# Title: Three-dimensional analysis of active faults in Southern Apennines using electrical resistivity surveys.

**Tutor: Prof. Luigi Ferranti**

**Co-tutors:**

**Dr. Francesco Iezzi**

**Dr. Maria Giulia Di Giuseppe (INGV-OV)**

# Proposal: *The investigation of active faults requires a detailed characterization of their geometries and activity periods.* *When faults are located within sedimentary basins and buried by Late Quaternary deposits, their characterization requires the application of geophysical surveys to image subsurface’s structures. The main objective of this research project is the study of tectonic structures, such as shallow and geologically recent (Late Pleistocene-Holocene) active faults in the Southern Apennines area through a multidisciplinary approach using geophysical survey In particular, the study focuses on high resolution 3D electrical resistivity tomography (ERT) surveys. The electrical surveys will be planned in terms of resolution and coverage of target areas, taking into account previous geophysical surveys, and will be complemented by reflection seismic soundings carried out in other research project. The integrated nature of the surveys will allow for optimization of the joint analysis of the data-set and the geophysical models.*

# Research Program

# *The first step consists of the development of specific approaches for the three-dimensional characterization of buried active faults by refining electrical geophysical data acquisition and processing techniques specifically adapted to the research target (optimization of arrays and electrode configurations, development of inversion procedures, and noise reduction, etc.). The second step consists of the performed geophysical survey to reconstruct 3D subsurface models in selected sites in the Southern Apennines. The third step requires the analysis of the inverted tri-dimensional models to reconstruct the surface extension and depth geometry of buried active faults.*

# *The research program also includes a joint analysis with available seismic reflection surveys performed at the same sites. The statistical analysis of the data will allow the development of original algorithms and techniques for the joint analysis of the multivariate dataset, both pre- and post-inversion (clustering, conditioned and cooperative inversions, joint inversions).*

# *The doctorate program will be performed in collaboration with the Istituto Nazionale di Geofisica e Vulcanologia-Osservatorio Vesuviano (INGV-OV). The candidate must have a strong knowledge of methodologies for the acquisition and processing of data of electrical resistivity.*

# *The project can be supported by funds external to the University of Naples.*

# =================