POLITECNICO DI MILANO

PhD in INGEGNERIA STRUTTURALE, SISMICA, GEOTECNICA / STRUCTURAL SEISMIC AND GEOTECHNICAL ENGINEERING - 40th cycle

INTERDISCIPLINARY Research Field: METHODS FOR ANALYSIS AND TECHNIQUES OF INTERVENTION FOR THE REGENERATION OF LARGE ABANDONED ARCHITECTURAL COMPLEX

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	Interdisciplinary PhD Grant The PhD research will be carried out in collaboration with research groups of the PhD programme in "**ARCHITECTURAL URBAN INTERIOR DESIGN**". See https://www.dottorato.polimi.it/?id=422&L=1 for further information. SDG linked to the research: 11 - Sustainable Cities and Communities The research has a twofold objective. First, the in-depth analysis of the typical features of degraded or unfinished works, considering technical and economic, social and cultural, contextual and symbolic variables. The second objective is the development of guidelines for the renovation of the buildings in question, through the study and application of computation and design techniques to a series of case studies. The two objectives align in the sense of providing the tools to draw up lists of priorities, which take into account the multiple variables at play in the field of regeneration of architectural complex.
Methods and techniques that will be developed and used to carry out the research	The research will be developed along the typically interconnected paths of architectural design and structural

	interconnected paths of architectural design and structural engineering, with the integration of the history of architecture and of the mechanical experimental techniques. The first objective, mentioned previously, requires the critical analysis of archival sources, exploiting for example the Registry of Unfinished Works. The second objective involves the development of innovative models, both physical and digital. The physical models will be created also using additive manufacturing techniques. The analysis of the case studies will be conducted using diversified and interdisciplinary computational and experimental techniques.
Educational objectives	The educational objectives have a strongly interdisciplinary nature. The analysis of archival sources must be carried out considering the aforementioned disciplines in an integrated way, also making use of artificial intelligence algorithms (reinforcement learning). The second part of the research is connected with the development of different skills: digital models are used both for architectural and technological and structural analyses; physical models are created at different scales and with different levels of detail depending on the experimental purposes.
Job opportunities	The regeneration of abandoned buildings will be an important topic in the next years. Highly skilled technical figures are requested by top level engineering firms and government agencies.
Composition of the research group	0 Full Professors 2 Associated Professors 3 Assistant Professors 2 PhD Students
Name of the research directors	R. Ardito, A. Gritti

Contacts
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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

Educational activities (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences): financial aid per PhD student per year. The Ph.D. course supports the educationalactivities of its Ph.D. students with an additional funding equal to 10% of the scholarship, startingfrom the first year.

Teaching assistantship: availability of funding in recognition of support to teaching activities by the PhD student. There are various forms of financial aid for activities of support to the teaching practice.The PhD is encouraged to take part in these activities, within the limits allowed by the regulations.

Computer availability: each Ph.D. student has his/her own computer forindividual use.

Desk availability: each Ph.D. student has his/her own desk, cabinet and locker.