



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

THEMATIC Research Field: ENVIRONMENTAL IMPACT MITIGATION, RESILIENCE AND LIFE CYCLE APPROACH

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

Motivation and objectives of the research in this field

The environmental issue and sustainable development (Sustainable Development Goals SDGs) require the identification of transformation processes of the built environment characterized by resilience, adaptation and mitigation of environmental impacts, adopting a life cycle thinking approach.

The research area is aimed at defining organizational models, environmental design strategies, process and product solutions that direct the built towards the reduction of environmental impacts, in line with the objectives of decarbonisation, circular economy, bio-economy, green economy, seeking ever greater efficacy in pursuing environmental performance requirements, in their inseparable relationship with social and economic ones.

This area can be defined by technologies, strategies, innovative process and design models and evaluation methods for the efficient use of resources (materials and water), at different scales (region, neighborhood, building, building product) and reduction of environmental impact, in particular:

Resilience, mitigation of climate change and decarbonisation: Development of technologies and



	<p>design/testing of technical solutions (e.g. <i>bio-based</i> and <i>nature-based solutions</i>) enabling speed up the reduction in GHG emission in line with the 2020 goals and for mitigation of the effects of climate change (European Green Deal).</p> <p><u><i>Efficiency and circularity in the use of resources and regeneration of the built environment:</i></u> Development of circular systemic approach for regeneration and adaptive reuse of the built environment, considering the building as 'materials bank' (reversible buildings, design for disassembly, building in layers, materials traceability, new materials and building systems).</p> <p><u><i>Service-driven sustainable business models:</i></u> Development of new business models oriented to the prolongation and efficient use of resources, through the extended responsibility of the manufacturer / constructor (e.g. Sustainable-Product Service Systems, Pay-per-Use, Buy-back-based and Lease or Rent / Ownership -based).</p> <p><u><i>Life cycle approach, sustainability metrics and environmental footprints:</i></u> Development of methods and tools for the design and evaluation of the environmental sustainability, with a holistic view along the whole life cycle of construction materials and along the whole value chain of the building process.</p>
<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>The research is based on a first phase of basic <i>curiosity driven</i> exploration, which can then develop towards an applicative and experimental research.</p> <p>The research is carried out by developing knowledge aimed at establishing cultural awareness and technical competence aimed at governing the complexity of the transformation processes of the built environment, considering both the intangible level (information and data management) and the material level (materials and construction solutions).</p> <p>Research and innovation activities must respond and give active support to the development of an evolutive framework that is shaped by societal challenges, by policy and regulatory drivers and by technology and industry</p>



	<p>trends, that might either be considered as challenges or opportunities</p> <p>SDGs related to this research:</p> <ul style="list-style-type: none"> •Goal 9 "Industry, innovation and infrastructure" and "Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation" •Goal 11 "Sustainable cities and communities" and "Make cities and human settlements inclusive, safe, resilient and sustainable" •Goal 12 "Responsible Production and Consumption" and "Ensure sustainable consumption and production patterns"
Educational objectives	<p>ABC-PhD Candidates are expected to produce knowledge advancements in their scientific field. Moreover, they are raised to be resilient, not frightened by the uncertainty and failure risks of innovations, trained in communication, management, networking and other transferrable skills, that are fundamental for doing research in this complex world.</p> <p>They are taught to cooperate in a competitive environment and to exploit their creativity to reach their goal, going beyond the limits of one scientific discipline, interacting and learning from other researchers and colleagues. Eventually, they are pushed to find out (and to network with) the possible stakeholders of their work.</p> <p>We retain that the best value for the Candidate and for the Program itself is the reward given by the chance of a practical application of the knowledge advancements realized.</p> <p>With this experience, ABC-PhD Doctors are expected to acquire the capacity to shoulder the responsibilities of R&D activities, to plan and to manage control tasks, to help the development and the critical optimization of policies and projects, to innovate: in particular about the PhD thesis topic, in general about the many sectors of Architecture, Built Environment and Construction Engineering and in all the most critical subjects related to</p>



	the sustainable transformation and management of the Built Environment (environmental, economic, social and cultural sustainability).
Job opportunities	<p>The holder of an ABC-PhD will gain high-level scientific knowledge, significant experience and proven R&D management skills, transferrable to other activities. This, together with the habit of communicating and working in English, acquired interacting with colleague at a global scale, during visits and stays abroad, and a deep knowledge of the academic world qualifies the Doctorate for positions offered by the best international universities and research centres. ABC-PhD experience, nevertheless, will offer the best occupational opportunities also for employments in architectural and engineering design enterprises, in public bodies and wherever highly qualified personnel (at an international level), specific competencies at the highest level, the attitudes and the network of a researcher is acknowledged.</p> <p>The more the Candidate, during the three PhD years, has taken the opportunities to stay in touch with the stakeholders of actual (or future!) societal needs and to operate real knowledge transfer, the more this comes true. ABC-PhD holders, in fact, are problem-setters, trained to model complex environments, to understand complex questions and to apply critical thinking, and problem solvers, trained to turn uncertainty in methodology and doubts in reliable solutions. The proposal has an innovative and strategic value with respect to the research and innovation paths outlined by the ECTP - European Construction Technology Platform and the EU funding program for research and innovation. The added value potentially associated with the proposed research and the expected impact in terms of innovation, scientific production and social impact derive from the close relationship with the ecological and digital transition underway at European level.</p>
Composition of the research group	8 Full Professors 10 Associated Professors 8 Assistant Professors 10 PhD Students
Name of the research directors	A.Campioli, D.Fanzini, E.Mussinelli, A.Zanelli



Contacts

Monica Lavagna <monica.lavagna@polimi.it>

Additional support - Financial aid per PhD student per year (gross amount)	
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Housing - Foreign Students	--
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Housing - Out-of-town residents (more than 80Km out of Milano)	--
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Scholarship Increase for a period abroad	
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Amount monthly	637.5 €
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By number of months	6
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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.