



PhD in INGEGNERIA STRUTTURALE, SISMICA, GEOTECNICA / STRUCTURAL SEISMIC AND GEOTECHNICAL ENGINEERING - 37th cycle

**THEMATIC Research Field: MONITORING AND CONSERVATION OF THE ITALIAN DAM
HERITAGE**

Monthly net income of PhDscholarship (max 36 months)

€ 1180.0

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 Italian dam heritage consists of about 540 large dams (at least 15 m high or more than 1 million cubic meter impound) and of over 1000 smaller structures. They all play a vital role in providing clean energy, and drinking and irrigation water. Dams ensure environmental protection against the frequent extreme events that occur as a result of the current climate change. The significance and progressive aging of these strategic infrastructures (all unique prototypes) require the development of specific monitoring and health diagnosis tools, capable of identifying any critical issue and guaranteeing timely interventions.

Methods and techniques that will be developed and used to carry out the research

The present research project aims at the development of a dam surveillance system based on the most advanced monitoring and analysis tools. Full field measurements allow one to record the structural configuration changes due to ambient excitations and environmental conditions. The information may be collected by unmanned aerial and underwater vehicles even in situations difficult to access, and potentially exploited to diagnostic purposes by building up a digital twin of the dam and reproducing its response to external actions using machine learning and artificial intelligence algorithms. These technologies have experienced rapid development in recent times but have not yet been validated in the dam context. The



	assessment of the newly available tools and the development of a consistent investigation protocol represent the main goals of the project. The description, in Italian, of the whole project is available on request, through the contact person.
Educational objectives	Doctoral candidates are provided with high-level scientific training in a context that fosters and refines research-related skills and problem solving abilities, considering both theoretical and experimental aspects.
Job opportunities	The interdisciplinary and inter-sectoral expertise acquired with the proposed research activities and the coaching of members of the dam engineering community, where a significant turnover is taking place, facilitate integration into the related job market and offer interesting career opportunities.
Composition of the research group	1 Full Professors 1 Associated Professors 0 Assistant Professors 2 PhD Students
Name of the research directors	Gabriella Bolzon

Contacts	
Gabriella Bolzon, Dept. of Civil and Environmental Engineering gabriella.bolzon@polimi.it +39.02.2399.4319	

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	566.36 €
By number of months	6

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

Educational activities (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences): The Ph.D. course supports the educational activities of its Ph.D. students with an additional funding equal to 10% of the scholarship, starting from the second year. In some cases, students will be allowed to use part of this funding also in the first year.

Teaching assistantship (availability of funding in recognition of support to teaching activities by the PhD student): Ph.D. students are encouraged to apply, upon prior authorization, to the calls to support teaching activities at the undergraduate and Master levels at Politecnico, being paid for that. The teaching assistantship will be limited up to about 80 hours, maximum half of them devoted to teaching and classroom activities and the rest to support classworks and exams. Increase in the scholarship for stays abroad: 566,36 euros per month, for up to 6 months.

Computer availability and desk availability: Each Ph.D. student has his/her own computer for individual use. Each Ph.D. student has his/her own desk, cabinet and locker.