### Scholarships and Financial support

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly net income of PhD scholarship (max 36 months)</td>
<td>€ 1,325</td>
</tr>
<tr>
<td>Increase in the scholarship for stays abroad</td>
<td>€ 566,36 per month, for up to 6 months</td>
</tr>
<tr>
<td>Number of scholarships</td>
<td>1</td>
</tr>
<tr>
<td>Beginning of PhD</td>
<td>2 November 2020</td>
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<tr>
<td>Deadline for application</td>
<td>3 September 2020</td>
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### Context of the research activity

Motivations and objectives of the research in this field: According to the Regional Office for Europe of the World Health Organization, environmental noise is an important public health issue, featuring among the top environmental risks to health. It has negative impacts on human health and well-being and is a growing concern among both the general public and policy-makers in Europe. Road traffic is the dominant source of environmental noise, with an estimated 100 million EU citizens affected by harmful levels. Therefore, vehicle noise regulations are getting more and more stringent and the automotive industry is committed to producing vehicles with reduced noise emissions. The progressive decrease of vehicle exterior noise generated by the powertrain and other sources (such as the air intake and exhaust systems) and the increasing popularity of electric and hybrid vehicles exalts the importance of the tyre/road noise as the dominant contributor to vehicle noise. Tyre manufacturers are putting a big effort to produce tyres with reduced rolling noise and acoustic design is...
definitely becoming one of the key aspects for tyre industry. The challenge of making tyres more and more silent requires developing advanced predictive tools to support the development of future products. The PhD scholarship is awarded by Pirelli Tyre, within the framework of the Pirelli-PoliMi Joint Labs agreement.

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

- Physical acoustic modelling of the footprint region and of the radiated sound field, based on FEM and FEM/BEM simulation and equivalent source synthesis.
- Black-box modelling of the noise generated by a tyre with assigned properties and operating conditions, based on artificial neural network identification.
- Grey-box modelling of tyre rolling noise based on the combination of the previous two approaches.
- Indoor/outdoor acoustic testing and model validation.

### Educational objectives

The candidate will be working on one of the most significant and challenging problems in acoustic engineering, dealing with both theoretical and experimental methodologies. He/she will become an expert in advanced acoustic 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 tyre noise predictive models.

### Job opportunities

Future job opportunities are primarily in the automotive field (especially in NVH area), i.e. R&D departments of automotive industries (including automobile manufacturers, tyre manufacturers and vehicle component suppliers in general). Besides this, job opportunities comprise national and international academic and nonacademic institutions and organizations, engaged in innovation, research and technical development. Our last survey on MeccPhD Doctorates highlighted a 100% employment rate within the first year and a 35% higher salary, compared Master of Science holders in the same field.

### Composition of the research group

- Number of Full Professors: 1
- Number of Associate Professors: 2
- Number of Assistant Professors: 2
- Number of PhD students: 4

### Name of the research director

Prof. Roberto Corradi

### Contacts

**Phone** +39 02 2399 8493  
**Email** roberto.corradi@polimi.it

### Additional support

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: per student € 1.534
- 3rd year: per student € 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