Description of Funded Research Projects
1st Call for H.F.R.I. Research Projects to support Post-Doctoral Researchers

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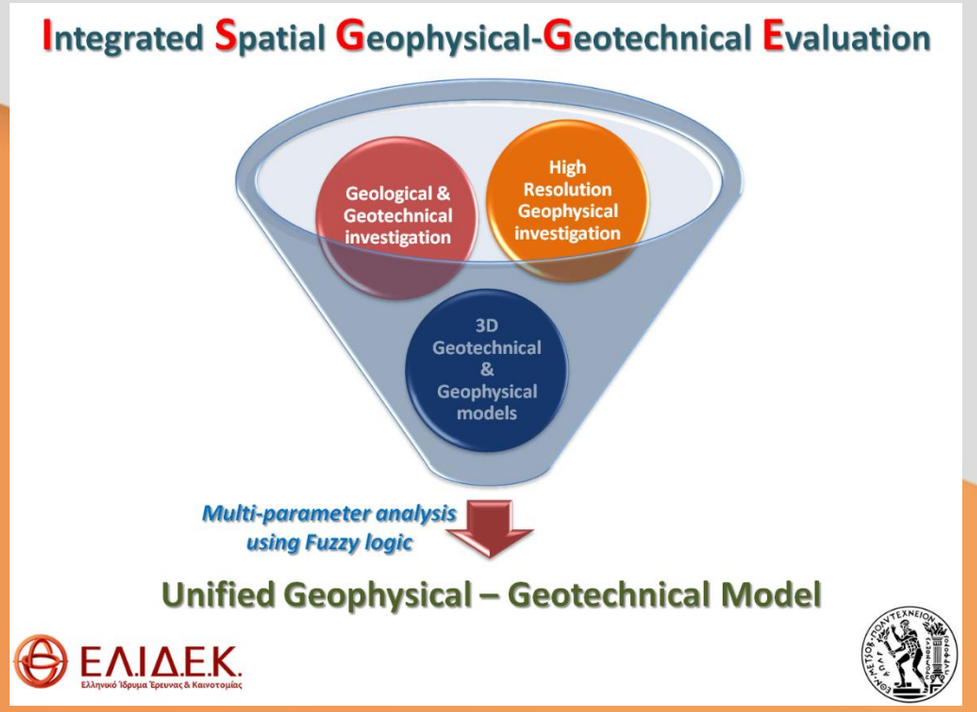
Research Project Title:

An Integrated tool for the Assessment of the Spatial Distribution of Geotechnical Parameters based on high Resolution 3d Geophysical Models

Principal Investigator:
Christos Orfanos



Popular Title:
Creation of a Unified Geophysical-Geotechnical Model

Scientific Field:
Engineering and Technology Sciences

Host Institution:
National Technical University of Athens

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In general, engineers, scientists and researchers, are tasked with finding solutions to complex problems by applying scientific, economic, social and practical knowledge, in order to design, build, and maintain structures, materials and processes. The latter, in combination with the unknown factor of the geological medium and the estimation of a sound geological model, has the triggered interest in performing research in the Geomechanics field, focusing on various types of engineering works. Assessing the stability and integrity of structures often requires a multi-disciplinary approach and constructive collaboration between experts in geotechnical and environmental engineering, in geophysics, hydrology, and geology. A trend to objectify the information on the condition of a structure is beginning to emerge, the development of tools appraising and integrating data from sources of similar and dissimilar nature.

This study aims to provide further insight into the geomechanical behavior of rock materials and soils by utilizing both geological/geotechnical and geophysical methods to address the mechanisms involved, highlighting the associated implications for both scientific and practical applications. The main goal of the proposed work is a thorough study concerning the joint 3-D spatial modeling of geophysical and geotechnical parameters, using sophisticated techniques, based on fuzzy logic, in order to properly assess geotechnical uncertainties relating to the subsurface medium. The targeted scientific breakthrough towards this project is the creation of an integrated tool, which would offer a sound unified 3-D geotechnical-geophysical-geological model at the preliminary stages of an engineering project for minimizing ambiguities.

Project Impact on Society

A possible failure of engineering structure could have certain consequences, which are divided into four main categories: a) Public Health and Safety b) Economic c) Psychological d) Governance/Mission Impacts. The potential risks associated with the failure of structures could be considerable and potentially result in significant destruction, including loss of life, massive property damage, and severe long-term consequences. A great percentage of such incidents owes to design inadequacy. The inadequacy is generally the result of lack of understanding and appreciation of the subsoil and geotechnical issues. Hence inadequate assessments, analyses and checks on various modes. The proposed methodology will contribute to the decrease of uncertainty of spatial distribution of geotechnical parameters, in order to prevent such failures.

To me, H.F.R.I. funding would mean...

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It is an opportunity for us to continue our research in sectors within our expertise. This project, in combination with our working experience and previous research activities, could be the basic pillar for the accomplishment of our future plans and the improvement of our working and scientific perspective in Greece.

The Principal Investigator,
Christos Orfanos

Funding

Amount: **119,500 €**

Duration: **36 months**

Foundation: **H.F.R.I.**

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