POLITECNICO DI MILANO

PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 40th cycle

PNRR 630 Research Field: DEVELOPMENT OF NON-CONTACT MEASUREMENT SYSTEMS FOR THE QUALITY ANALYSIS OF STEEL AND NON-FERROUS WIRES

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	The motivations behind this research arise from the need to enhance product quality and production efficiency in a competitive global market. The primary objectives are to develop and implement advanced technologies that enable zero defect manufacturing, thereby minimizing waste and reducing costs. By leveraging real-time non-invasive monitoring systems, artificial intelligence and data mining techniques, the research aims at creating more reliable machines for metallic wire production research.
Methods and techniques that will be developed and used to carry out the research	The research must be based on a combination of advanced methods and techniques such as: •Real-time non-invasive Monitoring Systems: Implementation of IoT sensors and edge computing devices to continuously monitor the production of metallic wires, ensuring immediate detection of anomalies and defects, as well as the closed-loop control of the processes. •Artificial Intelligence and Machine Learning: Development of AI algorithms to analyse data from the monitoring systems, predict potential issues, and optimize production parameters for zero defect manufacturing. •Data Analytics: Use of big data analytics to process and interpret vast amounts of production data, facilitating informed decision-making and continuous process

	improvement. •Simulation and Modeling: Creation of digital twins and simulation models to test and refine production processes in a virtual environment before implementation in the real world.
Educational objectives	The educational objectives aim to provide candidates with advanced scientific training by integrating theoretical knowledge with practical experimental skills. Through close collaboration with world-leading enterprises, candidates will enhance their ability to translate academic research into tangible industrial products. Graduates will gain comprehensive scientific expertise and will be able to face complex engineering challenges, promoting significant advancements in industrial processes.
Job opportunities	Employment statistics of PhDs can be found at: https://cm.careerservice.polimi.it/en/employment-statistics/ .
Composition of the research group	2 Full Professors 5 Associated Professors 2 Assistant Professors 0 PhD Students
Name of the research directors	Proff. Marco Tarabini, Paolo Chiariotti

Contacts
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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	750.0 €
By number of months	6

National Operational Program for Research and Innovation

Company where the candidate will attend the stage (name and brief description)	Mario Frigerio SPA
By number of months at the company	12
Institution or company where the candidate will spend the period abroad (name and brief description)	KOCH MACHINERY & TECHNOLOGY GMBH Germany
By number of months abroad	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Financial aid is available for all PhD candidates (purchase of study books and materials, funding for participation in courses, summer schools, workshops and conferences) for a total amount of euro 6.114, 50. Teaching assistantship: availability of funding in recognition of supporting teaching activitiesby the PhD candidate. 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.