



PhD in CHIMICA INDUSTRIALE E INGEGNERIA

CHIMICA / INDUSTRIAL CHEMISTRY AND CHEMICAL ENGINEERING - 39th cycle

PNRR 118 PNRR Research Field: NOVEL BIOPLOYMERS FOR ADVANCED APPLICATIONS

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 development of sustainable materials is of primary importance for the next future. In this field, biopolymers represent a valuable choice for the transition from oil-based materials to more sustainable ones. This is true not only for large scale products, but also for materials to be used for advanced application (e.g. biomedical, cosmetic, medical devices, etc..) The research to be carried out in this doctorate will be focused on the development of innovative polymeric materials obtained from bio sources or bioprocesses to be used for advanced applications. The implementation of these innovative materials will be carried out both at the small laboratory scale and then optimized to be scalable to larger volumes (pre-industrial scale)The research project is aligned with the priorities of the PNRR, in particular for the Biotechnologies in Regenerative Medicine and Tissue Engineering and Personalized Medicine (PNR Area 5.1.3); synthesis of Medical Devices and development of Organ-On-Chip and Lab-On-Chip (PNR Area 5.1.4). In addition the project fits with the Green Technologies area, in particular for the synthesis of Biochemicals in processes of Remanufacturing/Refurbishing, for Sustainability and Recycling ones (PNR Area 5.6.1)
Methods and techniques that will be developed and used to carry out the research	The PhD formation will be based all on the application of the chemical engineering concepts starting from the



	experimental design and then synthesis and validation of novel biopolymers to be applied for advanced applications starting from biomedicine to the development of novel biobased-devices. The PhD student will also work at the feasibility of the synthesis of these novel materials at the industrial scale. Relation to PNRRThe aims of the research are relevant to Mission 2 - Green revolution of the PNRR plan, and specifically M2C1 (Sustainable Agriculture and Circular Economy) for the development of key circular processes. They are also in line with the PNR objectives, which are an integral part of the PNRR, as listed in the motivation section.
Educational objectives	To form a PhD able to drive from the literature the design of innovative polymeric materials to be used for advanced biomedical applications and their successful implementation at larger pre-industrial scale.
Job opportunities	The background of the PhD at the end of his pathway will allows a number of possibilities in the chemical industry, with particular advantages in those positions for which the development and/or implementation of sustainable initiatives is key
Composition of the research group	5 Full Professors 3 Associated Professors 2 Assistant Professors 15 PhD Students
Name of the research directors	Prof. D. Moscatelli, Prof. F. Rossi

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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	700.0 €
By number of months	6



National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	
By number of months at the company	0
Institution or company where the candidate will spend the period abroad (name and brief description)	da definire
By number of months abroad	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Individual budget for research (5.700 euro): 1st year: 1.900 euro; 2nd year: 1.900 euro; 3rd year: 1.900 euro 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.