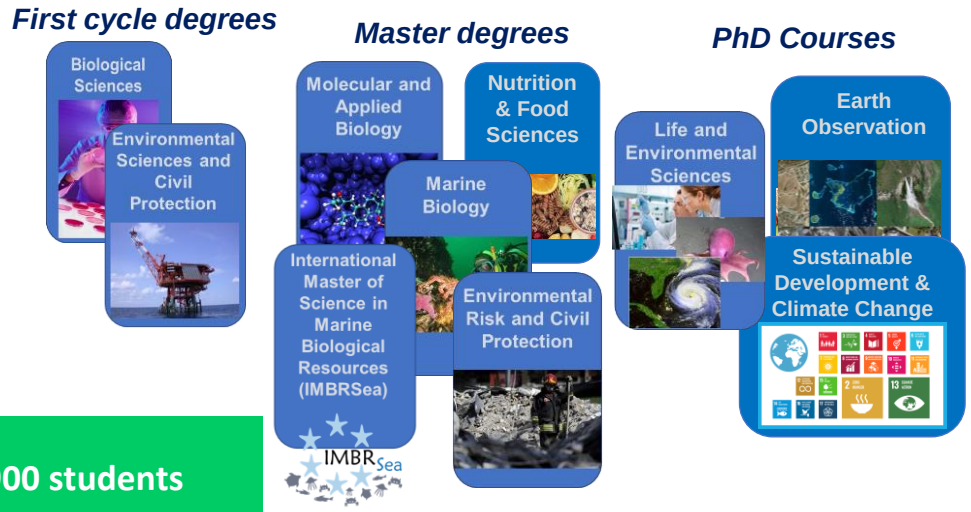
Department of Excellence

100 units of permanent staff (researchers and technicians)
80 PhD students and post-docs

in 2021-23, > 140 national and international projects for > 11 Mil €

in 2023 >220 international publications (>80% in Q1 Journals)

Teaching programmes:
2 First cycle degrees, 4 Master degrees, 3 PhD Courses

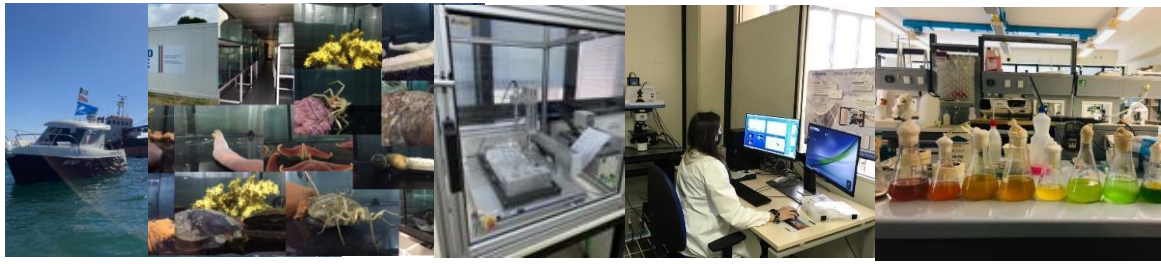


20 Professors have *h* index between 30 and >80, 15 have between 100 and 400 publications, 1 in Highly Cited Researchers (Clarivate)

> 1.900 students

Research Infrastructures & Excellence Laboratories:

- Marche Structural Biology Center (Ma.S.Bi.C.); The Aquarium-Joint Research Unit (JRU) of EMBRC ITALY (EMBRC-IT); Laboratory of Advanced Microscopy Research Instrumentation; Advanced Laboratory of Mass Spectrometry; Computing Data Center-DiSVA-HPC; Covid-19 LABC19; research vessels ACTEA and MYTILUS; Fano Marine Center (FMC), FORTUNAE Oceanographic Buoy.



UNIVERSITÀ POLITECNICA DELLE MARCHE

EFFECT-BASED ASSESSMENT
FOR CONTAMINANTS OF EMERGING CONCERN IN MARINE ECOSYSTEMS

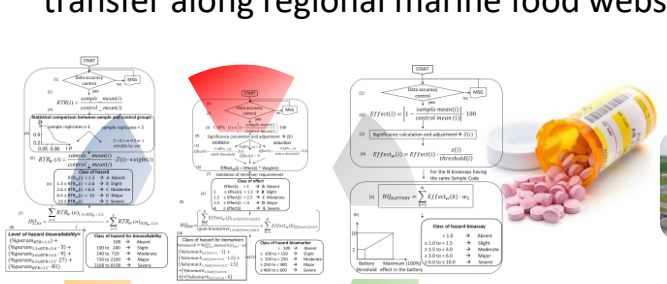
Supervisor: Prof. Francesco Regoli

Project Idea: EFFECT-BASED ASSESSMENT OF CONTAMINANTS OF EMERGING CONCERN IN MARINE ECOSYSTEMS (ACTIONS)

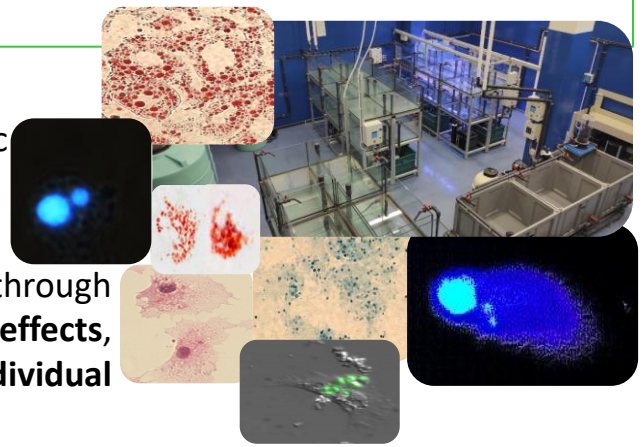
Backgroud: Contaminants of emerging concern (CECs) including pharmaceuticals, plasticizers, new pesticides, perfluorinated compounds, abuse substances, personal care products and their mixtures represent a global threat to marine ecosystems. Increasingly detected in marine waters, sediments, and organisms, they potentially hamper marine species and biodiversity due to a documented toxicity at very low concentrations. CECs presence, distribution and environmental risk assessment are not considered in any of routinary monitoring programmes and the urgent need of effect-based monitoring tools has been recently highlighted by many actions promoted by European Union.

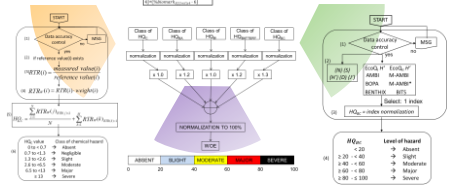
In this respect, ACTIONS will develop the following research objectives aimed to:

1. Chemical investigations on the CECs distribution, in coastal areas, targeting the occurrence, uptake and trophic transfer along regional marine food webs;



2. Characterize **effects** and risks through a **wide range of ecotoxicological effects**, measured **from molecular to individual levels**





3. Synthesize obtained results in an integrated **weight-of-evidence risk assessment procedure** for better evaluate and communicated the risk of CECs on marine ecosystems.

The project is expected to have tangible impacts in providing **integrated effect- based assessment and monitoring tools** to be shared and possible adopted by EU **regulatory guidelines** including Water Framework Directive, Marine Strategy Framework Directive, the EU Zero Pollution Strategy and Plan and the implementation of the EU biodiversity strategy for 2030.