**Cultural landscapes. 3D digitization and development of platforms for geospatial data management, analysis and communication.**

**Tutor: Leopoldo Repola**

**Co-tutor: Stefano Vitale**

Ancient monuments, the urban layout of our cities or villages, the landscape in its manifold ensemble of elements, preserve the traces of natural events, such as earthquakes, eruptions, floods, landslides, the effects of bradyseism, changes in sea level, and compose sequences of crises and risk mitigation, of destruction and reconstruction, of transformations, of changes in the dynamics of resource use. The project aims to develop a methodology for studying the cultural landscape through the production of numerical models for a comparative analysis of events and phenomena that have defined its transformation and induced ecosystem adaptation dynamics. The digitisation of geological, biological, archaeological and architectural contexts defines within the project the database from which to implement processes of virtual modelling and simulation of events according to relational and multi-scalar logics, in which to recognise their causes and analyse their effects in order to define possible scenarios, also with reference to the complex effects of ongoing climate change.

The activities of the research programme will consist of: (i) integrated 3D surveying procedures carried out using both commercial instruments and prototype systems, aimed at digitising more or less extensive portions of cultural landscapes; (ii) the creation of new scanning protocols, adaptable to different study contexts, with particular reference to the coastal and marine areas of the Campi Flegrei and Procida Island in Campania and the Vendicari Reserve and Capo Passero Island in Sicily; the development and implementation of a GIS platform capable of managing and analysing multidimensional geospatial data.

**PhD project proposal**

A PhD position will be reserved for a candidate who can carry out research on the proposed topic. The work programme includes the study of the most advanced three-dimensional acquisition systems on land, underwater and airborne by drone; the application of innovative post-processing procedures for numerical models; the development of a GIS platform for data management, analysis and visualisation. The platform will have to characterise the geological aspects, anthropic products and environmental features of the landscape, using data processing tools in a three-dimensional environment.

The work programme also includes study periods abroad at the Lab2PT Laboratory at the University of Minho - Portugal, specialising in the Arts, Social Sciences and Humanities, which is currently engaged in studies on the ancient landscape and the survey and valorisation of the numerous granite quarries in the area of the city of Braga, in order to enable the doctoral student to learn in the field the most advanced techniques for acquiring and analysing spatial data, as well as to exchange knowledge with the numerous international researchers engaged in the study of the landscape and its changes due to human activities and climate change.