



# PhD in CONSERVAZIONE DEI BENI ARCHITETTONICI / PRESERVATION OF THE ARCHITECTURAL HERITAGE - 40th cycle

**INTERDISCIPLINARY Research Field: CH-XAI-GIS FOR THE DEVELOPMENT OF  
INNOVATIVE INDICATORS IN EVALUATING, MANAGING, AND ENHANCING HISTORIC  
SETTLEMENTS**

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

**€ 1300.0**

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 main objective of the research is to test an innovative framework for the analysis, evaluation, and management of the cultural landscape and historical settlement palimpsest in fragile areas. Starting from the in-depth study and systemization of the types and families of data related to the different components, tangible and intangible, that build the cultural landscape palimpsest, the research aims to define and test a set of indicators, quantitative and qualitative, for the design of actions and tools for the planning and conservation, adaptive and sustainable, of heritage resources. More generally, the research fits into the groove of studies related to the investigation and definition of settlement-territorial quality, and the representation and formalization of related factors, with knowledge-making and decision-support purposes.

Interdisciplinary PhD Grant

The PhD research will be carried out in collaboration with research groups of the PhD programme in

**"ARCHITECTURE, BUILT ENVIRONMENT AND  
CONSTRUCTION ENGINEERING".**

See <https://www.dottorato.polimi.it/?id=422&L=1> for further information.



<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>The interdisciplinary research, based on the approach of the scientific fields of cultural heritage representation and topography / GIS science, intends to use a set of established methods for the analysis and enhancement of cultural landscapes (from the historic city to inland areas), enriching them through the incremental construction of hybrid databases, processed through the experimentation of geospatial information systems connected with open and inclusive experimental machine learning algorithms (Explainable Artificial Intelligence-XAI), whose effectiveness and deductive/predictive capabilities are to be tested.</p> <p>The research also interconnects CH representation and communication skills, visual thinking, geomatics and topography, conservation, and planning applied to historically settled territories into a single knowledge-making ecosystem.</p> <p>The interdisciplinary work will refer to the proposing PhD Programme (Preservation of the Architectural Heritage) and the affiliated one (Architecture, Built Environment and Construction Engineering).</p> <p>The contributions of the two research groups focus on the heuristic value of land representation and visualization tools when connected to innovative geospatial analysis and data processing methodologies.</p>
<p><b>Educational objectives</b></p>	<p>The goal is to train a researcher figure possessing specific skills related to enhancing the potential of tangible and intangible heritage resources of edge and marginal territories, capable of grasping and promoting their possibilities and perspectives for renewed habitability. The interdisciplinary educational objectives systematize, on the one hand, the research results in the field of open data for cultural landscapes and historically settled landscapes, enriching the analytical and information processing possibilities through the specific know-how of the two doctorates involved.</p> <p>On the other hand, the technological, geoinformatics, and data mining component makes it possible to respond to some concrete problems in the areas of preservation of cultural heritage and historic settled landscapes, from big-</p>



	<p>data real-time modeling to building processes based on open, replicable, and scalable algorithms.</p> <p>Finally, artificial intelligence, Bayesian inference, GIS-based multivariate analysis and clustering algorithms can enable the testing of highly innovative tools, such as Cultural Heritage Information Models (ChIM) and Cultural Heritage Digital Twins (ChDT), on specific sample areas.</p>
<p><b>Job opportunities</b></p>	<p>Graduates of the PhD programme have often found employment in public sector and conservation institutions, as well as in professional practices and in the business world, in specific specialized fields.</p> <p>PhD candidates from abroad find job in their native countries at University or in Cultural Heritage Institutions. As regards Italy, the relationship with Italian Ministry of Cultural Heritage (Mibact), has been definitely fruitful, especially when we consider that many among the best PhDs in Preservation of Architectural Heritage have been hired as officers and executives to the above ministry: recently many PhD from this Programme won the competitive exam to become public officers in the Ministry of Cultural Heritage and most of them are now responsible in prestigious seats.</p>
<p><b>Composition of the research group</b></p>	<p>11 Full Professors                  17 Associated Professors                  0 Assistant Professors                  48 PhD Students</p>
<p><b>Name of the research directors</b></p>	<p>Daniele Villa, M. Cristina Giambruno</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	650.0 €
By number of months	6

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

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

1. National Technical University of Athens (N.T.U.A.), Greece
2. Departamento de Historia del Arte, Universitat de València, Spain
3. Department of Architectural Composition, Universidad de Castilla-La Mancha
4. École Nationale supérieure d'architecture de Paris-La Villette (ENSAPLV), France
5. Faculdade de Arquitectura da Universidade do Porto, Portugal
6. Université Paris I - Pantheon - Sorbonne, Parigi, France
7. Universidad de Sevilla, Departamento de Historia de América, Spain
8. ISPC-CNR Istituto di Scienza del Patrimonio Culturale (Italy)
9. ISCR Istituto Superiore per la conservazione e il restauro (già ICR), Roma

**Educational activities** (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student per year ("DOTE"): **total amount: 5.300,25 euro:**

1st year: max **1.766,75 euro**

2nd year: max **1.766,75 euro**

3rd year: max **1.766,75 euro**



**Teaching assistantship** (availability of funding in recognition of supporting teaching activities by the PhD student)

There are various forms of financial aid supporting the teaching practice.

The PhD candidate is encouraged to take part in these activities, within the limits allowed by the regulations.

**Workspace:**

*In the CBA PHD room at Bldg. 14 in Leonardo Campus, are available workstations for shared use. All the Ph.D. students can use their laptops with a wireless connection.*

*Workstations and other equipment are available in the various departmental laboratories (Dastu) linked with the doctoral Program.*