



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

Research Area n. 2 - Transport Infrastructures and Geosciences

THEMATIC Research Field: GROUNDWATER MANAGEMENT IN A CHANGING CLIMATE

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 main research objective of the PhD will be to investigate the role of groundwater in the future climate change scenarios. The recent drought periods enhanced the attention on water resources usage, its availability and quality. Groundwater can be both a source of freshwater and a mean for the application of adaptation solutions to current and future climate conditions. To do so, a number of operations will be required, from climate and groundwater data gathering to its analysis, passing through numerical modelling, machine learning techniques and field experiments. The PhD objective can be translated in creating a link between these fields and develop tools for groundwater management and its possible adaptation uses considering its availability and quality. This will provide useful resources to tackle future droughts and water shortages, as well as providing more possibilities for water management.

The main case study focus will be on the Adda-Ticino groundwater basin in Lombardy, developing on collaborations with Consorzio Villoresi and Regione Lombardia aimed to assess i) the groundwater resources quality and availability ii) determine a sustainable groundwater level iii) define the management strategies.

Methods and techniques that will be



developed and used to carry out the research	The PhD candidate will carry on the work starting from groundwater and climate data gathering. From there, novel climate models and data will be used to obtain future scenarios. Machine learning and data analysis techniques will be used to explore the consequences of the generated scenarios (Python, R, Matlab). Adaptation solutions will be modeled through numerical modelling by improving the existing model (MODFLOW) of the study area and using it as forecast tool. The same model will be used to study some specific areas where water quality is threatened by anthropogenic pollution.
Educational objectives	The doctoral program offers advanced training in groundwater modeling and analysis. The candidate will have access to an experienced and skilled environment and will be able to experience a period abroad. The candidate will be able to develop and produce original scientific work on a topic both scientifically and socially relevant.
Job opportunities	The experience and skills developed through this doctoral program will open up career opportunities as analysts or managers in environmental policy authorities, senior consultants for engineering companies, or as researcher in universities, research centers, and R&D departments.
Composition of the research group	0 Full Professors 1 Associated Professors 3 Assistant Professors 1 PhD Students
Name of the research directors	Luca ALBERTI

Contacts
luca.alberti@polimi.it

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

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

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: PhDs have their own computer for individual use.

Desk availability: individual assignment for the entire career.