

# CIVIL AND ENVIRONMENTAL ENGINEERING

## AMMIN/DISEG - Research on Geotechnical Engineering

<b>Funded By</b>	Politecnico di TORINO [P.iva/CF:00518460019] Dipartimento DISEG
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<b>Context of the research activity</b>	The research will address the physical, hydraulic, and mechanical behaviour of soils, rocks, and other porous media through advanced experimental and modelling approaches. The project aims to enhance understanding of geomaterial response, stability, and sustainability in natural and engineered environments, with applications in energy, environment, and risk mitigation.
<b>Objectives</b>	<p>The PhD position focuses on investigating, interpreting, and modelling the physical, hydraulic, and mechanical behaviour of soils, rocks, and other porous or fractured multiphase media (geomaterials), both natural and engineered, at the elementary scale as well as the situ scale. The research aims to advance fundamental understanding and predictive modelling of geomaterial behaviour and their interaction with engineering systems and natural processes.</p> <p>The doctoral work will build on strong interdisciplinary foundations in physics, chemistry, and mathematics, with applications in civil, environmental, and energy engineering.</p> <p>Research topics include:</p> <p>Experimental and in situ characterisation of the chemo-physical, hydraulic, and mechanical properties of geomaterials using advanced testing and monitoring techniques.</p> <p>Theoretical and numerical modelling of geomaterial response under static, cyclic, and dynamic loading, accounting for coupled hydraulic, thermal, and chemical effects.</p> <p>Investigation of deformation and instability phenomena (e.g., landslides, subsidence, liquefaction, cavity collapse) through laboratory testing, field observation, and multiphysics simulations, including the influence of climate change.</p> <p>Seismic response analysis of geomaterials and soil–structure systems, from local to regional scales, with implications for site stability and risk assessment.</p>

	<p>Quantitative hazard and risk mapping, focusing on natural and anthropogenic processes and their mitigation.</p> <p>Sustainable improvement and reinforcement techniques for soils and rock masses, including the use of geosynthetics and innovative, low-impact materials.</p> <p>Geotechnical aspects of environmental protection and energy transition, with emphasis on renewable-energy systems and subsurface storage technologies.</p> <p>The candidate will contribute to the development of new experimental approaches or advanced modelling tools for understanding complex, coupled processes in geomaterials.</p>
<b>Skills and competencies for the development of the activity</b>	<p>The ideal candidate should have a background in geotechnical, civil, environmental, or geological engineering, with interest or experience in soil and rock mechanics, porous media behaviour, and experimental or numerical methods. Good analytical abilities, proficiency in scientific English, and openness to interdisciplinary research are expected.</p>