



PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 39th cycle

THEMATIC Research Field: HETEROGENEOUS AND ADVANCED MATERIALS

Monthly net income of PhDscholarship (max 36 months)

€ 1400.0

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

Heterogeneous materials, e.g. multimaterials, gradient lattices and composites, need to be designed according to their specific processing route and need to possess specific mechanical, thermal and physical properties to fulfill special functions that may vary within the volume of a single component. Even more, they could act as “smart materials” adding a further dimension to materials science, being able to react to external stimuli by providing a change in their behavior or properties. In addition, manufacturing processes also require extensive innovation to allow the control of both traditional and new materials according to reliable, cost-effective and sustainable criteria. The PhD candidate will develop a multidisciplinary approach and will work in an international environment strictly cooperating with European world-class universities, research centers and industries.

Methods and techniques that will be developed and used to carry out the research

The Material research group has expertise on microstructural and mechanical characterization of advanced metallic alloys. The methods to be used will involve Thermodynamic modelling of alloy microstructure, tools for experimental analyses on phase and microstructure analyses (optical and electron microscopy, EBSD, XRD, DSC, ...) and mechanical characterization among others by tensile testing, fracture toughness, fatigue testing, creep.

Educational objectives

At the end of the PhD cycle the candidate will be able to



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| | define, design and carry out original research projects by working in a team or leading a research group in the field of advanced materials. Opportunities will be offered for spending visiting periods hosted by project partners for scientific cooperation. |
| Job opportunities | <p>Job opportunities are foreseen at national and international academic institutions, high-tech companies and SMEs involved in innovation and technical development sharing research with the Materials groups at PoliMi. The candidate will work in cooperation with European companies, universities or public agencies (e.g. ESA).</p> <p>Our last survey on MeccPhD Doctorates highlighted a 100% employment rate within the first year and a 35% higher salary, compared to Master of Science holders in the same field.</p> |
| Composition of the research group | <p>4 Full Professors 7 Associated Professors 2 Assistant Professors 10 PhD Students</p> |
| Name of the research directors | Prof. Elisabetta Gariboldi, prof. Riccardo Casati |

| Contacts | |
|---|--|
| <i>Email:</i> Elisabetta.gariboldi@polimi.it riccardo.casati@polimi.it | |
| For questions about scholarship/support please contact phd-dmec@polimi.it | |

| Additional support - Financial aid per PhD student per year (gross amount) | |
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| Housing - Foreign Students | -- |
| Housing - Out-of-town residents (more than 80Km out of Milano) | -- |

| Scholarship Increase for a period abroad | |
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| Amount monthly | 700.0 € |
| By number of months | 6 |

| Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information |
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| 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 5.707,13. Our candidates are strongly encouraged 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. 700 euro/month- net amount).

Teaching assistantship: availability of funding in recognition of supporting teaching activities by 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.