



# PhD in SCIENCE, TECHNOLOGY AND POLICY FOR SUSTAINABLE CHANGE - 38th cycle

**PARTENARIATO PNRR Research Field: DATA-DRIVEN QUALIFICATION AND QUANTIFICATION OF FAIRNESS FOR DIVERSITY-AWARE, INCLUSIVE AND SUSTAINABLE TECHNOLOGIES**

<b>Monthly net income of PhDscholarship (max 36 months)</b>
<b>€ 1400.0</b>
In case of a change of the welfare rates during the three-year period, the amount could be modified.

<b>Context of the research activity</b>	
<b>Motivation and objectives of the research in this field</b>	<p>Data-based and so-called <i>intelligent</i> systems are not intrinsically neutral. Biases trickle into smart objects in the urban space, in any type of technological tool, from filter apps on social media to electronic credit loans. Deficits due to prejudices related to the social identity of individuals are becoming more constitutive, because they are increasingly mechanized.</p> <p>In particular when dealing with people, automated and algorithmic decision-making tools reflect technical errors originating with the problem of biased data and labels, which undermine the fairness of the learning process. In fact, they feed wrong and discriminatory classifications, these systems are not systematically guarded against bias.</p> <p>At the same time, especially with reference to sustainable technology solutions, their success is strongly tied to mass adoption, which may occur only if such technology is inclusive, fair and respondent to the socio-economic characteristics of its intended users. Such characteristics must be appropriately represented within an intersectional framework that defines diversity as the combination of social variables describing each individual.</p> <p>Making technology an active means for the enforcement of social justice and the reduction of inequalities is</p>



	<p>fundamental to meet the goals of the EU-promoted 'Just transition', which intertwines environmental sustainability goals with social development and inclusion.</p> <p>The objectives of the research are to frame methods and tools to define, model and quantify fairness objectives in technological contexts and their impact on different individual diversity dimensions, with particular reference to data-driven and intelligent systems. Applications of the framework will be carried out focusing on significant and representative case-studies, e.g., artificial intelligence and smart mobility.</p>
<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>This thesis will be developed adopting both qualitative and quantitative methods. In particular, the PhD student will be able to take advantage of the combination of the conceptual tools developed in the context of the philosophical and ethical reflection and of those using logic and computer science methods. The possibility of adopting both perspectives is essential given that none of them in isolation cannot solve the issues at stake and only a mixed approach is promising to address local and highly contextual solutions.</p>
<p><b>Educational objectives</b></p>	<p>The candidate will have a unique opportunity of working in a multidisciplinary team, made by experts of data analysis and dynamic decision making, and philosophy of science and ethics of technology, which are needed to address the challenging and timely research topic presented above. This entails a growth path for the candidate that will make her/him acquire different competencies – mainly technical and technological in the disciplines mentioned in the methodology description, but also considering the socio-technical nature of the considered problem, which is key to proposing effective solutions. The research outputs will target publishing on international conferences and journals, with specific attention to all the venues of interest for the different facets of the research.</p>
<p><b>Job opportunities</b></p>	<p>Beside academic contexts, professional opportunities of this PhD graduate will be in companies and policy institutions. In recent years, indeed, several companies</p>



	trying to address 'by design' issues related to bias and opacity of algorithms have been created. Such companies offer tools to 'de-biasing' AI systems, while certifying them from an ethical and social point of view. The PhD graduate will be an excellent candidate to work in this field and one with a unique expertise in context, where profiles with mixed backgrounds are still very rare.
<b>Composition of the research group</b>	3 Full Professors 6 Associated Professors 16 Assistant Professors 21 PhD Students
<b>Name of the research directors</b>	Viola Schiaffonati / Mara Tanelli

<b>Contacts</b>	
viola.schiaffonati@polimi.it mara.tanelli@polimi.it	

<b>Additional support - Financial aid per PhD student per year (gross amount)</b>	
<b>Housing - Foreign Students</b>	--
<b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>	--

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	700.0 €
<b>By number of months</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>
<p><i>Teaching assistanship:</i> availability of funding in recognition of supporting teaching activities by the PhD student</p> <p>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> <p><i>Computer availability:</i></p> <p>1<sup>st</sup> year: individual use 2<sup>nd</sup> year: individual use 3<sup>rd</sup> year: individual use</p>



*Desk availability:*

1<sup>st</sup> year: *individual use*  
2<sup>nd</sup> year: *individual use*  
3<sup>rd</sup> year: *individual use*