
Academic Year 2023/2024 – Cycle: XXXIX

Deadline: July 10th 2023 at 12 noon (CET)

PhD Program in SECURITY, RISK AND VULNERABILITY
**Curriculum: RISK AND RESILIENCE ENGINEERING FOR THE NATURAL,
INDUSTRIALIZED AND BUILT ENVIRONMENT**

<https://sicurezza.unige.net>

Research topic “PE-RETURN - Spoke VS2”

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Title: [Landslide susceptibility assessment and mapping at wide scale](#)

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Description:

Landslide susceptibility assessment and mapping are fundamental to land planning and management, and are also useful for monitoring and warning systems.

Landslide susceptibility expresses the probability of spatial occurrence of a landslide given a set of land and environmental conditions that are proven to influence the landslide. Landslide susceptibility zoning subdivides and classifies a territory on the basis of its landslide propensity. Various (direct; heuristic; statistical; deterministic) methods can be used to assess susceptibility and to map it. The approach used and the characteristics adopted to describe the land and environmental conditions depend on the scale. In the present research project, the focus is on statistical analysis for the estimation and mapping in GIS (Geographic Information System) of landslide susceptibility at a regional scale in subaerial environment. This methodology is particularly suitable for susceptibility zoning over large and very large areas.

The present PhD research aims to investigate the use of multivariate statistical analysis and/or machine learning techniques for susceptibility zoning, analysing the influence of several factors (morphological and geo-lithological of the territory, but also related to the anthropic development of the area, vegetation cover and climate) on the presence and triggering of landslides (mainly slides and flows). The analysis will exploit the GIS tool for the processing of cartographic or spatially distributed data.

By means of a careful critical analysis of the various procedure phases (e.g. choice of the calibration area; preliminary analysis on each single factor in order to evaluate its statistical distribution and real influence on the occurrence of landslides in the area under study), the aim is to develop an automatic procedure capable of obtaining a susceptibility mapping on large land areas, typically on a regional scale, in a short time and with relatively limited resources. This procedure may be refined at the medium and small scale, where data are available, for a more detailed hydro-geo-morphological description of the area under study.

Candidates are required to have expertise in the field of Geotechnics, with particular reference to slope stability. Knowledge of statistical methods or machine learning techniques and territorial information systems or GIS for the processing of digital cartography will also be positively evaluated.

For information: <https://sicurezza.unige.net/admission/how-to-apply/themes-rrenib-xxix-june-2023>
