PhD in PRESERVATION OF THE ARCHITECTURAL HERITAGE - 33rd cycle

Research Field: HERITAGE ASSETS AT RISK. PREVENTION MODALITIES AND BENEFITS

<table>
<thead>
<tr>
<th>Monthly net income of PhD scholarship (max 36 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>€ 1012.0</td>
</tr>
</tbody>
</table>

In case of a change of the welfare rates during the three-year period, the amount could be modified.

**Context of the research activity**

<table>
<thead>
<tr>
<th>Interdisciplinary PhD Grant</th>
</tr>
</thead>
<tbody>
<tr>
<td>The PhD research will be carried out in collaboration with research groups of the PhD programme in &quot;ARCHITECTURE, BUILT ENVIRONMENT AND CONSTRUCTION ENGINEERING&quot;. See <a href="http://www.dottorato.polimi.it/index.php?id=242&amp;L=1">http://www.dottorato.polimi.it/index.php?id=242&amp;L=1</a> for further information.</td>
</tr>
</tbody>
</table>

Recent earthquakes occurred in Central Italy have enhanced, one more time, the weakness of the built environment and the consequent lack of safety for people. The clear evidence and the seriousness of the problem call for the need to define strategies for risk prevention and preparedness. This implies the specification of a number of procedures, which have to be analyzed from both the point of view of feasibility and of the connected benefits as well, which normally are not considered. In relation to such benefits, the specific aspect of heritage assets is crucial, in consideration of both social and economical advantages, which could pay back for investments. The need to analyze seismic risk in depth and the definition of the prevention and preparedness levels which are required for human life protection imply both a direct economic advantage (damage prevention is less expensive than repair or reconstruction) and an indirect one as well (prevention activities are associated to positive outcomes which can be taken advantage of). In this perspective, we decided to promote an...
interdisciplinary scholarship on "**Heritage assets at risk. Prevention modalities and benefits**", which will take advantage of the cooperation between the phd program in Preservation of the architectural heritage, based in the DASTU department, under the supervision of prof. Claudio Chesi and the phd program in Architecture, Built Environment and Construction Engineering, based in the ABC department, under the supervision of prof. Stefano Della Torre. The proposed research is specifically finalized to characterize risk prevention activities for the protection of distributed heritage assets from protected buildings to historical town centres, to cultural landscapes and, therefore, of the territorial identity, of the inhabitant permanence, of productivity and inclination to innovate, and of tourist attraction as well.

<table>
<thead>
<tr>
<th>Methods and techniques that will be developed and used to carry out the research</th>
</tr>
</thead>
<tbody>
<tr>
<td>The proposed research, spanning between the issues of <strong>Heritage assets</strong> and <strong>Major risks</strong>, needs that experts in the fields of structural engineering and preservation of architectural values closely interact; it should also be opened to other disciplines, in relation to the topics presented in the following. Seismic risk prevention can be pursued mainly through interventions aiming at the improvement of structural resistance; this requires that preliminary initial studies are performed, in order to reach a suitable knowledge level. The available methods and tools interlace with studies in the field of preservation and restoration, for which knowledge is based on a multidisciplinary analysis of both buildings and places. The research must be addressed to the production of an asset registry, consisting in an open data-base which could provide the basis for the definition of the sequential prevention measures required by seismic safety. In view of safety evaluation, the analysis of the structural behaviour is essential. This problem looks complex in relation to the definition of improvement levels which can increase the resistance capacity respecting, at the same time, the cultural-historical value and the physical nature.</td>
</tr>
</tbody>
</table>
of the architectural asset. Studies aiming at damage prevention and reduction should go with the preparation of provisional interventions to be executed immediately. The study of not codified intervention modalities, such to add value to current practice, might come from the analysis of formerly upgraded buildings which survived recent earthquakes, both independent or parts of aggregates; in this sense, monumental buildings may suggest by themselves suitable intervention criteria and provide widely applicable indications.

Within the doctoral program various phd thesis have been focused on the theme of structural safety in seismic areas, mainly under the supervisio of prof. Claudio Chesi and prof. Stefano Della Torre. The results of these thesis have been published:

1. S. Tonna, C. Chesi, E. Vintzileou, K. Katopodis, *Traditional building criteria in the Lefkada island: peculiarities of the foundation system*, SAHC2014, 9th International Conference on Structural Analysis of Historical Constructions, Mexico City (Mexico), October 14-17 2014;
2. V. Sumini, C. Chesi, *A structural insight for the preservation of Marina City Towers in Chicago*, 16th World Conference in Earthquake Engineering, Santiago (Chile), January 9-13, 2017-03-13

**Educational objectives**

Students in the doctoral program work closely with one or more faculty members of the school and from their related fields of study. Members of the field and invited experts will also play important roles in a students academic progress. PhD candidates will be prepared to fill faculty researcher
positions or secure positions at research institutes and centers. Upon successful program completion, we expect that they will:

- Be prepared for employment in research/faculty positions at high-level research institutions
- Engage in and promote evidence-based practices through the application of rigorous methodology
- Provide leadership in the field by developing an independent line of ethical and culturally responsive research
- Contribute to development of the next generation of scholars.

Graduates of the PhD programme have often found employment in public sector and conservation institutions at progressively higher levels, as well as in professional practices and in the business world, in specific specialized fields. PhD candidates from abroad find job in their native countries at University or in Cultural Heritage Institutions.

As regards Italy, the relationship with Italian Ministero per i beni e le attività culturali e il turismo, 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.

<table>
<thead>
<tr>
<th>Job opportunities</th>
</tr>
</thead>
</table>

Graduates of the PhD programme have often found employment in public sector and conservation institutions at progressively higher levels, as well as in professional practices and in the business world, in specific specialized fields. PhD candidates from abroad find job in their native countries at University or in Cultural Heritage Institutions. As regards Italy, the relationship with Italian Ministero per i beni e le attività culturali e il turismo, 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.

<table>
<thead>
<tr>
<th>Composition of the research group</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Full Professors</td>
</tr>
<tr>
<td>8 Associated Professors</td>
</tr>
<tr>
<td>3 Assistant Professors</td>
</tr>
<tr>
<td>30 PhD Students</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of the research directors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chesi Claudio - Stefano Della Torre</td>
</tr>
</tbody>
</table>

## Contacts

**CONTACTS:**

**Scientific coordinators:**
- **prof. Claudio Chesi**
e-mail: claudio.chesi@polimi.it ; tel. 02/2399.4335
- **Prof. Stefano Della Torre**
e-mail: stefano.dellatorre@polimi.it; tel 02/2399. 4646
Phd coordinator:  
*prof. Carolina Di Biase*  
e-mail: carolina.dibiase@polimi.it; tel. +39 02.2399.9400

DASTU PhD Office:  
dr Marina Bonaventura E-mail: marina.bonaventura@polimi.it ; tel. +39/02/2399.5165  
Marilena Mastalli e-mail: marilena.mastalli@polimi.it ; tel. +39/02/2399.5405

ABC Phd Office:  
dr. Cristina Marchegiani  
E-mail: cristina.marchegiani@polimi.it  
Tel. :022399.2614

<table>
<thead>
<tr>
<th>Additional support - Financial aid per PhD student per year (gross amount)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing - Foreign Students</td>
</tr>
<tr>
<td>Housing - Out-of-town residents (more than 80Km out of Milano)</td>
</tr>
</tbody>
</table>

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

In the framework of the cooperation between the phd program in Preservation of the architectural heritage-DASTU dpt. and the phd program in Architecture, Built Environment and Construction Engineering -ABC dpt., the phd candidate will have the possibility of working in an interdisciplinary milieu, including also the "Laboratorio Interdipartimentale Sismo-Soil-Lab (ABC-DICA-DASU)  
http://www.polimi.it/it/ricerca-scientifica/strutture-di-ricerca/laboratori-interdipartimentali/sismosoillab/

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.), Grecia  
2. Instituto de Restauración del Patrimonio, de la Universitat Politècnica de València (UPV)  
3. École Nationale supérieure d'architecture de Paris-La Villette (ENSAPLV), Francia  
4. Fakultät Architektur und Urbanistik, Bauhaus-Universitaet Weimar, Germania  
5. Universidad de Sevilla, Departamento de Historia de América, Spagna  
6. National Institute of Archaeology with Museum, Bulgarian Academy of Science, Bulgaria  
7. Faculdade de Arquitectura da Universidade do Porto, Portogallo
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:
1st year: max 0 euros
2nd year: max 1.370,00 euros
3rd year: max 1.370,00 euros

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.

Computer availability:
In the CBA PhD room are available 4 workstations for shared use, connected with the printer and a plotter. All the PhD students can use their own laptop with the wireless connection. Workstations and other equipment are available in the various laboratories linked with the doctoral programme.

Desk availability:
1 desk for each phd candidate, individual use