



**POLITECNICO**  
MILANO 1863

DIPARTIMENTO DI ARCHITETTURA  
E STUDI URBANI

PhD Programme in

# Preservation of the Architectural Heritage

*37th Cycle (2021)*

**4 Open Topic** Scholarships

+

**1 Thematic & Interdisciplinary** Scholarship

**OPEN CALL | Deadline: 20th May 2021**

## DAStU - Politecnico di Milano

### Ph.D. programme in Preservation of the Architectural Heritage

#### Call for applications 2021 is now open!

The Ph.D. programme in **Preservation of the Architectural Heritage** grants **five Ph.D.** positions to start in November 2021.

All positions are fully funded with scholarships and other benefits:

- **Four positions** allow candidates to freely choose their own research topic.
- **One position** is based on a predefined research topic as follows:

**Integrated Historic BIM-GIS: Definition of an Innovative Multi-Information and Multi-Scale Digital Environment for the Conservation and Enhancement of Historic Settlements in Inner Areas.** This position is co-financed in collaboration with the Department of “*Architettura, Ingegneria delle costruzioni e Ambiente costruito*” (Dip. ABC). Academic supervisors: Prof. Annunziata Maria Oteri (annunziatamaria.oteri@polimi.it) and Prof. Luigi Barazzetti (luigi.barazzetti@polimi.it)

#### How to Apply

**The official call for applications, along with procedures and requirements, is available on:** <http://www.dottorato.polimi.it/en/looking-for-a-phd/call-for-positions-and-scholarships/index.html>

► **Deadline: May, 20<sup>th</sup>, 2021 (2 p.m. Italian time)**

► **For administrative inquiries contact:**  
Marina Bonaventura (marina.bonaventura@polimi.it)

► **Information about the Ph.D. programme in Preservation of the Architectural Heritage is available on:** <http://www.dottorato.polimi.it/en/phd-programmes/active-phd-programmes/preservation-of-the-architectural-heritage/index.html>

## Four Open Scholarships

#### **Motivation and objectives of the research**

The PhD programme focuses its attention to some currently crucial themes for the preservation, conservation, management and enhancement of Architectural Heritage. Actually, the conservation of Architectural Heritage is a strategic field, one of the main important resources for worldwide economy and the base for a sustainable future in different areas of the world.

The team of professors, promoting and participating in the debate around these themes on a national and international scale, will deal with a broad range of issues requiring strong and real multi-disciplinary approaches. Moreover, to the many competences present in the PhD Board will add others, from outside (different institutions), for specific topics.

The proposals covering the following issues are encouraged:

**Fragile Heritage**

Historic centres, fragility and potentiality; Inner Areas: census, conservation and re-use of architectural heritage; Strategic approaches for preservation; Social involvement and communities engagement in the protection and management of their heritage; Architectural Heritage at risk in seismic or in conflict areas; Architectural Heritage and Cultural Landscapes in countries in transition.

**Studies on Built Heritage**

Construction techniques and materials: from the 15th to the 20th century; Architecture and methods of construction: languages, technologies, products and sources; Preservation, conservation and re-use of pre-20th century architecture; The question of re-use as possible cause of conflict with the issues of conservation; Protection, conservation and re-use of twentieth-century architecture; Twentieth-century building techniques and methods of restoration; Inventories of cultural heritage, their history and

methodologies; Historical systems of heating, lighting, water supply and drainage / waste evacuation in individual buildings and on an urban scale; Wooden and masonry structures (carpentry, floors and ceilings, stone or brick vaults); Traditional construction techniques: conservation problems and approach; Materials and finishing of historic buildings: characteristics, production techniques and use as identified in technical literature and by material analysis; Technical literature on construction: texts and their transmission, treatises, early technical and scientific journals, architectural manuals and journals; Building archaeology: practical issues in archaeological research; Buildings materials archaeology: history of their use, continuity and discontinuity in the use of traditional building materials; archaeology of modernism.

**Diagnostics of Materials and Structural Issues**

Innovative materials and methods for the conservation of architectural surfaces; Protocols for monitoring the state of preservation of building materials; Innovative methods for the dynamic monitoring of resisting structures (under the effect of environmental noise or specific stimuli); Critical evaluation of empirical construction technologies developed in the pre-scientific age to meet special needs (in particular, resistance to earthquakes); Definition of evaluation process and knowledge of the increases “residual capacity” in existing buildings, ensuring the achievement of the preservation objectives.

**Cultural Heritage and Economic Evaluation**

The economic perspective on Cultural Heritage; The notion of Total Economic Value; Stated preferences and Revealed preferences methods; How to support decisions about preservation, exploitation and re-use of Cultural Heritage.

The PhD programme grants two scholarships financed by the Italian Ministry of University and Research. Applicants may freely submit a research proposal related to innovative topics of personal interest.

#### **For further information:**

PAH Programme Coordinator  
Prof. Mariacristina Giamb Bruno, DAStU, Politecnico di Milano  
E-mail: [mariacristina.giamb Bruno@polimi.it](mailto:mariacristina.giamb Bruno@polimi.it)

Tutor: Oana Cristina Țiganea; E-mail: [oanacristina.tiganea@polimi.it](mailto:oanacristina.tiganea@polimi.it)

The Ph.D. Supervisor will be selected from the Faculty Board Members after the enrollment.

## Integrated Historic BIM-GIS: Definition of an Innovative Multi-Information and Multi-Scale Digital Environment for the Conservation and Enhancement of Historic Settlements in Inner Areas.

### Motivation and objectives of the research

The Italian National Strategies for Inner Areas (SNAI) was promoted in 2013 by the Agency for Territorial Cohesion to contrast depopulation in marginal areas. The assessment of indicators for defining the potentiality of reuse of abandoned architectural heritage is a priority among the critical aspects that emerged in the application phase. Such a criticality (which weakens a method firmly based on the enhancement of cultural capitals) is influenced by the absence of rapid and reliable tools for data collection and interpretation to define these indicators.

Due to the complexity of the considered objects - the Italian settlement system in inner areas is characterized by small historical centers, and small productive and residential settlements; the research proposes an innovative method for capturing a significant variety of physical data (e.g., the characteristic of the architectural heritage and its environment, the level of preservation/damage, the risk vulnerability of the settlements, and so on) as well as the socio-economic statistics (the economic and productive framework, the local communities conditions, the significance and importance of architectural heritage for the communities, and so on).

The proposed method aims at developing a novel digital system defined as “Integrated Historic BIM-GIS”, which can be considered an evolution of the BIM-GIS systems for cultural heritage. The method will be tuned to handle complex and multi-stratified contexts at an urban scale. Besides, the opportunity to handle complex multi-scale information will provide important support in assessing indicators and developing strategies for revamping small settlements in inner areas.

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

The research aims at defining a method for revamping settlements in inner areas. The method must link architectural and urban heritage physical features with its potentiality of reuse and enhancement in the wider economic and social strategies for repopulation and revamping of a specific area. A novel strategy will be developed to collect information normally provided in BIM using a single geo-spatial and multi-scale environment typically offered by GIS. The process should include both information at an architectural scale (the single building and its constructive elements) and at territorial scale (main settlement and minor related settlements), also including connections and environmental details e.g., mobility, accessibility, landscape, and so on. One of the main purposes is merging the “I” (information) in both acronyms: BIM and GIS.

Therefore, the research will consider a new digital environment to develop an integrated BIM-GIS model. On the other hand, the rigid structure of such new platforms and their limitations must be taken into consideration, especially for managing the complexity and the stratification of historical settlements. This will require the development of procedures and strategies to handle complex information related to cultural heritage, hence the coined term Historic BIM-GIS.

The second purpose of the research is to integrate a significant variety of data in a single environment where information on economic and productive values of the given territory is gathered together with BIM models and GIS data. The system should harmonize different levels of information through a dialogue between existing geo-spatial data and new information provided by digital surveys based on innovative techniques such as LIDAR and multi-platform digital photogrammetry.

### For further information:

Supervisors and Scientific Responsible for this research:  
Prof. Annunziata Maria Oteri, DASTU, Politecnico di Milano  
E-mail: [annunziatamaria.oteri@polimi.it](mailto:annunziatamaria.oteri@polimi.it)

Prof. Luigi Barazzetti, Dip. ABC, Politecnico di Milano  
E-mail: [luigi.barazzetti@polimi.it](mailto:luigi.barazzetti@polimi.it)

This is a joint PhD grant between the following PhD programmes:  
**Preservation of the Architectural Heritage** and **ABC - Ph.D.**

## DASTU - Politecnico di Milano Ph.D. programme in Preservation of the Architectural Heritage

### How to Apply

**The official call for applications, along with procedures and requirements, is available on:** [www.dottorato.polimi.it/en/looking-for-a-phd/call-for-positions-and-scholarships/index.html](http://www.dottorato.polimi.it/en/looking-for-a-phd/call-for-positions-and-scholarships/index.html)

► **Deadline: 20th May 2021 (2pm, Italian time)**

► **For administrative inquiries, contact:**  
Marina Bonaventura ([marina.bonaventura@polimi.it](mailto:marina.bonaventura@polimi.it))

► **Information about the PhD programme in Urban Planning, Design and Policy is available on:** [www.dottorato.polimi.it/en/phd-programmes/active-phd-programmes/urban-planning-design-and-policy/index.html](http://www.dottorato.polimi.it/en/phd-programmes/active-phd-programmes/urban-planning-design-and-policy/index.html)