Supervisor Project Idea

Supervisor

Insert a brief CV and/or external link, the total number of publications, the ORCID link, 5 of the most significant/recent publications, and a list of funded projects and awards. max 300 words

Director of the Department of Life and Environmental Sciences (DiSVA) at Polytechnic University of Marche. Full Professor in Applied Biology, Chair of "Marine Ecotoxicology" and of "Biological and Ecological Risk Assessment", former Director of the Master Degree Program in "Environmental Risk and Civil Protection" and previous Editor-in-Chief of Marine Environmental Research. Delegate for Italian Ministry of University and Research MUR within Horizon Missions sub-group Restore our Ocean and Waters by 2030. He is an expert on marine pollution from traditional and emerging pollutants including pharmaceuticals and microplastics, ecotoxicological effects, use of effect-based monitoring approaches and of marine organisms as bioindicators of environmental disturbance. These studies are related to management and monitoring of coastal areas, potential transfer of pollutants and risk to human health, dredging and disposal activities, impact assessment of offshore gas and oil production, environmental management of highly polluted areas, remediation of industrial areas, biological effects of global changes, application of integrated, ecological risk assessment models. He is author of more than 270 peer-reviewed publications in international journals and book chapters. He has an h-index= 67 with 16780 citations (from Scopus); h index= 79, i10-index= 202, 23266 citations (from Google Scholar, http://scholar.google.it/citations). ORCID profile at: https://orcid.org/0000-0001-6084-6188. **Among the most recent research projects**: National Responsible of "Ecotoxicological Effects of Microplastics in Marine Ecosystems (EPHEMARE)", JPI-Oceans (2015-2018); International Coordinator of "Towards a risk-based assessment of microplastic pollution in marine ecosystems (RESPONSE)", JPI Oceans, 2020-23; International Coordinator of "Presence, behavior and risk assessment of pharmaceuticals in marine ecosystems (PHARMASEA)" Aquatic Pollutants, 2021-2024; Unit Coordinator of "MicroPLASTICs in edible aquatic organisms: ecotoxicological effects, transfer of chemical and biological CONtaminants and susceptibility to bacteria biodegradation (PLASTICON)", Italian Ministry of Health , 2021-2024; Coordinator of "Development of innovative technologies and circular economy approaches toward the impact of plastic pollution in highly valuable rocky shores (SOLVING)", Cariverona Foundation, 2021-2024; Coordinator of Activity "Assess and mitigate impacts and threats to marine biodiversity: Zero pollution strategy for biodiversity protection" within the PNRR funded National Biodiversity Future Center, NBFC, 2022-2026. **Among 5 of the most recent publications**: Mezzelani M., Regoli F. (2022). The Biological Effects of Pharmaceuticals in the Marine Environment. Ann. Rev. Mar. Sci., 14, https://doi.org/10.1146/annurev-marine-040821-075606; Nardi A., Mezzelani M. Costa S., d'Errico G. Benedetti M., Gorbi S. Freitas R. Regoli F. (2022). Marine heatwaves hamper neuro-immune and oxidative tolerance toward carbamazepine in *Mytilus galloprovincialis*. Env. Pollut. 300, 118970, http://doi.org/10.1016/j.envpol.2022.118970; Pittura L., Nardi N., Cocca M., De Falco F., d'Errico G., Mazzoli C., Mongera F., Benedetti M., Gorbi S., Avella M., Regoli F. (2022). Cellular disturbance and thermal stress response in mussels exposed to synthetic and natural microfibers, Front. Mar. Sci. 9:981365, https://doi:10.3389/fmars.2022.981365; Lucia G., Giuliani M.E., d'Errico G., Booms E., Benedetti M., Di Carlo M., Fattorini D., Gorbi S., Regoli F. (2022). Toxicological effects of cigarette butts for marine organisms. Environ. Int. 171, 107733, https://doi.org/10.1016/j.envint.2023.107733; Nardi A., Pittura L., d'Errico G., Cesaroni D., Mongera F., Gorbi S., Benedetti M., Regoli F. (2024). Cellular effects of microplastics are influenced by their dimension: Mechanistic relationships and integrated criteria for particles definition. Environmental Pollution, Volume 344, 1 March 2024, 123327, https://doi.org/10.1016/j.envpol.2024.123327

Research Group Description

Provide the name the reference department and a brief description of the research group, including external links, and available instrumentations and infrastructures. max 300 words

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 been involved in several national (PNRR, PRIN, PNRA, RF) and EU-funded projects (e.g. JPI OCEANs-EPHEMARE; JPI OCEANs-RESPONSE, Aquatic Pollutans-PHARMASEA). 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), for the analysis of virtually all contaminants such as metals (including speciation), polycyclic aromatic hydrocarbons, halogenated hydrocarbons, pharmaceuticals and personal care products, abuse substances, plastic additives, perfluorinated compounds. The Microplastics laboratory is equipped with instruments for sampling particles in seawater, extraction and characterization with µFTIR spectrometer. Laboratories for biomarker analyses allow the determination of biochemical and cellular alterations in model species including enzymatic determinations, aromatic metabolites, immunohistochemical, molecular and gene expression, genotoxicity analyses; laboratories are also equipped for performing ecotoxicological bioassays such as the main batteries with bacterial bioluminescence, algal growth, embryotoxicity, mortality. Activities typically include the integration of field sampling campaigns and laboratory exposures carried out in the “Aquarium Laboratory” facility containing 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.

Title and goals

Provide the title of the topic and a short summary of the project idea. max 200 words

EFFECT-BASED **A**SSESSMENT OF **C**ONTAMINAN**T**S OF EMERG**I**NG C**O**NCERN IN MARI**N**E ECOSYSTEM**S** (**ACTIONS**)

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 aims to develop the framework for a new risk assessment procedure integrating on one side chemical investigations on the CECs distribution, in coastal areas, targeting the occurrence, uptake and trophic transfer along regional marine food webs; on the other, effects and risks will be highlighted by a wide range of ecotoxicological effects, measured from molecular to individual levels, and synthesized 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.

Contact details (*including email address of the supervisor*)

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