



PhD in ARCHITETTURA, INGEGNERIA DELLE COSTRUZIONI E AMBIENTE COSTRUITO / ARCHITECTURE, BUILT ENVIRONMENT AND CONSTRUCTION ENGINEERING - 39th cycle

PNRR 118 INTERDISC Research Field: DIAGNOSTIC INTEGRATED SYSTEM FOR WALL AND PANEL PAINTINGS

Monthly net income of PhDscholarship (max 36 months)
€ 1275.0
In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
<p>Motivation and objectives of the research in this field</p>	<p>Interdisciplinary PhD Grant</p> <p>The PhD research will be carried out in collaboration with research groups of the PhD programme in "PHYSICS". See https://www.dottorato.polimi.it/en/prospective-phd-candidates/calls-and-regulations for further information.</p> <p>The Cultural Heritage field sees a variety of subjects that play an active role in the processes of data collection (digitization) and information processing. Data, information, and processes must be managed with tools that allow sharing, reuse, and durability. To ensure accessibility and the sharing of data and information, it is necessary to operate on two aspects:</p> <ul style="list-style-type: none"> - the first concerns the production of data; - the second relates to their management. <p>The research objectives will be concentrated on the second aspect, which, however, necessarily requires expertise regarding the first.</p> <p>In today's practice non-invasive surveys and analyzes are performed, they can give information on the shape, the materials, the artistic technique, and the signs of aging present in the work.</p> <p>This trend has been allowed by the technological evolution of the last few decades, which has led to the</p>



	<p>introduction of innovative investigative instruments. However, the information obtainable with these methodologies is neither easy to use and interpret nor easy to manage if you do not know the physical and instrumental principles on which they are based, and do not have sufficient knowledge of the (digital) formats through which it is possible to save and make available the results of the surveys.</p> <p>The objective of the research is the design and implementation of an integrated system for diagnostics that will make it possible to create a digital resource capable of supporting a complex network of exchanges and promoting the updating of data and information, the constant reuse of resources, and access to them.</p> <p>The candidate will have to investigate the methods of management and sharing of already existing data and information, then design an integrated system that meets the criteria (FAIR principles) of 'Traceability' (digital resources accompanied by persistent identifiers and metadata that is descriptive); 'Accessibility' (metadata accessible through standard protocols and released in an open format); 'Interoperability' (metadata that can be searched and indexed by any other information system in standard formats); and 'Reusability' (digital assets and metadata released under clear licences in languages recognised and understandable by the reference scientific community).</p> <p>This research will contribute to SDG 9.5.</p> <p>The research will contribute to the digital transformation process of the cultural ecosystem by supporting and promoting the creation of an integrated system for diagnostics (PNRR strategy, investment M1C3 1.1, 'Strategies and digital platforms for cultural heritage').</p>
<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>The research includes the first part of interdisciplinary activities that will concern the understanding of the ways in which to collect, order, and manage: very high-resolution three-dimensional models (models essential for an in-depth reading of the shape of the work and for the right referencing of non-destructive scientific investigations);</p>



	<ul style="list-style-type: none"> •punctual spectroscopic investigations and imaging for the identification of pictorial materials (pigments, binders, and any degradation products; •the techniques of Raman spectroscopy, X-ray fluorescence spectroscopy, optical fluorescence spectroscopy, and hyperspectral imaging will be considered); and •collection of the microclimate and brightness conditions of the environment (defining the correct conditions for conservation and use of a work). <p>However, although it is possible to record and collect a large amount of scientific and non-scientific data for a work, the process of interpreting such data is highly fragmented since typically each expert produces and analyses his own data in isolation from the other scientists involved.</p> <p>The museum curator or conservator often finds himself consulting technical reports rather than participating in the analysis of the data produced by scientific analyses.</p> <p>The design of an integrated system fits into this context: storing and combining multi-source and multi-type data, providing new information on the work of art, and allowing it to improve its knowledge and use.</p> <p>The integrated system will make it possible to work cooperatively on complex data sets in a common space of representation that can be used both to study the shape and dimensional characteristics of the object and to reference all the scientific data acquired on the artwork.</p> <p>The activity will make explicit reference to the Heritage assets, the wall paintings, and the paintings on wood. The internship and the period abroad will be decided according to the results obtained at the first year's end.</p> <p>This PhD position is funded by PNRR funding and will require the candidate to fill reports about the activity already developed at any time they are requested.</p> <p><u>A research period abroad in a research centre to be defined is mandatory. The destination will be defined at the beginning of the PhD.</u></p>
<p>Educational objectives</p>	<p>The educational objectives are focalized mainly in:</p>



	<ul style="list-style-type: none"> •Manage 3D model and punctual investigations 1), 2), 3) in the 'Methods and techniques' section; •Data referencing (Information Platform - GIS HBIM); •Standard protocols and open format; •Cooperative platform design.
Job opportunities	<p>Designing and implementing an integrated system for conservation purposes is the more actual topic in the field of Cultural Heritage field. At the national and international levels, the research responds to the objectives expressed in terms of the digitization of the CH field. The research will be able to contribute to the digital transformation process of the cultural ecosystem (museums, institutes, public places of culture, etc.). Italian national strategy of the Ministry of Culture, 'Digital strategies and platforms for CH', in agreement with the EU plan of action and guidelines.</p>
Composition of the research group	<p>0 Full Professors 5 Associated Professors 0 Assistant Professors 7 PhD Students</p>
Name of the research directors	<p>Prof. C. Achille (ABC) & E. Puppini (Physics)</p>

Contacts	
<p>Prof.ssa Cristiana Achille 02 2399 6520 cristiana.achille@polimi.it</p> <p>Prof. Ezio Puppini 02 2399 6138 ezio.puppini@polimi.it</p>	

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	637.5 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	
By number of months at the company	0
Institution or company where the candidate will spend the period abroad (name and brief description)	The destination will be defined at the beginning of the PhD.
By number of months abroad	6

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

Additional support:

Budget for the research activity (only for positions supported by scholarship):

total amount Euro 5197.60 per student

In detail:

- 1st year Euro 1732.53
- 2nd year Euro 1732.53
- 3rd year Euro 1732.53

Additional information about the organization and regulations of ABC-PhD programme can be found in the Regulations for the 39th Cycle of ABC-PhD:

download is available at link:

<https://www.dottorato.polimi.it/corsi-di-dottorato/architettura/architettura-ingegneria-delle-costruzioni-e-ambiente-costruito>

Additional information about ABC department and ABC-PhD programme:

available at link:

<https://www.dabc.polimi.it/>

Desk availability:

The ABC department provides non-permanent desks to be temporarily booked in common PhD rooms.