Polytechnic University of Marche – Ancona

The Polytechnic University of Marche (UNIVPM) includes 12 Departments in five main research areas spanning from Engineering, Environmental and Life Sciences, Agriculture, Economics and Medicine. UNIVPM staff includes ca 1350 employs and the University enroll almost 20.000 students.

The Department of Life and Environmental Sciences (DISVA) owns highly qualified laboratories operating in the fields of marine ecology, marine biology and nature conservation, marine botany and zoology, environmental microbiology, developmental biology and reproduction, algal physiology, geology and sedimentology, paleoceanography, physical oceanography, and restoration of marine ecosystems. DISVA has been recognized by Ministry of University and Research as "Department of Excellence" with extra funding for the implementation of its infrastructures. DISVA collaborates with many Centers and Academia all over the world (USA, Canada, Belgium, France, Spain, UK, Germany, Norway, Austria, Greece, Croatia, Indonesia, Vietnam, Madagascar, Singapore, Israel, and Japan) in the framework of national and international research projects and networks of excellence. DISVA has participated over the last 15 years in more than 20 EU projects and has a wealth of experience in the coordination and management of EU and international projects, including 3 projects devoted to marine restoration in temperate and tropical seas. DISVA carries out research activities worldwide with specific attention on costal (hard and soft bottom) and deep-sea areas, including the Western and Eastern Mediterranean, Atlantic, Pacific, Arctic and Antarctic Ocean and Sub-Antarctic regions.

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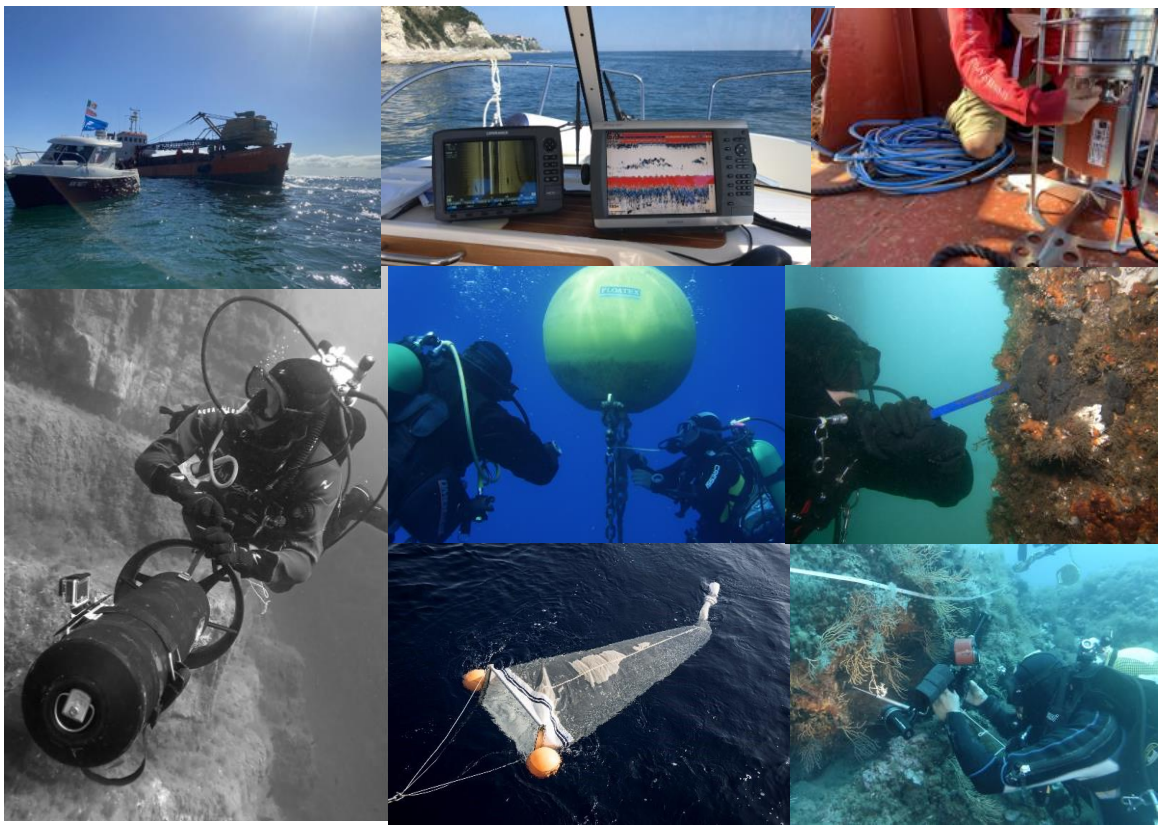
BIOLOGICAL RESOURCES

Research Vessels

Ecosystem access and organism collection is guaranteed using the Research Vessel “Actea” and the Zodiac “Mytilus”. Sampling devices are available to collect water and sediment samples, pelagic and benthic organisms on-site. This service is supported by technical and scientific staff for the research vessels and sampling activities. Available sampling devices include CTD with sensors for oxygen, turbidity and fluorescence determination, Niskin bottles, pumping system to collect microplastics from water column, Van Veen Grab, different sampling nets and small ROV. Water and sediment samples are collected and stored for analyses of Bacteria, Archaea, meiofauna and macrofauna, phytoplankton and zooplankton.



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EXPERIMENTAL FACILITIES

Aquaria

Facilities for aquatic organisms' maintenance and experiments under controlled conditions and multiple stressors on target species. Overall ca 200 mesocosms and aquaria for a total volume of 25.000L are available and subdivided for a) Mediterranean species, and b) tropical species (including sea anemones, stony corals, and soft corals). Target species for farming and maintenance: phytoplankton and zooplankton (Rotifers, *Artemia salina*, harpacticoid and calanoid copepods) and Zebrafish. This facility includes scientific and technical staff for the reproduction and maintenance of species, the set-up of manipulation experiments and general monitoring/functioning of the facility.

Polar Aquarium to allow maintenance and experiments on target species simulating the polar environmental conditions and different climate change scenarios. The facility includes dedicated aquaria for polar species and scientific staff for the reproduction and maintenance of species, the set-up of manipulation experiments under different climate scenarios and general monitoring/functioning of the aquarium. Target groups for experiments: invertebrates and fish of different species depending on their availability from the Arctic and Antarctic regions.

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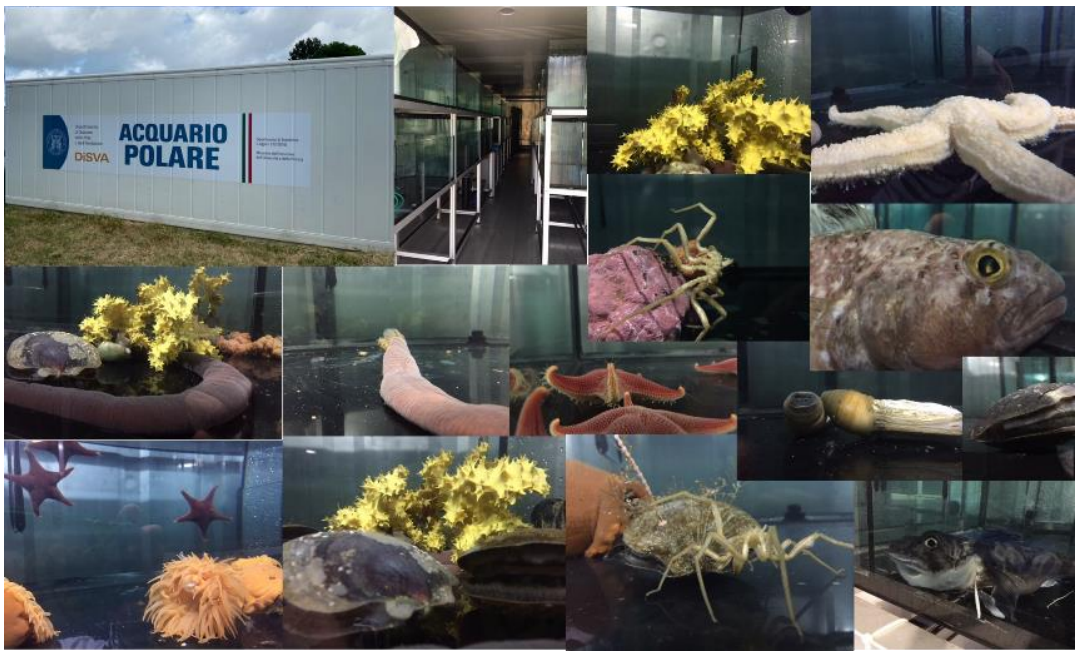

TECHNOLOGY PLATFORMS

Molecular biology and omics

Production of recombinant proteins from marine organisms and protein structure resolution and modelling in the Molecular Biology Core Facility (Ma.S.Bi.C.) (https://www.disva.univpm.it/content/masbic). Applications include i) the purification of proteins and membrane proteins from marine organisms, ii) studies of enzyme functions and integration of molecular, biochemical, cellular, and organismal approaches, iii) crystallization and structure determination and iv) transcriptome and gene expression analyses. Main services of the facility: high-throughput protein production, enzyme functions, cloning system and robotics, crystallography.

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Structural and chemical analyses:

These analyses are performed using the Mass Spectrometry facility which include LC-MS, GC-MS, ICP-MS instrumentation, in addition to Atomic Absorption Spectrophotometry, HPLC with fluorescence and diode array detectors. Environmental chemistry service allows to determine all the classes of chemical pollutants including traditional (metals, PAHs, halogenated hydrocarbons) and emerging pollutants (i.e. pharmaceuticals, microplastics, flame retardants). Approaches available include: environmental chemistry, Liquid Chromatography-MS, Gas Chromatography-MS, ICP-MS, Atomic absorption. Analyses of metals, PAHs, pesticides, microplastics are performed in fish, invertebrates, water, and sediments.

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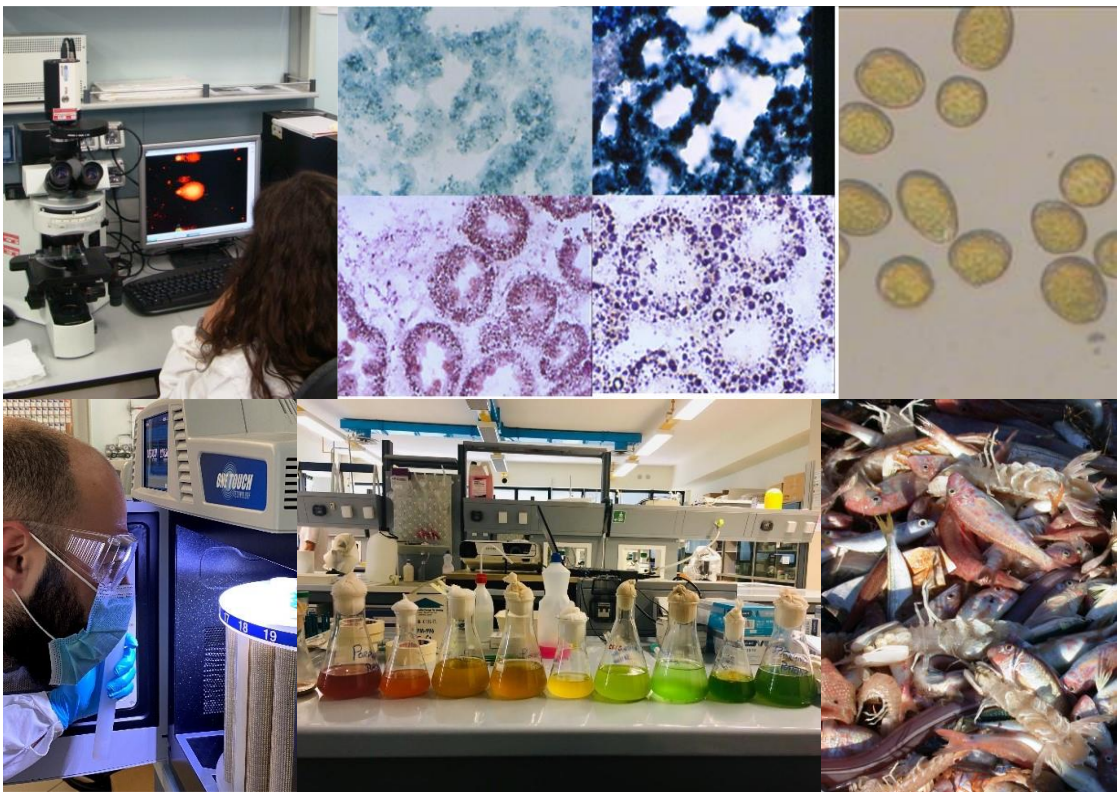

Bioassays

Analyses of the main cellular biomarkers (i.e. biotransformation, detoxification, oxyradical metabolism and oxidative stress, peroxisomal proliferation, impairment and toxicity to cellular membranes, lysosomes, other organelles and DNA) and ecotoxicological bioassays (bacterial bioluminescence, algal growth, embryotoxicity, mortality). Effects underlying metabolization, detoxification and toxicity of chemical pollutants can be analyzed at the molecular, biochemical, cellular and organism levels. Analyses of biomarkers, bioassays, and ecotoxicology are performed in fish, invertebrates, water, and sediments.

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E-SERVICES

Data analysis tools and software

Advanced bioinformatic laboratory and data mining facility and risk assessment models for the elaboration of large datasets of chemical and biological data. Typical applications include management of contaminated sediments, remediation of polluted areas, impact of oil and gas exploitation/production. Data elaboration includes Weight of Evidence WOE and risk assessment.