



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

**THEMATIC Research Field: ADVANCED SUSTAINABLE CATALYTIC SYSTEMS**

**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**

The PhD activity is focused on the development of advanced, innovative, and sustainable catalytic systems. The catalytic systems will be prepared starting from biobased chemical substances, from waste and residues, from "circular chemical substances" i.e., chemicals coming from recycling, mainly from depolymerization. The catalytic systems will be used for reactions with benign environmental impact, such as CO<sub>2</sub> conversion and water remediation. The reactions will be designed using the metrics of green chemistry and the principles of sustainable chemistry. Transition metals compounds will be studied as the active components of the catalyst systems. Techniques of organic and organometallic synthesis will be preferentially used. Techniques for chemical, physical, and structural characterization will be used. The catalytic performances will be investigated.

**Methods and techniques that will be developed and used to carry out the research**

The research will be carried out by using experimental techniques and facilities suitable for the synthesis and the characterization of low molecular mass chemicals. A thorough literature survey will be an essential part of the work. Analytical techniques such as chromatography, NMR spectroscopy, calorimetry, thermogravimetric, infrared, and Raman analyses will be used.

**Educational objectives**

The main objective is to give the student tools to:



	The main objective is to give the student tools to: (i) perform sustainable chemical reactions; (ii) prepare low molar mass chemicals and modify polymers; (iii) characterize organic substances; (iv) perform catalytic reactions and study reaction kinetics; (v) establish structure-property correlations.
<b>Job opportunities</b>	The research doctor will be able to find a natural location both in private and public companies and institutes In the field of chemical synthesis, polymeric composites materials, in particular in the R&D Department, with the tools and ability to perform highly innovative activities.
<b>Composition of the research group</b>	3 Full Professors 6 Associated Professors 8 Assistant Professors 19 PhD Students
<b>Name of the research directors</b>	V. Barbera, M. Galimberti, P. Metrangolo

<b>Contacts</b>	
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<b>Additional support - Financial aid per PhD student per year (gross amount)</b>			
<b>Housing - Foreign Students</b>	--		
<b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>	<b>1st year</b>	<b>2nd year</b>	<b>3rd year</b>
	2000.0 € per student	2000.0 € per student	2000.0 € per student
max number of financial aid available: 1, given in order of merit (only for students with scholarship)..			

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	700.0 €
<b>By number of months</b>	6



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

**Confidentiality**

:since this is a thematic scholarship, the management of Confidential Information, Results and their publication should be subordinate to the restrictions . Upon acceptance of the scholarship, the beneficiary may have to sign a specific commitment.

**Educational activities** (funding for participation in courses, summer schools, workshops and conferences) - financial aid per PhD student per year:

- 1<sup>st</sup> year: around 1.900 euros per student
- 2<sup>nd</sup> year: around 1.900 euros per student
- 3<sup>rd</sup> year: around 1.900 euros per student

**Teaching assistantship:** availability of funding in recognition of supporting teaching activities by the PhD student: There are various forms of financial of 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.