**Project:** “Microbiome applications to combine farming productivity and environmental biodiversity preservation”, CN biodiversity, Spoke 2, WP3 Sustainable valorization of marine resources

**Scientific responsible and owner of the funds**: Prof. Marco Candela

**Title of the research fellowship**: Microbiome applications to combine farming productivity and environmental biodiversity preservation

The project will focus on the assessment of microbiome structures in wild fishes and the marine environment in aquaculture sites, which is relevant to the productivity, quality, safety and sustainability of marine fish food production. The health and safety of the marine ecosystem in proximity to aquaculture cages will be evaluated through the assessment of the mutual interactions and exchanges between fish farms and marine microbiomes, also in terms of pathobiomes. In addition, innovative blue-technology approaches will be conceived with the specific aim of modulating the marine microbiome and improving the environmental quality and sustainability of open-fish cage aquaculture practices. In particular, environmental and metagenomic variables in seawater, sediments, trophic web and fish food products will be considered. Environmental variables will include the main physical (temperature, salinity, pH) and chemical (nutrients, organic carbon) characteristics, as well as chemical pollutants (xenobiotics, heavy metals, microplastics). Marine sites to be investigated will also include areas outside hatcheries where water pipes pump in and out the water used to farm fishes. Attention will be posed to evaluate the fish and marine pathobiome. The marine ecosystem health will be evaluated using bio-indicators, among which corals and their associated microbiome, in proximity to open-cage aquaculture installations and nearby sites. Marine organisms (such as bivalves, crustaceans, annelids, and other organisms that are part of the fish food web) and the associated microbiome will be monitored, in light of their potential role of vectors/reservoirs of microbes for fishes.