POLITECNICO DI MILANO

PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 41st cycle

INTERDISCIPLINARY Research Field: CONDITION-BASED MAINTENANCE AND MACHINE LEARNING IN WHEEL-RAIL DAMAGE

Monthly net income of PhDscholarship (max 36 months)
1500.0
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	Interdisciplinary PhD Grant The PhD research will be carried out in collaboration with research groups of the PhD programme in **"INFORMATION TECHNOLOGY"**. See https://www.dottorato.polimi.it/?id=422&L=1 for further information.
Methods and techniques that will be developed and used to carry out the research	The methods and techniques for this ambitious objective will be: 1) development of models for the two competing phenomena of RCf and wear with a series of dedicated experiments; 2) integration of degradation models with data about the train service to predict the development of a given detected damage 3) image analysis applied to sets of images taken by the maintenance personnel with techniques of machine learning to obtain a 'damage classification'
Educational objectives	The educational objective is to develop a new area of interaction of different disciplines that could provide the PhD student new skills to be applied to the solution of a complex problem. The objectives also require flexibility and ability to combine different techniques ranging from detailed damage calculations to data analysis. The courses that will be offered are intended to provide the students the tools for this research activity. The activity will have the support of the new master course of Mobility Engineering as well as the support by LucchiniRS to deal

	with real measurements and experimental data.
Job opportunities	Job opportunities are very wide for this topic and they could be: 1) transportation authorities and railway companies; 2) wheelset producers; 3) national railway agencies.
Composition of the research group	2 Full Professors 2 Associated Professors 3 Assistant Professors 4 PhD Students
Name of the research directors	Proff. S.Beretta, S.Foletti(DMEC),P.L. Lanzi(DEIB)

Contacts
For questions about scholarship/support please contact phd-dmec@polimi.it

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents	--

Scholarship Increase for a period abroad	
Amount monthly	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
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 6.114,50. An increase in the scholarship will be applied for periods up to 6 months (approx. 750 euro/month- net amount). Additionally, PhD candidates who spend at least 3 months abroad are eligible for an extra reimbursement of euro 3,000 to cover travel expenses. 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 theteaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.