University of Genova

Department of Earth, Environmental and Life Sciences

Doctorate Course in Earth and Environmental Science and Technology

Università degli Studi di Genova

STAT

Dottorato in Scienze e Tecnologie per l'Ambiente e il Territorio

Earth Science Curriculum

Research Theme n. 7

Titolo: Analisi della stabilità dei versanti in condizioni climatiche mutevoli **Title**: Slope stability analysis under a changing climate
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Program description including the formation program abroad
Landslides are important hazardous phenomena that impose severe financial costs on society. The global increase in landslide events increasingly attracts the attention of the scientific community to improve knowledge on these natural phenomena and develop functional, reliable, and integrated risk mitigation strategies. However, the relationships between landslide-causal factors and their occurrence can be very complex and, to accurately understand the behavior of landslides, the development of multidisciplinary approaches has a crucial role.
 	
   The project primarily focuses on the coupled application of engineering-geological and geophysical approaches, and/or methodologies to investigate the past and present evolution of landslides in some areas of the Liguria region. Especially, the research activity will integrate the use of engineering-geological and remote-sensing data along with geotechnical and seismic monitoring data. Purpose of the research program is to investigate the mechanisms of slope deformation in selected areas, and to develop quantitative scenarios. In this regard, special emphasis will be given to the role of varying geo-environmental conditions, such as climatic drivers or hydro-geotechnical aspects. The research work is expected to provide new insights and knowledge on slope deformation mechanisms, also giving useful contributes in terms of landslide prediction.
 	
   Research will be carried out in the frame of the PNRR RETURN partnership project (multi-Risk sciEnce for resilienT commUnities undeR a changiNg climate), encompassing multidisciplinary research groups with expertise in landslide hazard, engineering-geology and seismic hazard. The PhD trainee will have the opportunity to develop the research activities also in the frame of ongoing collaborations with foreign (e.g., University of Granada, National Technical University of Athens) and national (e.g., Federico II University of Naples) universities.

Financial support: PNRR project RETURN
Tutor's publications (max 3) ▪ Raimondi, L., **Pepe, G.**, Firpo, M., Calcaterra, D., & Cevasco, A. (2023). An open-source and QGIS-integrated physically based model for Spatial Prediction of Rainfall-Induced Shallow Landslides (SPRIn-SL). ENVIRONMENTAL MODELLING & SOFTWARE, 160, 105587. ▪ **Pepe G.**, Cevasco A., Piazza M., Macciò R., Arrighetti F., Casagli N. (2021). On the efficiency and effectiveness of automatic deep drainage systems during an extreme rainfall event: the Mendatica landslide case study (western Liguria, Italy). LANDSLIDES, 18(12), 3799-3820. ▪ De Ferrari, R., Ferretti, G., **Barani, S.**, **Pepe, G.**, Cevasco, A. (2017). On the role of stiff soil deposits on seismic ground shaking in western Liguria, Italy: evidences from past earthquakes and site response, ENGINEERING GEOLOGY, 226, 172-183.