



# PhD in ARCHITETTURA, INGEGNERIA DELLE COSTRUZIONI E AMBIENTE COSTRUITO / ARCHITECTURE, BUILT ENVIRONMENT AND CONSTRUCTION ENGINEERING - 37th cycle

**THEMATIC Research Field: DEFINITION OF ANALYTICAL PROCEDURES AND METHODOLOGIES FOR THE PRICE LIST OF PUBLIC WORKS OF THE LOMBARDY REGION. DIGITAL PLATFORMS FOR PUBLIC WORKS THROUGH BIM METHODOLOGY: 5D ANALYSIS**

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

**€ 1400.0**

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

Cost control and the adequacy of information between the public works project and its production on site is one of the still unsolved problems in the construction sector, where digitization and the use of information models (BIM 5D) could give greater results towards an effective industrialization of the supply chain and optimization of its processes.

This research aims at studying automatic or semi-automatic processes of analysis, control, and management of the data through AI techniques and at promoting an effective and efficient integration of both the information of the process (along the entire supply chain) and the production (along the entire life cycle of the asset), with the following main objectives:

- Definition of a structure of price analysis for processing in public works, through BIM methodology;
- Management and control of production factors for the verification and adequacy of prices with respect to BIM project information models. Architecture of a digital platform for the 5D management of construction



	<p>contracts; and</p> <ul style="list-style-type: none"> <li>• Digital assessment of Public Procurement department of Regione Lombardia (for this activity is necessary fluently Italian: B2/C1).</li> </ul>
<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>During the research project the following methodologies and techniques will be applied:</p> <ul style="list-style-type: none"> <li>• Business process modelling and reengineering to define the actual processes and the development of the future ones based on the new frameworks of information management;</li> <li>• Case study analysis to develop the processes and apply these processes in real use-cases;</li> <li>• Building Information Modelling (BIM) to manage digital models and define sources and archives;</li> <li>• BIM methods and tools of information modeling for cost management: 5D;</li> <li>• Digital information platforms for construction according to the RAF of the DigiPLACE EU project;</li> <li>• Definition of a system of coding and standardized description of works and resources for public procurement;</li> <li>• Structure of analysis and management of the factors of production for the development of unit procurement prices;</li> <li>• Analysis of the adequacy of price items with AEC objects of project BIM information models; and</li> <li>• Use of open languages (IFC UNI EN ISO 16730) and Information delivery Specifications (IDS; BuildingSMART Int.) for the verification of data adequacy.</li> </ul> <p>This scholarship is fully funded by Regione Lombardia.</p>
<p><b>Educational objectives</b></p>	<ul style="list-style-type: none"> <li>• Information management in construction sectors (BIM).</li> <li>• Digitalization in construction.</li> <li>• Digital construction platforms.</li> </ul>



	<ul style="list-style-type: none"> <li>• Open language, data analysis.</li> </ul>
<b>Job opportunities</b>	<ul style="list-style-type: none"> <li>• Cost Advisory for Public Administrations.</li> <li>• Cost control in BIG private and public projects.</li> <li>• BIM management staff: digital cost control and coordination.</li> <li>• BIM Manager for Public Administrations.</li> </ul>
<b>Composition of the research group</b>	1 Full Professors 2 Associated Professors 1 Assistant Professors 3 PhD Students
<b>Name of the research directors</b>	Prof. Alberto Pavan and Dr. Claudio Mirarchi

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

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	564.01 €
<b>By number of months</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>
<p><b>This scholarship is funded by Regione Lombardia</b></p> <p><b>Additional information can be found in the Regulations for the 37th Cycle of ABC-PhD:</b>  download is available at link:  <a href="https://beep.metid.polimi.it/web/abcphd/documenti-e-media">https://beep.metid.polimi.it/web/abcphd/documenti-e-media</a></p> <p><b>Additional information about ABC department and ABC-PhD programme:</b>  available at link:  <a href="https://www.dabc.polimi.it/">https://www.dabc.polimi.it/</a></p>



**Additional economic support:**

Budget for the research activity:

total amount Euro 3.068,66 per student

In detail:

- 1st year 0,00 Euro
- 2nd year 1.534,33 Euro
- 3rd year 1.534,33 Euro

**Desk availability:**

The ABC department provides non-permanent desks to be temporarily booked in common PhD rooms. A part-time presence in the premises of Lombardia Region administration is scheduled.

**Teaching assistantship**

There are various forms of financial aid for activities of support to the teaching practice.

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