



PhD in SCIENCE, TECHNOLOGY AND POLICY FOR SUSTAINABLE CHANGE - 39th cycle

PARTENARIATO PNRR Research Field: BIO-INSPIRED ENGINEERING SOLUTIONS FOR ENHANCED ENVIRONMENTAL SUSTAINABILITY

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

Within the MUSA project (Multilayered Urban Sustainability Action), the ecosystem of technology and sustainable innovation co-funded by the National Recovery and Resilience Plan (PNRR), the Spoke 3 is dedicated to Deep Tech: Entrepreneurship & Technology Transfer. The objective of Spoke 3 is therefore to support the competitiveness of the territory, recognized as a "cradle of innovation?". The project aims at strengthening entrepreneurship based on research and technological innovation, developing a series of actions along the entire value chain from the idea to the business.

In this context, the PhD research intends to explore the role that bio-inspired solutions can play in fostering the development of environmentally sustainable products. Bio-inspired design is considered suitable to create products and systems that are resilient, adaptable, and environmentally friendly taking inspiration from the principles and strategies that characterize how living organisms use environmental resources. However, too often bio-inspired solutions require long refinement and development processes to reach adequate maturity for industrial exploitation. The PhD research intends to build and validate methods and tools to translate bio-inspired solutions into mature industrial applications.

D.D. 3277 del 30/12/2021 Avviso pubblico per la presentazione di Proposte di intervento per la creazione di



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| | <p>12 Ecosistemi dell'innovazione sul territorio nazionale da finanziare nell'ambito del Piano Nazionale di Ripresa e Resilienza, Missione 4 Componente 2 Investimento 1.5 - Creazione e rafforzamento di ?ecosistemi dell'innovazione?, costruzione di ?leader territoriali di R&S? - finanziato dall'Unione europea - NextGenerationEU.</p> <p>D.D. 1055 del 23/06/2022</p> <p>D43C22001410007</p> |
| <p>Methods and techniques that will be developed and used to carry out the research</p> | <p>The research will be developed by referring to established approaches towards bio-inspired engineering, as well as to methods and tools developed within the research unit such as the Guild-Based Bio-Inspired Design approach and the Bio-Inspired Material Database (BIMD). Prospective Life-Cycle Assessment (LCA) techniques will be the main reference to assess emerging technologies, product systems, and value chains in a consistent and comprehensive way towards enhanced environmental sustainability.</p> <p>The methods and tools developed within the PhD research will be tested and validated by means of industrial applications meant to demonstrate: (i) the innovation potential; (ii) the reduced CO2 footprint; (iii) the adequate technology maturity level of the conceived Bio-Inspired solutions.</p> |
| <p>Educational objectives</p> | <p>Operational competencies on up-to-date methodologies and technologies for developing innovative and environment-friendly products.</p> <p>Capability to interpret technology evolution and the dynamics of product innovation. R&D skills for scientific and industrial applications. Soft skills in the delivery of scientific talks, drafting project reports and scientific papers, delivery of presentations to industry.</p> |
| <p>Job opportunities</p> | <p>Our last survey on PhD graduates highlighted a 100% employment rate within the first year and a 35% higher salary compared with Master of Science holders in the same field. Therefore, at the end of the course, the</p> |



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| | <p>researcher will gain the skills and experience to be able to enter various professional work and research fields. These are some examples of job opportunities for the researcher:</p> <ul style="list-style-type: none"> - Academic Researcher in universities, research institutions, or academic organizations. - Research Manager in R&D organizations or departments, taking on leadership roles in managing research projects and developing new technologies with a specific focus on reduced CO2 footprint. - Technology Transfer specialist in applied research centres and consulting firms. - Sustainability manager in manufacturing companies. |
| Composition of the research group | 1 Full Professors 3 Associated Professors 1 Assistant Professors 3 PhD Students |
| Name of the research directors | Gaetano Cascini / Niccolò Becattini |

| Contacts |
|---------------------------|
| gaetano.cascini@polimi.it |

| 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 | 700.0 € |
| By number of months | 6 |

| Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information |
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| <p>Financial aid is available for all PhD candidates (purchase of study books and materials, funding for participation in courses, summer schools, workshops and conferences) for a total amount of ? 5.707,13.</p> <p>Our candidates are strongly encouraged to spend a research period abroad, joining high-level research groups in the specific PhD research topic, selected in agreement with the Supervisor. An increase in the scholarship will be applied for periods up to 6 months (approx. 700 euro/month - net amount).</p> <p>Teaching assistantship: availability of funding in recognition of supporting teaching activities by</p> |



the PhD candidate. 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.[GC1] [GC1] Questa è la tipica indicazione a meccanica, non so se sia necessario modificarla per coerenza con le altre