



PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 37th cycle

Research Area n. 1 - Advanced Materials and Smart Structures

THEMATIC Research Field: DESIGN APPROACH TO STRUCTURES UNDER EXTREME LOADING CONDITIONS

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	
<p>Motivation and objectives of the research in this field</p>	<p>Structural design under extreme loading conditions is increasingly used for a variety of structures and in different fields to combine need of high structural performances, lightness, efficiency, reliability, reduced maintenance costs, and sustainability. Various loading conditions may happen during service life, including extreme loading conditions. Such events are often very complex, and an approach mainly based on experimental tests could be unfeasible and unsafe; the development of reliable and efficient numerical methods is therefore becoming crucial not only for optimization but also for predicting and preventing damage occurrences. Such predictive methods however are not exempt from difficulties; this poses the definition of reliable and accurate approaches, an open challenge both for the academic and the industrial world. The main object of the research is an investigation of predictive methods (virtual testing) aimed to simulate the mechanical behavior of structures under extreme loading conditions (impact, explosion, crash, corrosion, etc). Structures may be realized with different kind of materials (metals, composite, ceramic, multilayers). Modeling strategies will be considered in order to investigate both the extreme loading conditions and the residual life of the damaged structures.</p>



<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>Methods are related to boost the capability of creating a multidisciplinary, multiphysics virtual environment aimed to define:</p> <ul style="list-style-type: none"> • Numerical methods exploiting the present software at state of the art and beyond (meshfree methods, Eulerian-Lagrangian approach, ALE, innovative material constitutive models, etc.) • Analytical and semi-analytical approaches • Experimental validation
<p>Educational objectives</p>	<p>We provide doctoral candidates with high-level scientific training, fostering and refining research and problem-solving abilities. 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 field of structural design under extreme loading conditions. The candidate will strongly enhance both theoretical and experimental skills acquired during master studies.</p>
<p>Job opportunities</p>	<p>A recent survey showed that PhD candidates are 100% employed after one year, in national and international companies and academic and non-academic research institutions, engaged in innovation, research and technical development. On average the survey showed that people earning our PhD title obtain 35% higher salary than the corresponding employers with a Master of Science degree. Specifically, the skills and know-how developed during the PhD will allow to cover positions for design and integrity assessment of advanced systems and components in aerospace, automotive and mechanical companies.</p>
<p>Composition of the research group</p>	<p>1 Full Professors 3 Associated Professors 0 Assistant Professors 9 PhD Students</p>
<p>Name of the research directors</p>	<p>Prof. Andrea Manes</p>



Contacts	
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Additional support - Financial aid per PhD student per year (gross amount)	
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Housing - Foreign Students	--
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Housing - Out-of-town residents (more than 80Km out of Milano)	--
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Scholarship Increase for a period abroad	
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Amount monthly	566.36 €
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By number of months	6
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Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

<p>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 1.534, 3rd year: euros 1.534. Teaching assistantship: availability of funding in recognition of support to 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: 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</p>
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