



PhD in SCIENZE E TECNOLOGIE ENERGETICHE E NUCLEARI / ENERGY AND NUCLEAR SCIENCE AND TECHNOLOGY - 40th cycle

Number of scholarship offered	1
Department	DIPARTIMENTO DI ENERGIA

Description of the PhD Programme
<p>With the PhD Programme in Energy and Nuclear Science and Technology (STEN), the Department of Energy offers to graduate students a research opportunity in the following areas: production, conversion and transmission of energy, rational use of energy and environmental control, thermal science, nuclear systems and nuclear fuel cycle, radioprotection and application of ionizing radiations, methods for safety and reliability analysis and development of innovative materials for energy applications.</p> <p>The PhD Programme has the objective of providing high quality training in scientific research and, as a consequence, preparing professional profiles capable of tackling the numerous activities involved in high level research, both in academia and in industry, which often requires a higher level of education than that offered by the Master of Science and Master study courses. The PhD graduate is specifically trained for leading, organizing, planning, managing and controlling research activities at high levels of international competitiveness in the field of Energy and Nuclear Science and Technology.</p> <p>The department involved in the STEN PhD is the Department of Energy, which is also the administrative responsible for this PhD programme.</p> <p>The research subjects offered by the STEN PhD Programme are listed in the relevant call.</p>



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THEMATIC Research Field: SINGLE AND MULTI-PHASE THERMO-FLUID DYNAMICS OF INDUSTRIAL SYSTEMS: EXPERIMENTAL INSIGHTS AND ADVANCES

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	<p>The industrial sector is continually evolving, driven by the need for increased efficiency, reliability, and sustainability in its processes and components. Single and two-phase flows are at the heart of numerous industrial applications, ranging from power generation to chemical processing. The performance and safety of these systems are paramount, as they directly impact operational costs and environmental footprint. However, there remains a significant gap in the comprehensive understanding of such systems under varied operational conditions.</p> <p>This research aims to bridge this gap through rigorous experimental testing and analysis. Objectives of the research are:</p> <ul style="list-style-type: none"> · To conduct a systematic experimental investigation of single and two-phase industrial components, enhancing the understanding of their behavior and performance under different operational scenarios. · To develop predictive models that accurately describe the thermal-hydraulic phenomena observed in single and two-phase systems. · To explore innovative design modifications that could lead to improved efficiency and reduced environmental impact. · To disseminate the findings broadly to the industrial and academic communities, fostering the adoption of best



	practices and informing future research directions.
Methods and techniques that will be developed and used to carry out the research	<p>This Ph.D. project aims at developing novel data processing techniques to derive accurate correlations from experimental data to predict system behaviour under various operating conditions.</p> <p>The expected tools to be used during the research are:</p> <ul style="list-style-type: none"> - Theoretical tools: Thermodynamics, Energy modeling, Statistical analysis, Machine Learning, ... - Computational tools: Matlab, Python, Fiji, ANSYS Fluent, OpenFoam...
Educational objectives	Promoting interdisciplinary collaboration, developing critical thinking and advancing research skills
Job opportunities	Job opportunities for a successful Ph.D candidate include both industrial and academical research or specific job positions as Thermal-Fluid Engineer
Composition of the research group	2 Full Professors 3 Associated Professors 3 Assistant Professors 8 PhD Students
Name of the research directors	Riccardo Mereu

Contacts	
riccardo.mereu@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
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.

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.

Computer availability: individual use.

Desk availability: individual use.

Awards: Awards will be recognized to the PhD candidate up to Euro 2.000,00 (gross amount) per year, in case of exceptional achievements in the research project (modelling tools, scientific papers, etc..), subject to the evaluation of the research director.