POLITECNICO DI MILANO

PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 37th cycle

Research Area n. 1 - Advanced Materials and Smart Structures

THEMATIC Research Field: DEVELOPMENT OF HIGH-STRENGTH ALUMINIUM ALLOYS AND INNOVATIVE MANUFACTURING PROCESSES

Monthly net income of PhDscholarship (max 36 months)
€ 1325.0 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 PhD candidate will work on the design of novel high-performance Aluminium alloys optimized for additive processes and on counterpart materials produced by other innovative or more conventional routes. The PhD grant is based on a research project jointly carried out with a renowned company in the motorsport sector. Details about the project are available on request.
Methods and techniques that will be developed and used to carry out the research	The Material research group at Department of Mechanical Engineering of PoliMi has expertise on microstructural and mechanical characterization of advanced metallic alloys (https://www.mecc.polimi.it/us/research/research-lines/materials/). The methods to be used will involve Thermodynamic modelling of alloy microstructure, experimental crystal, phase and microstructure analyses (optical and electron microscopy, EBSD, XRD, DSC...) and mechanical characterization by tensile testing, fracture toughness, fatigue testing. Production of new materials and samples for the testing is also foreseen by the additive manufacturing systems available in the labs of the Department of Mechanical Engineering (https://www.mecc.polimi.it/us/research/departmental-laboratories/).
Educational objectives	At the end of the PhD cycle the candidate will be able to

	plan and carry out original research by working in a team or leading a research group active in the metallurgy and additive manufacturing fields. The candidate will strongly enhance both theoretical and experimental skills acquired during master studies. Opportunities will be offered for spending visiting periods at project partner laboratories for scientific cooperation.
Job opportunities	The project activity is strongly connected to industrial needs and an industrial partners is directly participating to project tasks. It is to remark that Additive Manufacturing is a rapidly growing sector that is attracting great interest from many industrial fields spanning from automotive to aerospace, biomedical, tooling and mechanical industry, jewelry and sport equipment.
Composition of the research group	4 Full Professors 6 Associated Professors 4 Assistant Professors 8 PhD Students
Name of the research directors	Prof. Maurizio Vedani

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	566.36 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Funding for educational activities (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences); funding per PhD student per year: 2nd year: euros 1.5343 3rd year: euros 1.534. Teaching assistantship: there are various forms of financial aid to support activities of teaching practice. The PhD student is encouraged to take part

in these activities, within the limits allowed by the regulations. **Computer availability:** 1st year: individual use 2nd year: individual use 3rd year: individual use.
Desk availability: 1st year: individual use 2nd year: individual use 3rd year: individual use.