



PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 39th cycle

**PNRR 117 Research Field: ASSESSMENT OF CITY READINESS LEVEL FOR AUTONOMOUS
PUBLIC TRANSIT**

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**

The implementation of public transport services operated by Autonomous Vehicles (AV) and, in general, the introduction of Cooperative, Connected and Autonomous Mobility (CCAM) can actively reduce traffic congestion and emissions, enhancing road safety and sustainable mobility in metropolitan areas. When implemented as last mile connection services, autonomous shuttles could boost the shift from private to collective transportation also in those neighbourhoods poorly served by public transport, improving accessibility and equity in peripheral metropolitan areas, coherently with PNRR objectives (PNRR Mission 2).

From the analysis of the innovative previous experiences of the Italian sites where collective autonomous mobility has already been deployed, there is a lack of a method to assess the readiness level of Italian cities to deploy CCAM services. Besides the technical requirements for CCAM operations, the readiness level should be evaluated in terms of perception and acceptance of residents toward autonomous vehicle, which involves socio-economic and cultural factors. These method(s) should be able to identify new metropolitan areas for the transferability of autonomous public transport services, together with a roadmap to assess the scalability of AV deployment in metropolitan areas and to replicate AV deployment in other metropolitan cities, with the ultimate goal of supporting policy making and develop new



	<p>business models in the Italian economic context.</p>
<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>The research will be conducted in collaboration with FONDAZIONE LINKS in the <i>FCC- Future Cities and Communities</i> research domain. The research will focus on developing a quantitative method to assess the readiness level of Italian cities to deploy autonomous collective transport services. The method should consider technical requirements related to vehicles and infrastructure, but also the perception and acceptance of the local community towards autonomous mobility. The following methods and techniques will be explored and developed:</p> <ul style="list-style-type: none"> •Gathering and analysis of spatial data (e.g. road infrastructural characteristics, ITS and ICT systems availability and performances) and comparison with technical requirements of different commercially available autonomous shuttles (e.g. operational design domains - ODDs) •Advanced survey-based methods to assess perception, acceptance and willingness to use/to pay of autonomous vehicles by local communities •Cost-benefit and multi-criteria analyses, in order to assess the economic, environmental and social impact of autonomous transit services.
<p>Educational objectives</p>	<p>The project will provide candidate with:</p> <ul style="list-style-type: none"> •knowledge of the transportation sector, particularly the autonomous, cooperative and connected mobility; •methodological competences at both the theoretical and applied level; •problem setting and solving capabilities; •capabilities to interact with people with different background.
<p>Job opportunities</p>	<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.</p>



	<p>the same field.</p> <p>The research will be partly developed collaborating to research projects ongoing at Fondazione LINKS.</p>
Composition of the research group	<p>2 Full Professors 1 Associated Professors 2 Assistant Professors 4 PhD Students</p>
Name of the research directors	Prof. Pierluigi Coppola

Contacts	
<p>The research activities will be carried out at the Department of Mechanical Engineering of the Politecnico di Milano (Director: Prof. Marco Belloli).</p> <p>The supervisor of the research will be Prof. Pierluigi Coppola (<i>E-mail</i> pierluigi.coppola@polimi.it <i>Phone</i> +39 02 2399 8376, https://www.mecc.polimi.it/ricerca/personale-docente/prof-pierluigi-coppola).</p> <p>The Politecnico di Milano supervisor will be supported by a tutor that will be designated by Fondazione LINKS.</p> <p>For questions about scholarship/support please contact phd-dmec@polimi.it.</p>	

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

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	Fondazione LINKS
By number of months at the company	18
Institution or company where the candidate will spend the period abroad (name and brief description)	to be defined
By number of months abroad	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 5.707, 13.

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.