



# PhD in INGEGNERIA AMBIENTALE E DELLE INFRASTRUTTURE / ENVIRONMENTAL AND INFRASTRUCTURE ENGINEERING - 38th cycle

Research Area n. 3 - Environmental and Hydraulic Engineering and Geomatics

**PNRR\_351\_DOTT\_RICERCA Research Field: DEVELOPMENT OF FLOOD DAMAGE  
ASSESSMENT TOOLS FOR THE ITALIAN CONTEXT**

**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**

**Motivation and objectives of the research  
in this field**

The capability of performing reliable flood damage assessments (FDA) is of paramount importance to achieve objectives of sustainability and resilience of societies towards climate change effects, as they are set in the National PNRR.

Indeed, FDA has gained increased importance in the last decades as key information tool for effective flood risk management. Knowledge of flood damage is of paramount importance both in the emergency (to identify priorities of intervention and to support the damage compensation by private and public bodies) and in the peace time (to identify areas at higher risk and to evaluate benefits of flood mitigation strategies). However, we are far from the capability of performing comprehensive FDA including all potentially affected assets and kinds of damage, especially in the Italian context, so far characterised by an approach to flood risk management more concentrated on hazard control rather than damage reduction. This is reflected in the paucity of damage data related to past flood events, and in the consequent lack of damage modelling tools. The recent MOVIDA project, aimed at performing a comprehensive FDA in the Po District, highlights that a quantitative estimate of flood



	<p>damage is currently possible only for limited types of assets. For the others, only damage proxies can be identified, like the value of exposed assets or qualitative indicators of expected impacts. In such a context, the research will address the need of developing tools for estimating flood expected damage to those assets for which the paucity of models is more evident. At the same time, investigated assets will be chosen according to their strategic role for the resilience of a community (like economic activities, transport networks, etc.) as well as for the wellbeing of a society, being them distinctive of their cultural background (like environmental and cultural heritage).</p>
<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>The research will be based on the analysis of the Italian context and case studies. A mixed empirical/expert-based approach will be implemented to derive modelling tools, grounded on evidence supplied by the investigation phase, and working at different spatial scales, i.e., from local to meso Main stakeholders will be involved in the development of modelling tools, to design models addressing the different risk mitigation needs: i.e., from interventions on single assets (by the public or the private market), to the design of mixed risk mitigation strategies at the waterbasin level.</p>
<p><b>Educational objectives</b></p>	<p>The PhD student will learn advanced concepts and analytical tools for flood risk assessment and management, basics of ICT, statistical analysis and spatial planning.</p>
<p><b>Job opportunities</b></p>	<p>Research agencies, Research Institutions, Insurance companies, Public Bodies and Authorities involved in environmental policies.</p>
<p><b>Composition of the research group</b></p>	<p>1 Full Professors 2 Associated Professors 0 Assistant Professors 4 PhD Students</p>
<p><b>Name of the research directors</b></p>	<p>Daniela Molinari</p>

<b>Contacts</b>	
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**Additional support - Financial aid per PhD student per year (gross amount)**

Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

**Scholarship Increase for a period abroad**

Amount monthly	597.76 €
By number of months	6

**National Operational Program for Research and Innovation**

Company where the candidate will attend the stage (name and brief description)	to be defined
By number of months at the company	6
Institution or company where the candidate will spend the period abroad (name and brief description)	to be defined
By number of months abroad	6

**Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information**

Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research:

1. Autorità di Bacino Distrettuale del fiume Po
2. Agenzia interregionale per il fiume Po
3. CNR - IGAG
4. Università de L'Aquila
5. University of Liege

Educational activities (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences): approximately 1624,30 euros per PhD candidate per year, on average.

Teaching assistantship (availability of funding in recognition of support to teaching activities by the PhD candidate): there are various forms of financial aid for activities of support to the teaching practice. The PhD candidate is encouraged to take part in these activities, within the limits allowed by the regulations.

Computer availability and desk availability: individual assignment for the entire career.