



PhD in CHIMICA INDUSTRIALE E INGEGNERIA CHIMICA / INDUSTRIAL CHEMISTRY AND CHEMICAL ENGINEERING - 40th cycle

**PNRR 630 Research Field: INNOVATIVE SOLUTIONS FOR THE EXPLOITATION OF
MARGINAL LAND THROUGH THE ENHANCEMENT OF CROP PRODUCTIVITY**

Monthly net income of PhDscholarship (max 36 months)

€ 1500.0

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**

Among the 17 Sustainable Development Goals of the United Nations <https://sdgs.un.org/goals>, the goal n. 2 is: "Zero Hunger: Providing food and humanitarian relief, establishing sustainable food production". The sustainable production of food is thus a primary goal for humanity. Further objective is to exploit lands which are nowadays marginal or are even unsuitable for cultivation. Indeed, the goal n. 15 of the United Nations is: "Life on Land: Reversing man-made deforestation and desertification to sustain all life on earth". Hence, also desert land should become suitable for cultivation. Moreover, also lands which were contaminated, for example by industrial productions, should become suitable for cultivations.

In the Mission of a big company, such as Rewind of the ENI Group is stated: "to work to give new life to industrial lands through efficient, sustainable remediation and revaluation projects". These goals could be pursued by developing more robust crops, which should be based on more productive seeds. This research is thus focused on identifying innovative solutions for the development of more productive seeds for more robust crops. The preparation of innovative materials is seen to be beneficial for the reported goals.

Methods and techniques that will be

The prior art investigation will be a fundamental part of the



<p>developed and used to carry out the research</p>	<p>research. Typical techniques of wet chemistry must be applied for the preparation of innovative materials. Typical techniques for the characterization of materials will be applied, such as thermogravimetric analysis, infrared analysis and chromatographic analyses. Reference seeds will be identified and germination studies will be performed by using standardized tests based on either agar based soils or real soils, either in laboratory climatic chamber or in walk-in greenhouse. ENI will fund this research.</p>
<p>Educational objectives</p>	<p>The activity is aimed at giving high education, allowing the student to be able to: i) perform wet chemistry activities focused on the preparation of innovative materials ii) characterize innovative materials iii) perform studies on seeds, in particular through germination studies The student will be able to understand and apply the guidelines for sustainability</p>
<p>Job opportunities</p>	<p>The research doctor will be able to find a location, in particular in the R&D Department, both in private and public companies and institutes active in the fields of chemistry and material science, biotechnology, innovative materials for agriculture.</p>
<p>Composition of the research group</p>	<p>1 Full Professors 3 Associated Professors 2 Assistant Professors 9 PhD Students</p>
<p>Name of the research directors</p>	<p>Prof. Maurizio Stefano Galimberti</p>

<p style="text-align: center;">Contacts</p>	
	<p>maurizio.galimberti@polimi.it</p>

<p style="text-align: center;">Additional support - Financial aid per PhD student per year (gross amount)</p>	
<p>Housing - Foreign Students</p>	<p style="text-align: center;">--</p>
<p>Housing - Out-of-town residents (more than 80Km out of Milano)</p>	<p style="text-align: center;">--</p>



Scholarship Increase for a period abroad	
Amount monthly	750.0 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	ENI Via Felice Maritano 26, 20097 San Donato Milanese (Milano) https://www.eni.com/
By number of months at the company	6
Institution or company where the candidate will spend the period abroad (name and brief description)	To be defined
By number of months abroad	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>Confidentiality: since this is a thematic scholarship, the management of Confidential Information, Results and their publication is subordinate to the restrictions agreed upon with the funding company.</p> <p>Upon acceptance of the scholarship, the beneficiary must sign a specific commitment.</p> <p>Individual budget for research (about 6.000 euro): 1st year: 2.000 euro; 2nd year: 2.000 euro; 3rd year: 2.000 euro</p> <p>Teaching assistantship (availability of funding in recognition of supporting teaching activities by the PhD student): there are various forms of financial 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 regulation.</p>