



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

PNRR_351_PUBBL_AMMIN Research Field: RADIOCHEMISTRY, RADIATION CHEMISTRY AND NUCLEAR WASTE

Monthly net income of PhDscholarship (max 36 months)

€ 1300.0

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 research addresses current environmental and safety issues arising from industrial activities related to radioactive waste management and decommissioning of nuclear and industrial facilities. In particular, the main research objectives are: syntheses and preparation of new solid matrices for stable confinement of nuclear and radioactive wastes, both organic and inorganic; evaluation of compliance with waste acceptance criteria, improving the radioresistance and studies on the radio-induced modifications of new synthesized materials; radiochemical and technological processes for treatment of contaminated wastes. *The research objectives are consistent with the aims and areas indicated in DM 351, Art. 2 (investments 3.4 and 4.1) in order to increase the human capital reserve in PAs engaged in research-oriented activities. The STEN PhD is part of Area 09 Industrial and Information Engineering. The project has a chemical, physical, engineering and nuclear multidisciplinary nature, useful for public administrations. In particular, it pursues the aims of applied research and development of interest for all ARPA that on the national territory operate with expertise in the nuclear field. The aim of the research is to address environmental issues relating to the storage of contaminated materials awaiting years of innovative technological solutions that can be implemented in the short term with the extraordinary*



	<p><i>support of the PNRR. Some situations in Lombardy can be considered as a case study. The PhD, which typically develops autonomy to research, will contribute to the training of specialists able to develop specific innovative technological solutions as well as support the PA in the drafting of guidelines and technical specifications of general application, effective in addressing various environmental issues and enhancing management, leadership and communication skills. The proposed three-years course provides a predominant part in the Integrated Nuclear Laboratories of the Politecnico di Milano, at least 6 months of activity at the radiochemical-nuclear laboratories in Arpa Lombardia and 6 months abroad at a university or research facility with which a didactic and scientific collaboration in the field of Nuclear Waste Management is underway within a H2020 project. The results of the joint research will be disseminated in National and International Conferences and scientific publications on Open Access Journal.</i></p>
<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>Methods for fresh grout and hardened matrix characterization (workability, setting time, bleedingζ), methods for waste acceptance criteria evaluation (mechanical/thermal/irradiation/leaching-resistance), nuclear measurements and analytical chemistry techniques (ICP-MS, ICP-OES, LSC, alpha and gamma spectrometry UV-VIS, FTIR, SEM, XRD, XRF, etc.); codes for radiation transport shielding and dose calculations for radioprotection purposes.</p>
<p>Educational objectives</p>	<p>To gain know-how in radiochemistry, radiation chemistry and nuclear waste management in the abovementioned research fields. To develop and tackle multidisciplinary and complex issues, taking advantages from , equipment, facilities and experimental background of Academic, Public and Industrial research groups involved. To collaborate with, national and international contexts (Regione Lombardia, stakeholders, EURATOM/H2020, IAEA, JPNM-EERA, ENEN2Plus Collaborative Projects).</p>
<p>Job opportunities</p>	<p>In the field of nuclear and radiochemical activities, national or international industries and Institutions</p>



	involved in nuclear decommissioning, management and disposal of nuclear and industrial waste; International Research Centres, Regulatory Bodies and Agencies IMT Atlantique, SCK-CEN, CEA and Predis Partners, IAEA, ARPA, JRC-Ispra, ENI, SOGIN, NUCLECO, etc.
Composition of the research group	1 Full Professors 0 Associated Professors 2 Assistant Professors 2 PhD Students
Name of the research directors	Mario Mariani, Eros Mossini, Elena Macerata

Contacts	
mario.mariani@polimi.it; +39 02 2399 6358 (6395) http://www.radiochimica.polimi.it https://www.youtube.com/channel/UCKh-HxSAWYhhNX076uuvTOA/videos phd-STEN@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	650.0 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	Agenzia Regionale Protezione Ambiente Arpa Lombardia
By number of months at the company	0
Institution or company where the candidate will spend the period abroad (name and brief description)	
By number of months abroad	0

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. The amount is about Euro 5300. 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. Accommodation in Politecnico's Residences (http://www.residenze.polimi.it) is available for</p>



PhD candidates; special rates will be applied to selected out-of-town candidates (detailed info in the call for application). **Research period abroad:** Our candidates are strongly encouraged (6 months minimum is mandatory) to spend a research period abroad, joining high-level, research groups in the specific PhD research topic, selected in agreement with the Supervisor. An increase in the scholarship will be applied for periods up to 6 months (approx. 600 euro/month - net amount).