

PhD in Electrical, Electronics and Communications Engineering

Research Title: Mobility in the Smart City

Funded by	Future Urban Legacy Lab (FULL) of Politecnico di Torino
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Supervisor	Claudio Casetti (casetti@polito.it , DAUIN) and Matteo Robiglio (matteo.robiglio@polito.it , DASP); co-supervisors selected among the members of FULL board and external advisors if appropriate
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Contact	https://full.polito.it
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Context of the research activity	<p>The urban realm is by its nature a complex and cross-disciplinary field of researches and practices. It configures both the key source of economic growth and the place of growing inequalities where challenging demands and organized potential to elaborate answers – in terms of social innovation and applied technologies – spatially concentrate. Studying the urban realm as a space offers the unique chance of rejoining the separated paths of human sciences, hard sciences and design sciences.</p> <p>FULL-The Future Urban Legacy Lab., based at Polito, aims at providing knowledge and action in the field of relevant global urban challenges and to support local decision-making processes. The acronym FULL welds legacy and future, which are intended as the socio-technical products of layering processes in space and time.</p> <p>For this very reason FULL participates in the objectives and research programs of DET PhD Programme. The shared interest of FULL and DET is to bridge knowledge of the past and visions for the future in the urban realm. FULL mission is to explore, imagine and design the future of global and local urban legacy embodied in city form by understanding and activating the potential of physical and organizational forms of inherited urban settings. Transformative attitude towards urban phenomena is the ideal testing ground of FULL research work. FULL added value is to boost established research experiences at Polito in order to integrate analytical and empirical methods together with evidence-based design.</p>
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Objectives

Within the FULL research framework, PhD candidates will define their specific research interests in accordance with the two general themes to which FULL is devoting its effort, namely: a) production, distribution and flow of people, goods and resources in urbanized areas and b) dynamics of difference, inequality and marginality in the city. The specific program that the successful candidate will have to pursue aims at studying aspects related to the mobility of people and things within the urban environment of the "Smart City". The term Smart City identifies the set of solutions needed to cope with severe urban problems such as traffic, pollution, energy consumption, waste treatment. A Smart City is therefore a complex, long-term vision of a better urban area, aiming at reducing its environmental footprint and at creating better quality of life for citizens. Mobility is one of the most critical facets of life in today's metropolitan large areas. It ties in both environmental and economic aspects and it requires both high-end technology and virtuous people behaviour. Smart Mobility is largely permeated by ICT, used in both backward and forward applications, to support the optimization of traffic flows, but also to collect and analyze citizens' habits in our cities.

It is thus required that the PhD candidate analyses different aspects and problems of mobility in the Smart City, including road pricing, traffic flows, complex and multimodal mobility, safety of four-wheel vehicle drivers and their coexistence with "vulnerable" road users (pedestrians, bicycles, motorcycles). One aim of this PhD topic is to investigate the existing Smart Mobility initiatives like part of a larger Smart City initiative portfolio, and to investigate the role of ICT in supporting smart mobility actions, influencing their impact on the citizens' quality of life and on the public value created for the city as a whole. The study will have to be undertaken first and foremost by a solid grasp of existing mobility data, and by exploiting the potential of new communication technologies (5G networks, ITS systems and vehicular networks according to IEEE and ETSI standards) and through the support of IoT (Internet of Things) paradigms and ecosystems.

Skills and competencies for the development of the activity

DET PhD candidates working in FULL should: preferably hold a Master Degree in Communications and Computer Networks Engineering or related disciplines that include specific training in modelling and simulation of mobile networks and mobility systems, such as OMNET++, VEINS, SuMo; demonstrate independent and critical thinking in drafting their research statement, making competent use of references to academic and technical literature; have excellent knowledge of English as a work language; be able to work in multidisciplinary team; have basic competence in technical software such as database management, data analysis and visualization.