POLITECNICO DI MILANO

PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 41st cycle

INTERDISCIPLINARY Research Field: POLIMI GREEN ELASTOMERS – POGREEL

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 "**INDUSTRIAL CHEMISTRY AND CHEMICAL ENGINEERING**". See https://www.dottorato.polimi.it/?id=422&L=1 for further information. *General objective:* development of highly durable and high-performance elastomeric materials or components with ingredients of natural origin to replace toxic and harmful compounds for human health, wildlife and the environment, in response to stringent legislative requirements *Specific objective 1:* prepare elastomeric materials or components, with ingredients of natural origin, non-toxic or harmful and resistant to radiation, ozone, high temperature, humidity, UV rays, mechanical stress *Specific objective 2:* define innovative tests to determine the resistance over time of elastomers exposed simultaneously to ozone, temperature, humidity, UV rays, mechanical stress; derive master curves for performing accelerated tests.
Methods and techniques that will be developed and used to carry out the research	The necessary skills are basic chemistry and materials for specific objective 1, basic chemistry, materials and experimental mechanics for specific objective 2. An innovative method will be developed for accelerated laboratory testing of elastomeric materials simultaneously exposed to ozone, high temperature, humidity, UV rays, mechanical stress. To date, there are no known master

	curves to predict damage with accelerated laboratory tests, for simultaneous exposure to different agents.The LiDuP interdepartmental laboratory (Lightweight construction and durability performance, www.lidup.polimi.it) will be used, the founders being the Department of Mechanical Engineering and the Department of Chemistry. The skills in chemical kinetics and experimental mechanics are expected to lead to master curves, for the first time.
Educational objectives	Both hard skills and soft skills will be gained by the PhD candidate *Hard skills:* structural computing, environmental fatigue, sensorization, data acquisition and processing, chemical processes, AI applied to measurement and experimental mechanics, rubber production, rubber chemical processes tyre testing, tyre science and technology, safety management *Soft skills:* research management, networking, dissemination, communication, outreach.
Job opportunities	Employment by OEMs or Automotive Suppliers (1.5million positions in EU only). The PhD candidate will have an in-depth understanding of the paradigms proper of automotive industry, this will enable him/her to access future jobs in the field with precise sense of business. List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research: Automotive supplier or OEM, Deutsche Kautschuk-Gesellschaft, German Rubber Society. 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	3 Full Professors 2 Associated Professors 2 Assistant Professors 11 PhD Students
Name of the research directors	Proff. G. Mastinu, M.Galimberti, M.Gobbi

Contacts
Phone +39-0223998212

Email: gianpiero.mastinu@polimi.it maurizio.galimberti@polimi.it massimiliano.gobbi@polimi.it
For questions about scholarship/support: 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 € 6.114,50. 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. 750 euro/month - net amount). Additionally, PhD candidates who spend at least 3 months abroad are eligible for an extra reimbursement of €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 the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.