



PhD in SCIENZE E TECNOLOGIE ENERGETICHE E NUCLEARI / ENERGY AND NUCLEAR SCIENCE AND TECHNOLOGY - 38th cycle

PARTENARIATO PNRR Research Field: DESIGN OF A PILOT UNIT FOR SOLVENT-BASED POST-COMBUSTION CO₂ CAPTURE IN CEMENT AND INDUSTRIAL PLANTS

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

CUP F53C22000560006

Decreto di concessione D.D. 224 del 08/08/2022

D.D. 3264 del 28/12/2021 Avviso pubblico per la presentazione di proposte progettuali per "Rafforzamento e creazione di Infrastrutture di Ricerca" da finanziare nell'ambito del PNRR Missione 4, "Istruzione e Ricerca" - Componente 2, "Dalla ricerca all'impresa" - Linea di investimento 3.1, "Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione", finanziato dall'Unione europea - NextGenerationEU

Motivation and objectives of the research in this field

The PhD research program deals with the design of a new mobile and fully instrumented unit for solvent-based CO₂ capture processes. Modelling activities, aimed at supporting the design activities, experimental data reconciliation and interpretation, from test campaigns, absorption process simulations at full-scale (with special focus on particular components such as new regenerators or new solvents) and techno-economic analyses focused on the application of the technology in the industrial sector are then envisaged to complete the PhD. *The PhD is co-funded by the Italian PNRR project "ECCSELLENT" ("Development of ECCSEL-R.I. Italian facilities: user access, services and long-term sustainability", CUP: F53C22000560006, Missione M4C2 - I3.1) and by the*



	<i>'Innovandi program' of the Global Cement and Concrete Association (https://gccassociation.org/innovandi/).</i>
Methods and techniques that will be developed and used to carry out the research	<p>The research will be highly inter-disciplinary, since competences in the following disciplines are required since the early stage or will be developed during the PhD program: solvent-based pilot plant design, experimental testing (including selection and operation of scientific instrumentation), energy systems design and simulation, applied thermodynamic, process modelling and techno-economic analyses. The PhD will deal with data from real plants or from models/literature. Process engineering analysis tools and software (e.g. Aspen Plus, gProms, Matlab, Python, Thermoflex, etc.) will be used for process modelling and simulation purposes. In the framework of the research projects funding the PhD position, the candidate will be involved in project meetings, deliverables preparation, as well as in the operational execution of specific tasks (spanning from modelling, to testing, to dissemination and communication activities). PhD results shall be published in scientific papers, submitted to international journals, and/or presented at conferences. Experimental activities at POLIMI lab located in Bovisa and/or at LEAP lab located in Piacenza, or in active cooperation with other R&D institutions will be pursued.</p>
Educational objectives	<p>In the course of this job experience, the candidate will develop:</p> <ul style="list-style-type: none"> • scientific and technical skills thanks to the guidance of experienced professors and research staff of the "Gecos" research group (www.gecos.polimi.it) and of the LEAP laboratory (www.leap.polimi.it). • skills in teaching and supervision of younger students. • project management skills. • skills in the preparation of research projects proposals for competitive calls.
Job opportunities	The PhD research will qualify the candidate with skills in



	applied research and technology transfer in the field of low-carbon technologies and in the sector of CCUS. In these areas, Politecnico di Milano and LEAP are involved in national and international collaborative research projects in partnership with companies and other R&D institutions.
Composition of the research group	5 Full Professors 6 Associated Professors 10 Assistant Professors 20 PhD Students
Name of the research directors	Manuele Gatti, Matteo Carmelo Romano

Contacts	
manuele.gatti@polimi.it	
matteo.romano@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	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>Educational activities: Financial aid per PhD student is available for purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences, instrumentations and computer, etc. This amount is equal to 10% of the annual gross amount, for 3 years.</p> <p>Teaching assistantship: Availability of funding in recognition of supporting teaching activities by the PhD student. 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.</p> <p>Computer availability: individual use.</p> <p>Desk availability: individual use.</p> <p>Awards: Awards up to 4000 € net per year may be granted upon achievement of satisfactory results in terms of scientific performance and contribution to side activities. More details will be provided by the supervisors/tutor and PhD school.</p>

