



# MESMic Hub: An integrated approach to unravel metal ion interactions with microbial ecosystems

## *Metals in Environmental Systems Microbiology*



The MeSMic Hub is one of the thematic hubs from E2S ([Energy and Environment Solution](#)), it is a so called “project team” composed of 6 scientific leaders and around 20 other scientific & technical staff members. Thanks to the different fields of expertise covered by the team, the Hub can deliver an interdisciplinary approach (genetics, molecular biology, microbial physiology and ecology, biogeochemistry, environmental and analytical chemistry) to the study of metal ion interactions with microbial ecosystems.

The impact of metals on microorganisms and their adaptation within an ecosystem is the main aim of this project. Microorganisms release, in conditions of deficiency for essential trace elements or facing toxic concentrations of metal ions, metal chelators such as, e.g. organic thiols, siderophores, or metallophores, allowing the control of their intracellular concentration. The MeSMic Hub aims at developing a holistic approach to extend our understanding of the role and fate of metals in microbial ecosystems and to link systematically the genomes of microorganisms with the chelators produced. This includes the development of a comprehensive (broad scale, qualitative and quantitative) method to characterize the metal-ligand complexes biosynthesized at the different levels of system complexity (gene, cell, community, ecosystem). The projects also develop tools to describe and to quantify comprehensively the molecular response of these systems and the natural isotopic fractionation of selected metals under environmental stress conditions.

The MeSMic Hub currently works on 3 cases study as listed below:

- Metals, metallophores and metabolic interactions in complex multi-species microbial assemblages: incidence on community structure and assembly
- Molecular mechanisms of the acquisition of essential metals in heterotrophic bacteria that degrade organic matter in marine environments
- Mercury, thiols and transformation processes by microorganisms; from the cell to complex multi species microbial assemblages

The whole project includes 20 years of post-doc and 6 PhDs over 5 years.



