

PhD in Civil and Environmental Engineering

Research Title: Solutions for climate change mitigation and adaptation

Funded by	DIATI su fondi MIUR (Progetto Dipartimento di Eccellenza)
Supervisor	To be defined
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Context of the research activity	<p>The PhD position is part of a multidisciplinary research project for understanding climate change and for providing possible mitigation and adaptation solutions. The project involves researchers from a wide set of scientific disciplines, broadly belonging to environmental and civil engineering (http://www.diati.polito.it/). It has been designed to provide a comprehensive and interdisciplinary analysis of the problem of climate change and of its solutions. The PhD candidates will have the chance to be exposed to the latest and most original research in the field, and will count on a diverse and competent faculty and strong links with leading research institutes worldwide.</p>
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Objectives	The research activity carried out by the PhD student will focus on one of the many facets of climate change, including the following:	
	A - Monitoring and analysis of climate change (cc)	
		<ul style="list-style-type: none">• Developing innovative tools for monitoring meteorological and environmental variables correlated to cc• Developing innovative measurement tools of atmospheric variables from air drones• Paleoclimatic reconstructions in the Alpine area• Monitoring of snowfields and alpine glaciers• Evaluation of carbon footprints, water footprints and environmental footprints of products, processes, companies, people• Monitoring and modeling of groundwater resources and changes in topographic altitude

	B - Climate change mitigation	
		<ul style="list-style-type: none"> • Development of technologies useful for the minimization of human impact and energy optimization • Development of negative technologies (which allow a reduction in carbon dioxide concentrations) • Development of construction materials containing high quantities of recovery products • Development of innovative solutions for the transport of people and goods to reduce greenhouse gas emissions; • Development and methods for improving the performance of underground storage facilities for natural and anthropogenic gases
	C - Adaptation to climate change	
		<ul style="list-style-type: none"> • Development of eco-compatible asphalts resistant to extreme temperatures and precipitations • Development of technologies related to green roofs and walls • Development of environmentally friendly solutions for climate change adaptation of lake and river ecosystems • Development of adaptation solutions to the change of Alpine socio-economic systems • Functional design of infrastructures to take into account the behavioral adaptation of users to extreme environmental conditions • Analysis of the effects of the CC on water treatment technologies and remediation of contaminated sites • Development of integrated systems for planning and forecasting flood risk in non-stationary conditions • Development of integrated systems for multimodal management of transport systems in emergency conditions • Development of integrated systems for the planning of the effects of frost and thaw cycles on the risk of collapse in rock faces • Use of tunnels to increase the resilience of housing and infrastructure against extreme events

Skills and competencies for the development of the activity	The research project is inherently multidisciplinary, and a wide range of competences can fit well the requirements for developing the activities, depending on the specific focus of the PhD. The applicant must be proficient in spoken and written English.
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