



PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 39th cycle

THEMATIC Research Field: INTERIOR NOISE IN VEHICLE COMPARTMENTS

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

Noise, vibration and harshness (NVH) of vehicles is getting more and more important for the automotive industry and it represents a concern for both vehicle manufacturers and component suppliers. Vibration has always been an important issue closely related to reliability and quality. Noise is of increasing importance in terms of both environmental impact and onboard sound quality. Harshness is related to the quality and transient nature of vibration and noise. NVH has become important as a result of the demand for increasingly comfortable vehicles. Indeed, while legislation of environmental noise is focusing on vehicle exterior noise, customers are requiring higher standard in relation to noise and vibration inside the vehicle. Nowadays, noise and vibration are considered to be two of the most important issues in vehicle design. In this context, customers expect continuous improvement in new vehicles. Their new purchase has to be better equipped and more comfortable, and to perform better than the older vehicle. Unfortunately, the acoustic field in the vehicle compartment is the result of many and different contributions, such as powertrain noise, tyre/road noise and aerodynamic noise. Their combination, together with psychoacoustics related aspects, define the signature of an automotive and reflect the high quality and distinction of a specific brand. Therefore, the challenge requires advanced simulation tools and experimental procedures to support the manufacturers not only eliminating squeaks and rattles and suppressing overall noise levels, but also



	tuning and enhancing the automobile interior sound.
Methods and techniques that will be developed and used to carry out the research	<ul style="list-style-type: none"> •Physical acoustic modelling of the compartment acoustic cavity based on finite element simulation •Cabin interior noise simulation based on the different source inputs and including geometries and materials influence •Simulation and optimization of the car audio system •Development of noise control strategies (passive and active) •Assessment of cabin sound quality, including psychoacoustics •Testing and model validation <p>The candidate shall contribute to the development of advanced simulation tools. He/she will take part in experimental activities, to collect the necessary data for the advancement of the research and to allow for the validation of the proposed numerical models.</p>
Educational objectives	<p>The candidate will acquire high-profile skills and will be working on one of the most significant and challenging problems in NVH engineering, dealing with both theoretical and experimental methodologies. He/she will become an expert in advanced NVH modelling and experimental testing, including signal processing and system identification. The candidate is supposed to provide original contributions to the development and experimental validation of innovative simulation tools.</p>
Job opportunities	<p>Future job opportunities are primarily in the automotive field (especially in NVH area), i.e. R&D departments of automotive industries (including automobile manufacturers and vehicle component suppliers in general).</p> <p>Besides this, job opportunities comprise national and international academic and nonacademic institutions and organizations, engaged in innovation, research and technical development.</p> <p>Our last survey on MeccPhD Doctorates highlighted a</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.
Composition of the research group	1 Full Professors 1 Associated Professors 0 Assistant Professors 2 PhD Students
Name of the research directors	Prof. Francesco Ripamonti

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	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>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.</p> <p>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).</p> <p>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.</p>