



# PhD in INGEGNERIA AMBIENTALE E DELLE INFRASTRUTTURE / ENVIRONMENTAL AND INFRASTRUCTURE ENGINEERING - 39th cycle

## Research Area n. 2 - Transport Infrastructures and Geosciences

Number of scholarship offered	1
Department	DIPARTIMENTO DI INGEGNERIA CIVILE E AMBIENTALE

### Description of the Research Area

This research line is devoted to the study of design, construction and management of transport infrastructures and to applied geology. It includes research groups dealing with the following research topics: A) Technologies for road and airport pavements: 1. Maintenance and rehabilitation. Suitable management tools and theoretical models, as well as applications for specific pavements and contexts; LCA (Lyfe Cycle Analysis), calibration of intervention thresholds and the forecast of distress evolution of specific road networks in order to guarantee traffic safety and structural durability, along the pavement life; advanced performance testing by non-destructive methods; new methods to determine surface evenness of pavements. 2. New technologies for pavements enhancement of structural performances of airport pavements with severe special constraint by applying non-standard structural schemes and high-performance materials, sustainable pavements (re-use, recycling, in situ stabilization), multipurpose pavements (photocatalytic materials, etc.), material performances evaluation: visco-elasticity, fatigue and rutting life, thermal cracking, Experimental lab tests, Pavement Management System B) Applied geology: 1. the analysis of the hydrogeological risk linked to the underground excavation in rocks (water inflow, piezometric drawdown, etc.). 2. the forecast of the landslides hazard (to asses the influence of some hydrogeological parameters, as permeability and heterogeneity coefficient, on slope instability). 3. the water resources localization and management, pollution problems, also in coastal aquifers.



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**OPEN SUBJECT Research Field: TRANSPORT INFRASTRUCTURES AND GEOSCIENCES**

**Monthly net income of PhDscholarship (max 36 months)**

**€ 1195.5**

In case of a change of the welfare rates during the three-year period, the amount could be modified.

## Context of the research activity

<p><b>Motivation and objectives of the research in this field</b></p>	<p>The researches concern: Sustainable infrastructures (re-use, recycling, etc.) , Multipurpose pavements (photocatalytic pav.), new technologies for infrastructures, LCA (Lyfe Cycle Analysis), Pavement Management System, materials performance evaluation; applied geological and hydro geological analysis of the evolution of the slopes dynamics; the hydrogeological risk analysis correlated with excavation of tunnels; the study of water circulation in rock masses linked with environmental and civil engineering problems.</p>
<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>Researches are developed at all levels: analytical, in situ and in lab experimental/instrumental (refraction seismic profiling, electric resistivity tomography, NAT- Nottingham Asphalt Tester), numerical (UDEC, Modflow, Ansys, Abaqus).</p>
<p><b>Educational objectives</b></p>	<p>The main objective is to form scientists or high level technicians in the engineering geology and transportation fields. In particular as regards the hydrogeological problems and road materials.</p>
<p><b>Job opportunities</b></p>	<p>Main opportunities in the job market include Universities, Research Centers, top level management in Authorities</p>



	involved in environmental policy, and senior consultants for engineering companies.
<b>Composition of the research group</b>	3 Full Professors 2 Associated Professors 5 Assistant Professors 6 PhD Students
<b>Name of the research directors</b>	Crispino Maurizio, Papini Monica

<b>Contacts</b>
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Web pages of these research fields: <a href="http://www.dica.polimi.it/sezioni/infrastrutture/">www.dica.polimi.it/sezioni/infrastrutture/</a>

<b>Additional support - Financial aid per PhD student per year (gross amount)</b>	
<b>Housing - Foreign Students</b>	--
<b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>	--

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	597.75 €
<b>By number of months</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>
<p><u>Educational activities</u> (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences): financial aid per PhD student per year: max 1620.00 euros per student on average.</p> <p><u>Teaching assistanship</u> (availability of funding in recognition of support to teaching activities by the PhD student) :there are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.</p> <p><u>Computer availability and desk availability</u>: 1<sup>st</sup> year +2<sup>nd</sup> year +3<sup>rd</sup> year: individual use.</p>