

## **Lying on the seabed: modelling post-depositional alteration of pottery in the marine environments**

*(Proposer: Prof. Lara Maritan)*

The numerous shipwrecks discovered in the last decades in many marine areas, especially in the Mediterranean basin, pointed out the intense trades in antiquity, but also opened new questions on the provenance of the cargos and on the alteration that the archeological materials suffered during the long period they laid down on the seabed.

This project aims to define the systematic geochemical and mineralogical changes that occur in the ceramics buried in seawater for centuries. Being porous and composed by both mineral and amorphous phases, these materials can undergo alteration due to the interaction with the seawater and its dissolved elements. Processes like the precipitation of secondary phases in pores, elemental adsorption and/or leaching at the mineral and amorphous phase surface, transformation of pristine mineral phases into new phases, as well as devitrification processes, represent the main transformations of ceramics when settled into a seawater-soaked environment. The composition of the sediments, the contact with other materials used for the securing elements of the ship transporting the ceramics (wood, metals), as well as the action of biodeteriogens living in such environment, play an import rule in the type of processes and on their characteristics especially in terms of microchemical conditions.

The modelling and definition of the physical, chemical and mineralogical changes that affect ceramics laid down in underwater environments will be a useful tool to properly correct archaeometric data (especially chemical compositions) to trace the provenance of ceramics (for comparison with reference groups of analogous productions), to define trades in antiquity, and to provide information for conservation and restoration actions.

Case studies from Mediterranean underwater sites will be considered for deep micro-stratigraphic, mineralogical and chemical investigations with advanced analytical methods at both the macro and the micro-scale, taking advantage of the new facilities available at the department, as well as collaboration with University of Bordeaux Montaigne, where well-equipped laboratories will support the analytical needs of the project. Collaborations will include institutions operating in underwater archaeology, such as the University of Salento.

Analytical costs will be covered by the financial support of DOR funds.