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Excellence MIUR 2018-2022

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INTRODUCTION

This document contains a series of one-page reports from the students enrolled in the Urban and Regional Development Ph.D. Programme at the Interuniversity Department of Urban and regional studies and planning of Politecnico and Università di Torino.

The programme is designed to train highly-qualified specialists in urban and territorial development, while promoting the appropriate exploitation of their individual talents, to develop a distinctly multidisciplinary figure, a professional able to adapt to a wide variety of scientific knowledge and areas in a flexible and dynamic way.

The offered training will therefore give to PhD students the possibility to exploit specific skills acquired, to effectively interact with other professionals participating in urban and regional planning projects. Based on multi- and inter-disciplinary PhD skills, the programme intends to move fluidly through the conventional boundaries that separate social sciences from applied technical, engineering, physical-natural sciences.

In order to train specialists who are able to effectively navigate in the global context, the doctoral programme should adopt also a strong international nature, both in the sense of attracting young motivated and qualified scholars from abroad, as well as offering to students a training which corresponds to the highest academic and professional standards, also thank to the contribution of foreign scholars and the organisations of internships in highly qualified institutions. To stay coherent with the adopted approach the training activity is also developed entirely in English.

The PhD programme is mainly focused on twenty topics, which can be related to four Sustainable Development Goals adopted by the United Nations Member States:

SDG 11: Sustainable cities and communities
1. Urban and regional governance
2. Spatial planning
3. Urban studies
4. Human, economic and political geography
5. Built environment
6. Real estate
7. Natural environment
8. Landscape
9. Cultural heritage
10. Cultura and social innovation

SDG 13: Climate actions
11. Climate change
12. Sustainable land use and territorial resilience
13. Risk prevention and management
14. Geomatics

SDG 9: Industry, innovation and infrastructure
15. Transport systems
16. Building information modeling
17. Big data for spatial development
18. Virtual and augmented reality for spatial development

SDG 7: Affordable and clean energy
19. Renewable energy and energy transition
20. Water management

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PAST CYCLES p. 64

XXXIV CYCLE - 3rd YEAR STUDENTS

NAME **Fabrizio AIMAR**
E-MAIL fabrizio.aimar@polito.it

COURSE	XXXIV cycle - 3rd year
RESEARCH TITLE	Social Resilience and UNESCO Cultural Landscapes. The Relation between Social Resilience and the Lanscape Identity in Response to the Anthropic Variation of the Systems
TUTOR(S)	Angioletta VOGHERA, Rohit JIGYASU (ICCROM)

ACADEMIC CONTEXT

Plieninger T. and Bieling C., 2012. *Resilience and the cultural landscape. Understanding and managing change in human-shaped environments*, Cambridge University Press, Cambridge, UK.
Lieskovský J. and Bürgi M., 2018. Persistence in cultural landscapes: a pan-European analysis. *Regional Environmental Change*, 18, pp.175-187.
Brunetta G., Ceravolo R., Barbieri C.A., Borghini A., de Carlo F., Mela A., Beltramo S., Longhi A., De Lucia G., Ferraris S., Pezzoli A., Quagliolo C., Salata S., Voghera A., 2019. Territorial Resilience: Toward a Proactive Meaning for Spatial Planning. *Sustainability*, 11, p. 2286.

EXTERNAL COLLABORATIONS

- R3C, Responsible Risk Resilience Centre, Politecnico di Torino
- LINKS Foundation (Cultural Heritage & Regional-Urban Development area), Turin
- ICCROM, International Centre for the Study of the Preservation and Restoration of Cultural Property
- Italian Pavilion at the 17 International Architecture Exhibition, Venice

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The landscape is alive and constantly mutates over time (Antrop, 2005). In literature, permanence, identity, and preservation of cultural values ask for the integration of co-evolution in landscape planning. So, the debate around the relationship between cultural heritage and resilience has opened (Brunetta et al., 2019), falling into Target 11.4 (UN, 2015).

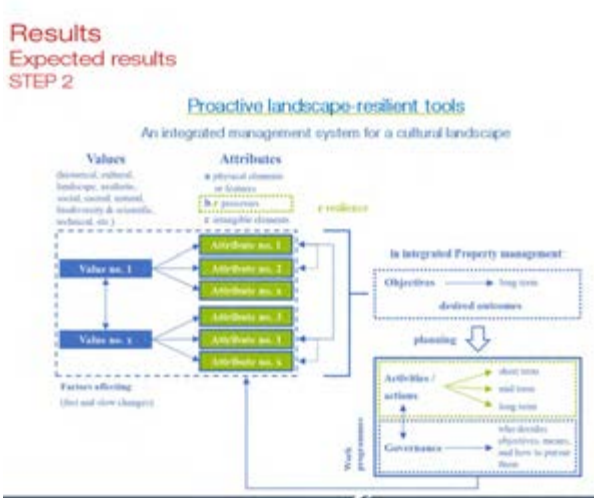
"UNESCO Cultural Landscapes … represent the 'combined works of nature and man' (Convention, art. 1). They are illustrative of the evolution of human society … over time" (UNESCO Guidelines, art. 47). Based on SoC reports, Primary Factors affect 11/28 WH agricultural landscapes, e.g. socio-cultural uses of heritage, and secondary factors impacting, e.g. identity, social cohesion, and changes in the local community.

So, what is the relationship between resilience and identity? What is the limit between persistence and change to achieve the systemic robustness required by UNESCO and cope with dynamic shifts? What is the main objective of cultural landscapes?

To grasp the socio-economic transformation processes, the resulting impacts on OUV and other heritage values, their management and what factors will determine the continuation of cultural landscapes in the future, 2 case studies have been established: the Vineyard Landscape of Piedmont: Langhe-Roero and Monferrato, Italy and the Cultural Landscape of Honghe Hani Rice Terraces, China. Analyses have been carried out on the different meanings of landscape and the driving forces of change affecting them, including interviews with local and international experts and scholars. Findings have revealed common issues, as depopulation, abandonment of cultivated plots, inward migration, new crops/practices that can affect integrity and authenticity in the long run.

So, to maximize resilience and minimize vulnerability, retaining memory and community identity seem essential. Social resiliency needs to establish a local capacity building to promote active conservation, defining an acceptable limit between dynamic pressures and communitarian memory.

Landscape cannot be a self-goal, but it requires an adaptive capacity in integrated management systems to create social robustness and permit multiple ways to look at and perceive it. It emerges how communities are landscape attributes, which necessitate being strengthened by launching new interrelationships with their values into the UNESCO OUV and Guidelines. The research also provides proactive landscape-resilient tools for inclusion in potential revisions of existing management plans..



NAME **Velia BIGI**
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COURSE XXXIV cycle - 3rd year

RESEARCH TITLE Vulnerability to Natural Resilience and the Lanscape Identity in Response to the Anthropic Variation of the Systems

TUTOR(S) Alessandro PEZZOLI, Magda FONTANA (Università di Torino), Maurizio ROSSO (Politecnico di Torino)

ACADEMIC CONTEXT

Bigi V., Pezzoli A., Comino E., Rosso M., 2020. A Vulnerability Assessment in Scant Data Context: The Case of North Horr Sub County . *Sustainability*, 12 (15), p. 6024.
Bigi V., Comino E., Fontana M., Pezzoli A., Rosso M., 2021. Flood Vulnerability Analysis in Urban Context: A Socio-economic Sub-Indicators Overview. *Climate*, 9(12).

EXTERNAL COLLABORATIONS

- Fondazione Amref–CCM

HIGHLIGHTS OF THE RESEARCH ACTIVITY

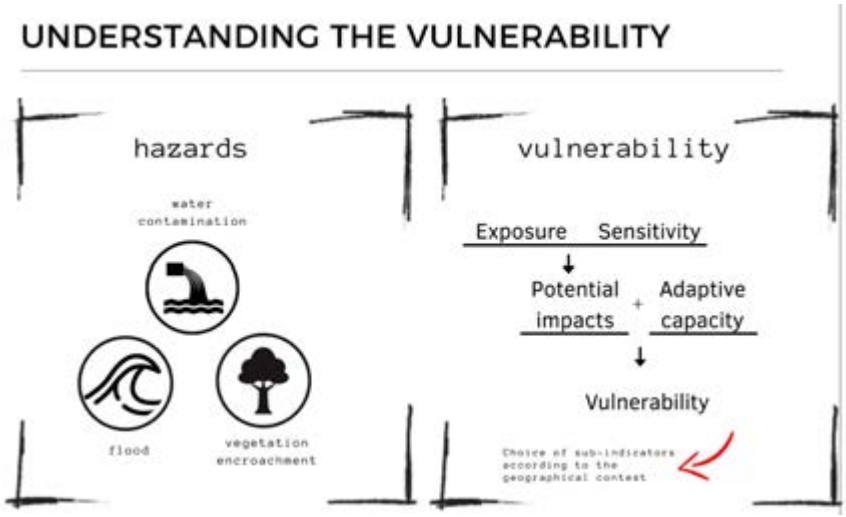
In the context of climate change, the increase of natural risks will pose a serious challenge. A modern approach relies more on natural risk prevention and management rather than respond to emergency. This research contributes to the Priority n°1 of the Sendai Framework for Disaster Risk Reduction 2015-2030,in particular, to the understanding of the vulnerability to natural hazards in order to reduce their negative impacts on the societies. For this to happen, the decision-making system should be supported by reliable and unambiguous data.

However, the geography plays its role also in the distribution, range and integrity of data availability. Rural areas suffer of a deficiency in the quantification of natural-related risks for lack of economic interest. While in urban areas the accessibility, quality and organisation of data is overwhelming.

Therefore, different approaches are selected based on geographical contexts to determine the vulnerability and its related sub-indicators.

In Kenyan rural areas belonging to the Arid and Semi-Arid Lands, pastoralism system is sustained by water and pasture. Therefore, the issue of access to clean and safe water and vegetation distribution changes were assessed.

In Italian urban areas in Piedmont Region, systems are affected by fluvial and pluvial flood events. The assessment of flood vulnerability is however biased by the choice of sub-indicators. Indicator-based assessment models for flood vulnerability, in fact, do not have a specific set of indicators that are universally or widely accepted. To overcome this knowledge gap, the most accepted sub-indicators of exposure, sensitivity and adaptive capacity were identified and analysed.



NAME	**Francesca BLANC**
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COURSE	XXXIV cycle - 3rd year
RESEARCH TITLE	Testing Comparative Spatial Planning Studies in Latin America. Case Studies from Ecuador and Bolivia
TUTOR(S)	Giancarlo COTELLA, Marcin DĄBROWSKI (TU Delft)

ACADEMIC CONTEXT

Janin Rivolin U., 2012. Planning Systems as Institutional Technologies: A Proposed Conceptualization and the Implications for Comparison. *Planning Practice and Research*, March, pp. 37-41

Galland D. and Elinbaum P., 2018. A "Field" Under Construction: The State of Planning in Latin America and the Southern Turn in Planning. *Disp*, 54 (1), pp. 18-24.

Blanc F. and Cotella G., 2019. Testing comparative spatial planning studies in the Latin American context: theoretical implications and challenges for regional development. *REDES*, 25(3), pp. 1032-1050.

Blanc F., 2021. *Unpacking the Ecuadorian spatial planning law: policy mobilities in Latin America between transnational agency and path-dependent logics*. Manuscript submitted for publication.

EXTERNAL COLLABORATIONS

- TU-Delft, Delft University of Technology, The Netherlands. Joint research Project EU-PLAN
- UdC, Universidad de Cuenca, Ecuador
- Universidad Privada Boliviana, Cochabamba, Bolivia

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Until recently, comparative spatial planning studies had mostly focused on the European continent. Since the end of the 1980s, a growing number of studies contributed to the proliferation of theoretical and methodological approaches, as well as to a further definition of the object of study. At the same time, comparisons focusing on other parts of the World are much less frequent, if one excludes the rather 'dry' reports produced by international organizations. Aiming at investigating the reasons behind this empirical gap, the PhD thesis inquires how to test comparative spatial planning analysis in the Latin American context, in particular in the Andean region, with focus on Ecuador and Bolivia. By doing so, the PhD research firstly inquires the theoretical implications and challenges that emerge when applying to the global South conceptual and analytical frameworks developed in the Northern hemisphere. As spatial governance and planning systems are highly context-dependent, and the European and Latin American contexts are highly different, these methodologies are contextualized and critically tailored in the context of the 'southern turn in planning' and in the light of decolonized perspectives in urban research.

Secondly, the PhD research analyzes how the spatial governance and planning systems work at national and local level in Ecuador and Bolivia, in terms of structure, tools, discourse and practices. It focuses both on the mechanisms adopted by each country's spatial governance and planning systems to allocate land use and spatial development rights, as well as on the actual relations and balance between public and private interests in guiding the development. All this in the framework of the recent and ongoing spatial governance and planning legal reforms.

Thirdly, the PhD research investigates how international influences have shaped the Ecuadorian and Bolivian spatial governance and planning systems, at both national and local level. It focuses on the role played by the mainstream urban agencies, the cooperation aids and the international city networks, discussing the rising impact of the 'urban solutionism' and the 'global philanthropy' in Latin America, within the framework of the policy mobilities literature.

NAME **Francesca Caterina BRAGAGLIA**
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COURSE XXXIV cycle - 3rd year

RESEARCH TITLE Ruling the Unruled?
The Institutionalisation of Social Innovation in Spatial Planning

TUTOR(S) Umberto JANIN RIVOLIN, Fabrizio DI MASCIO, Gavin PARKER (University of Reading, UK)

ACADEMIC CONTEXT

Swyngedouw E., 2005. Governance innovation and the citizen: the Janus face of governance-beyond-the-state. *Urban studies*, 42(11), pp. 1991-2006.
Moulaert F., Swyngedouw E., Martinelli F., Gonzalez S., eds., 2010. *Can Neighbourhoods Save the City?: Community development and social innovation*. London: Routledge.
Eraydin A., Frey K., 2018. *Politics and Conflict in Governance and Planning: Theory and Practice*. London: Routledge.
Bragaglia F., 2020. Social innovation as a 'magic concept' for policy-makers and its implications for urban governance. *Planning Theory*, pp. 1-19.

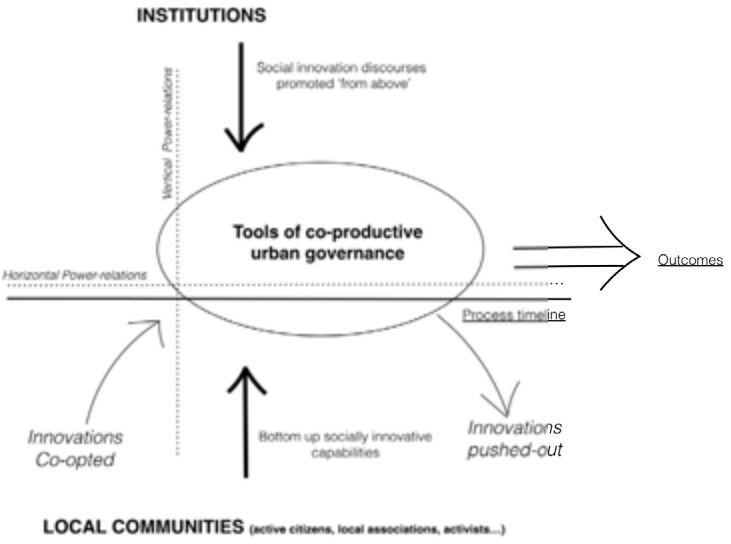
EXTERNAL COLLABORATIONS

- Science Po Paris, France
- University of Reading, United Kingdom

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Over the past years, social innovation has been considered as a possible partial solution to the economic crisis and to the current welfare system failures (Moulaert et al., 2007), leading to the conclusion that civil society can co-operate - and sometimes even substitute government - in urban welfare provision and spatial planning interventions. In this sense, many European countries, have recently been trying to organize and stress this great socially innovative ferment - originating outside the governmental apparatus - within institutional frameworks. Among the others, the Neighbourhood Plans, instituted in 2011 in England with the 'Localism Act', and the Conseils Citoyens, that since 2014 have profoundly redefined 'La Politique de la Ville' in France, are emblematic examples of this new faith in co-creating and co-managing the city with citizens and associations. These new tools are the clear expression that in the current scenario, spatial governance can no longer be interpreted from a uni-directional perspective.

Starting from a broad theoretical reflection on the concept of social innovation in the academic and policy discourse, the thesis argues that social innovation is actually a 'magic concept' for policy-makers and this has profound implications for urban governance (Bragaglia, 2020). The research is thus aimed at investigating the application of the Neighbourhood Plans London and the Conseils Citoyens in Paris. In more practical terms, the research aims to understand (a) at what conditions and in what institutional settlements it is possible to develop mutually engaging relationships between municipalities and civil society capabilities; (b) if the new instruments can transform the established vertical and horizontal power relationships (Arnstein, 1969; Foucault, 1982) between public authorities and civil society, or they are simply 'flanking mechanisms' (Brenner and Theodore 2002, p. 374) of traditional asymmetrical relationship of power to 'govern through citizenship' (Rose, 2008); (c) Under which conditions, it is possible to develop mutually engaging relationships between governments and civil society capabilities that can improve the operation of urban governance.



NAME **Alessandra BUFFA**
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COURSE XXXIV cycle - 3rd year

RESEARCH TITLE Integrating Resilience Concept and Urban Form: the Pandemic Crisis Experience of Covid 19

TUTOR(S) Grazia BRUNETTA

ACADEMIC CONTEXT

Davoudi S., Shaw K., Haider L.J., Quinlan A.E., Peterson G.D., Wilkinson C., Fünfgeld H., McEvoy D., Porter L., Davoudi S., 2012. Resilience: A Bridging Concept or a Dead End? [. . .]. *Planning Theory & Practice.* 13(2), pp. 299-333.
Hamidi S., Sabouri S., Ewing R., 2020. Does Density Aggravate the COVID-19 Pandemic?. *Journal of the American Planning Association.*
Wong D. W. S., and Li Y., 2020. Spreading of COVID-19: Density matters. *PLoS ONE*, 15(12).
Samuelsson K., Barthel S., Colding J., Macassa G., Giusti M., 2020. Urban nature as a source of resilience during social distancing amidst the coronavirus pandemic. *Landscape and Urban Planning*.

EXTERNAL COLLABORATIONS

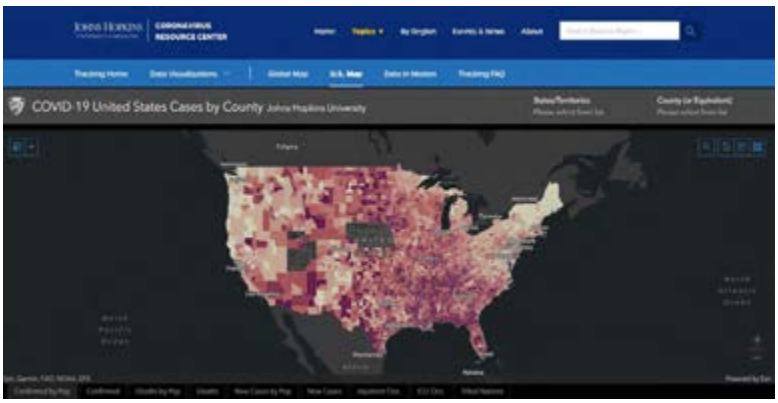
- White Arkitekter Office, Stockholm, Sweden
- SMoG , Spatial Morphology Group, Chalmers University of Technology, Gothenburg, Sweden
- Stockholm Resilience Centre Stockholm, Sweden

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The Coronavirus pandemic we are experiencing for at least two years has left many people wondering about the relationship between urban density and the virus circulation. This does not mean higher-density values are necessarily more vulnerable and lower-densities are more resistant to the pandemic. Some scientists state high density is a key factor. Others argue it is unrelated. Evidence from data invoked on both sides has often been anecdotal. Supporters of lower densities choose cities such as New York or Madrid as examples of the perils of high density, while advocates of higher densities point to Hong Kong or Seoul. Much of the time such debates are blind to the differences between various kinds of densities and to the need to include also other geographic and socio-economic variables in the analysis, with respect to the scale.

In this challenging, unexpected and global contest, the thesis joins the debate by exploring the association of physical, socioeconomic and demographic factors at the county level with COVID-19 related cases and deaths in the metropolitan US counties, during the so-called Delta-variant wave through the Summer 2021. Regression analysis models include the 923 metropolitan counties of the US to account for mid-scale level and to identify to most influencing factors in the virus circulation. Quite surprisingly, the case and death numbers are negatively associated with population density, as well as income levels and education. By contrast, they are significantly positively associated with the population size, the prevalence of certain races and the connectivity capacity. To better understand then the density issue, the study makes a zoom on a specific urban case study corresponding with New York City, where it becomes clear that more than density, what turns to be relevant for the coronavirus-spread at more local scale, are rather the crowded conditions within homes. Indeed, the urban contest of New York City shows that the combination of overcrowding conditions, poor-house quality standards, many neighborhoods with foreign populations and a medium-low economic level have definitely played a role in excess contagion and mortality from COVID-19.

Thus, almost at the end of this early and preliminary study, the thesis highlights that density is not linked to rates of COVID-19 infection, after verifying also socio-economic, population and connectivity factors in the US metropolitan counties. On the contrary, connectivity confirms to be a significant predictor, worth for deeper research. Insights of this work will certainly propose a ground-breaking contribution to the increasing knowledge on COVID-19 infection, beyond the clinical sector.



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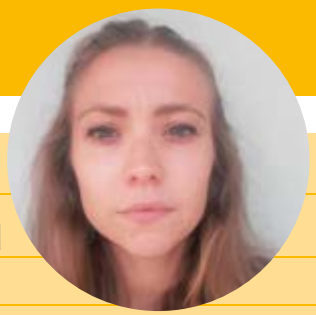


COURSE XXXIV cycle - 3rd year

RESEARCH TITLE Agent-Based Model and Geographic Information System (GIS): an Integrated Approach to Test Sustainable Policies and Urban Transformation Scenarios

TUTOR(S) Marta Carla BOTTERO

ACADEMIC CONTEXT

Gilbert, N. and Terna, P., 2000. How to build and use agent-based models in social science. *Mind & Society*, Vol.1, pp. 57-72.
Heppenstall A. J. J., Crooks A. T., See L. M., Batty M., 2012. *Agent-based models of geographical systems*. Springer.
Caprioli C., Bottero M., 2018. Agent-based modelling and Geographic Information System for the evaluation of eco-district's scenarios. In: Leone A., Gargiulo C., eds., *Environmental and territorial modelling for planning and design*. Naples: FedOAPress., pp. 35-45.
Caprioli C., Bottero M., De Angelis E., 2020. Supporting Policy Design for the Diffusion of Cleaner Technologies: A Spatial Empirical Agent-Based Model. *ISPRS International Journal of Geo-Information*, 9(10), p. 581.

EXTERNAL COLLABORATIONS

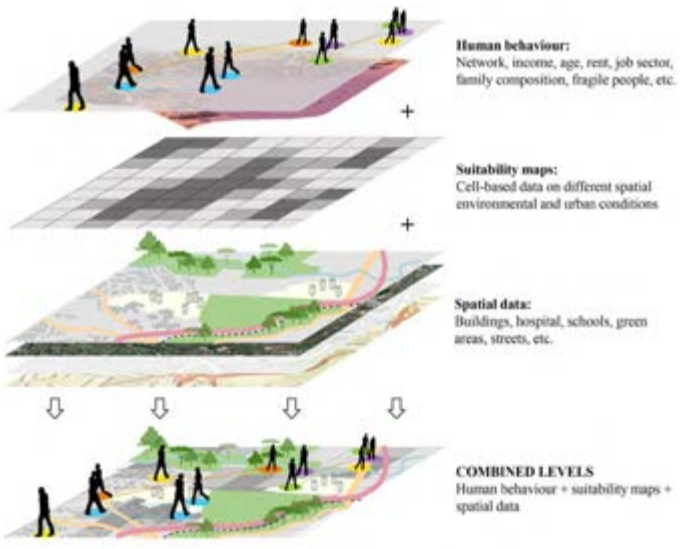
- QUT, Queensland University of Technology, Brisbane, Australia

HIGHLIGHTS OF THE RESEARCH ACTIVITY

When dealing with the city and the processes that characterize it, we face an extremely complex system, in which multi-dimensional aspects, multi-scalar and multi-temporal perspectives are strongly relevant. At the same time, the increasing awareness of the fundamental role of sustainability issues and the necessity of long-term perspectives in urban transformation and planning require more urgently to identify and evaluate the environmental, economic and social impacts of alternative policies.

This PhD research aims at developing a tool able to support the decision-making process for supporting the definition of sustainable policies and long-term strategies in urban contexts. Through the development of an innovative approach in urban contexts, based on agent-based systems, the objective is twofold. On one hand, to test different sustainable policies at the district scale and to verify the effectiveness and efficiency based on the analysis of the behaviors and decision rules of the inhabitants. On the other hand, to predict, before the implementation, the multiple effects and outcomes generating by an urban transformation in a consolidated area. In both cases, the development of an agent-based model, strongly based on a bottom-up approach in the evaluation of different strategies and scenarios, could be an opportunity to create an alternative perspective of these complex problems, thus supporting decision-makers and planners in the definition of policies and strategies for urban development. The final objective is to identify the key drivers and key effects which guide these processes and connect them to the specificities of a place and its population, more than developing an instrument able to give definitive answers on these themes.

To reach the goal, the research integrates an agent-based model with the potentiality of GIS, to combine the stakeholders' attitudes and behaviors in a temporal and dynamic perspective with the consideration of the spatial dimension of the urban complex problems. Also, the integration of Multicriteria Analysis (MCA), Choice Experiment method, Hedonic Price Model and specific surveys are implemented to include in the model more intangible variables, such as social attitudes of the population, their decision rules and the level of importance of each relevant criterion considered.



NAME **Elisabetta COLUCCI**
E-MAIL elisabetta.colucci@polito.it

COURSE	XXXIV cycle - 3rd year
RESEARCH TITLE	Development of a Geo-Spatial Ontology to Support the Documentation of Minor and Abandoned Historical Centres
TUTOR(S)	Andrea M. LINGUA, Antonia SPANÒ (Politecnico di Torino), Margarita KOKLA (NTUA Athens)

ACADEMIC CONTEXT

Kavouras M. and Kokla M., 2007. *Theories of geographic concepts: Ontological approaches to semantic integration*. CRC Press.
Acierno M., Cursi S., Simeone D., Fiorani D., 2017. Architectural heritage knowledge modelling: An ontology-based framework for conservation process. *Journal of Cultural Heritage*, 24, pp. 124-133.
Kokla M., Mostafavi M. A., Noardo F., Spanò A., 2019. Towards Building a Semantic Formalization Of (Small) Historical Centres. *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLII-2/W11, pp. 675-683.

EXTERNAL COLLABORATIONS

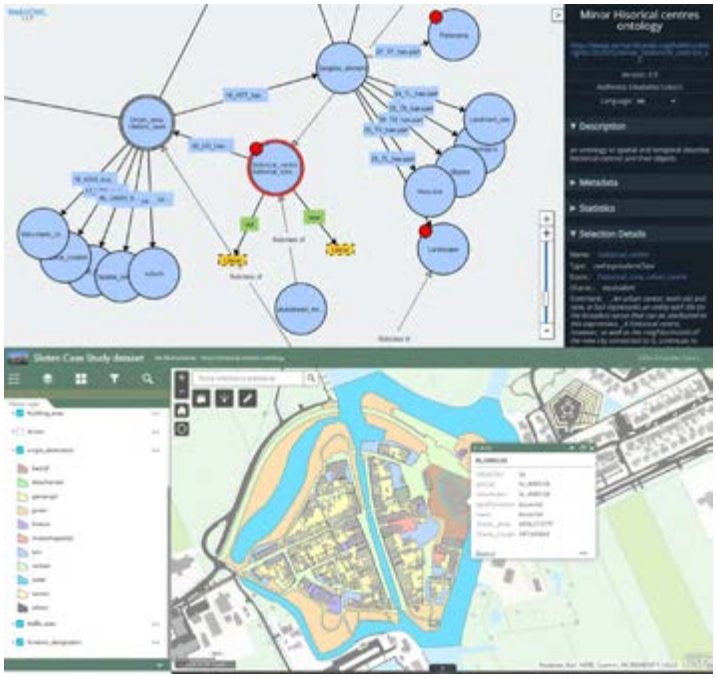
- OntoGeo, Geographic Information Science and Geoinformatics Research, Group National Technical University of Athens, School of Rural and Surveying Engineering, Greece
- Delft University of Technology, Department of Urbanism, Faculty of the Built Environment and Architecture, 3D geoinformation research group, The NetherInds

HIGHLIGHTS OF THE RESEARCH ACTIVITY

This theme of research deals with geomatics and, it is about geographical information. The main topic of this dissertation focus on the possibility to standardise spatial information in the domain of historical centres, urban, rural, minor or abandoned. The notion of the urban centre, historical city, ancient urban area took different meanings and evolved during the centuries. Due to their intrinsic evolution of functions, values, morphologies, and geometries, historical centres must be preserved, documented, and safeguarded by urban actions, restoration plans, and renovations. Hence, the study, the communication and the protection of built heritage are supported by many processes and require specific data to collect, store and post-process. These activities involve many disciplines, actors, and stakeholders, leading to sharing common knowledge and using a unique language. For this reason, the main topic of this research is the study of ontologies for spatial and geographical data. They are very useful to create a unique and standard thesaurus and to ensure semantic interoperability.

The main aim is spatial and temporal documentation. Moreover, this method could help the decision-making process of small urban and rural areas in different scenarios. The research wants to produce an accurate representation of reality through a multi-scale analysis approach and different levels of detail. This study will identify the semantic formalisation of historical centres designing an ontology starting from existing standards and knowledge to bridge these gaps. Then, this ontological structure will be validated, enriching and populating it with concepts and relations from real data case studies, existing regulations, documents, datasets and 3D integrated metric survey.

Finally, this thesis will develop a geodatabase with the data mapped from the case studies' datasets. Furthermore, after the ontology web publication, to share data information and open data and link spatial data to the semantics of the ontology, the geodatabase is published through a WebGIS.



NAME **Giulia DATOLA**
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COURSE XXXIV cycle - 3rd year

RESEARCH TITLE Toward Resilient Cities: Assessing Urban Resilience Performance Using a System Dynamics Approach

TUTOR(S) Marta BOTTERO, Elena DE ANGELIS (Politecnico di Torino)

ACADEMIC CONTEXT

Sharifi A., Yamagata Y., 2016. Urban Resilience Assessment: Multiple Dimensions, Criteria, and Indicators. In: Yamagata Y., Maruyama H. ed., *Urban Resilience. Advanced Sciences and Technologies for Security Applications*. Cham: Springer, pp. 259-274.
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Bottero M., Datola G., De Angelis E., 2020. A System Dynamics Model and Analytic Network Process: An Integrated Approach to Investigate Urban Resilience. *Land*, 9(8), pp. 242-268.

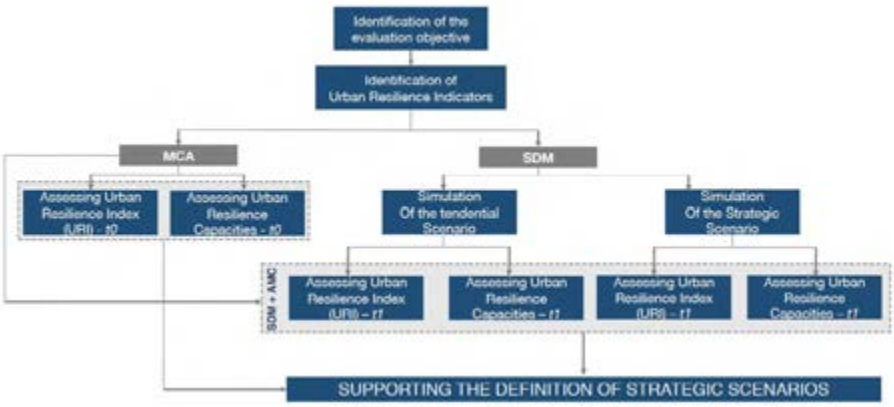
EXTERNAL COLLABORATIONS

- Riga Technical University, Institute of Energy Systems and Environment, Latvia
- ResCult project, Increrasing Resilience of Cultural heritage: a supporting decision tool for the safeguarding of cultural assets (Politecnico di Torino).

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Cities are exposed to numerous stresses and shocks, both natural and man-made (Godschalk, 2003; World Economic Forum, 2013). They are facing new and continuing challenges regarding job creation, the provision of essential services (housing, water, basic health services and education), green space planning, and maintenance (Ribeiro & Pena Jardim Gonçalves, 2019). Recognizing these scenarios, the global community is striving to enhance urban resilience for cities, to make them able to adapt and transform themselves to face these stresses (Da Silva & Moench, 2014; Gencer, 2017). Thus, it is fundamental to provide decision-makers specific evaluation tools able to assess the urban resilience performance of a city at both the current state and in the future conditions. Considering these new operative needs, this thesis proposes the definition of an integrated evaluation approach to assess the urban resilience performance at the current state of cities and to simulate its possible behavior over time, according both to the evolution of the urban condition and to strategic scenarios.

The first phase concerns the analysis of the concept of urban resilience and the review of the existing frameworks for the urban resilience assessment, in order to highlight both the weaknesses and the strengths of the existing method. Secondly, a multidimensional set of indicator has been defined through the support of the Multi-Criteria Analysis (MCA) with the purpose of calculating a synthetic index of urban resilience and urban resilience capacities at the current state. The third phase consists in describing the mutual relationships and modelling the dynamics of the different criteria included in the evaluation model through the System Dynamics Model (SDM) (Forrester, 1968). Subsequently, SDM will be also used to simulate the evolution of different scenarios over time, considering their effects in the different urban dimensions. The final step concerns the integration of the MCA and the SDM to evaluate the urban resilience performance of the urban system in the future, considering both the evolution of the current conditions and strategic scenarios. The purpose is supporting real stakeholders and decision-makers in the definition of strategic interventions with the perspective of urban resilience maintenance and enhancement. In detail, the proposed evaluation approach is applied to the city of Turin (Italy) and to the city of Riga (Latvia), to address its flexibility and repeatability.



NAME **Arianna FONSATI**
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COURSE XXXIV cycle - 3rd year

RESEARCH TITLE InfraBIM Tools and Methods Applied to Organizations' Implementation Process

TUTOR(S) Anna OSELLO, Alessandro DAMIANI (Lombardi Ingegneria S.r.l.)

ACADEMIC CONTEXT

Eastman C., Teicholz P., Sacks R., Liston K., 2011. *BIM Handbook. A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Constractors*. Inc. Hoboken, New Jersey: John Wiley & Sons.
Succar B., Sher W., Williams A., 2012. Measuring BIM performance: Five metrics. *Architectural Engineering and Design Management*, 120-142.
Dodge Data & Analytics, 2017. *The Business Value of BIM for Infrastructure 2017*.
BS EN ISO 19650-1:2018, *Organization and digitization of information about buildings and civil engineering works, including building information modelling - Information management using building information modelling: Concepts and principles.*

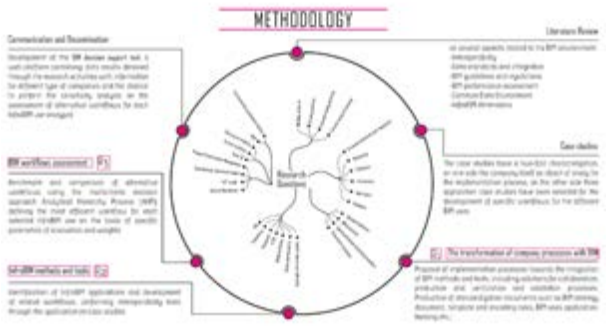
EXTERNAL COLLABORATIONS

- Lombardi Ingegneria S.r.l.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The benefits of a BIM-oriented approach are attractive not only at building level, but as far as infrastructural projects are concerned too. The transition of BIM methodology to the infrastructural domain has emphasized its prospects, providing new challenges and pushing the process beyond any previous limit. Currently, the BIM maturity level within the infrastructure field still needs implementation, because interoperability needs further improvements. Among the necessities of companies, not only the big ones but especially the SME, there is the identification of the most efficient workflows to follow in order to develop specific BIM uses. Within this context, the present thesis analysed in details these workflows, establishing an evaluation framework able to consider in the performance assessment of such workflows different parameters, characteristics of the different working environment. In terms of company management, the main objectives of the research focused on BIM methodology implementation process, in order to develop documents necessary to a BIM-oriented procedure and management of the entrusted works. During the development of the research, three main case studies have been developed from different perspectives, to test the interoperability among platforms and tools and to verify the efficiency of specific approaches and practices. The interoperability tests performed on the case studies enabled the organization of a database containing values of performance towards the InfraBIM use selected. The methodological approach has been organized under the following main sections:

- Literature review on several aspects related to the InfraBIM environment;
- Development of BIM implementation processes, defining the "BIM strategy" of the company "Lombardi Ingegneria S.r.l." through standard documents containing template and encoding rules, BIM uses applications, training etc.;
- Analysis of methods and tools, performing interoperability tests through the application on case studies, defining the values of specific indicators to be used for the evaluation of the most suitable workflow for a specific goal;
- Benchmark and comparison of alternative methods and tools through multicriteria method AHP;
- Development of a BIM decision support tool for companies approaching BIM implementation, including the results on the comparison among workflows.



NAME **Chiara GENTA**
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COURSE XXXIV cycle - 3rd year

RESEARCH TITLE Exploring Assessment Frameworks and SDGs Interlinkages for Implementing Circular Economy Strategies in European Urban Contexts

TUTOR(S) Patrizia LOMBARDI, Serenella SALA (Joint Research Centre)

ACADEMIC CONTEXT

Brandon P.S., Lombardi P., Shen G.Q., 2017. *Future challenges in evaluating and managing sustainable development in the built environment*. London: Wiley-Blackwell.
Miola A., Borchardt S., Neher F., Buscaglia D., 2019. *Interlinkages and policy coherence for the sustainable development goals implementation: an operational method to identify trade-offs and co-benefits in a systemic way*. Luxemburg: Publications office of the European Union.
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EXTERNAL COLLABORATIONS

- Ispra, Joint Research Centre
- Interreg project MOLOC, Comune di Torino
- Green Team, Politecnico di Torino

HIGHLIGHTS OF THE RESEARCH ACTIVITY

In a growing world, cities have an increasing role in facing contemporary challenges. On one hand they can be considered main responsible of consumption of energy and resources, but at the same time they are key actors in facilitating and experimenting transformation toward a more sustainable development. In September 2015 the UN adopted the Agenda 2030 for Sustainable Development which is articulated in 17 goals and 169 targets. Among the SDGs (sustainable development goals), which represent a new integrated vision for the global future, goal 11 is completely dedicated to cities with the aim of making them more inclusive, safe, resilient, and sustainable. Circular economy (SDG12) is increasingly adopted in urban governance to implement a socially inclusive and environmentally desirable urban transition. Different interconnections exist between goals related to circular economy and urban sustainable development both in terms of co-benefits and trade-offs. In this context, the role of cities in the sustainable transition has a long-standing interest. Moreover, little attention has been paid on the how circular economy is implemented in urban context and which positive and negative impacts and feedbacks are generated.

The research will try to fill this gap by investigating European consumption patterns at the urban scale from a consumer point of view through the evaluation of the consumption footprint of a case-study and compared with EU results. Successively, interlinkages with other SDGs are assessed in order to identify possible area of action that maximize positive interconnections. The thesis is articulated in two parts. In the first part a detailed literature review about transition cities, circular economy urban practices and methodologies for interlinkages analysis is developed as a basis for the definition of a preliminary framework of synergies and trade-offs between SDG12 (about circular economy) and other goals in urban contexts. In the second part, through the use of a case-study a quantitative evaluation of consumption patterns of European cities is carried out. This evaluation tried to go beyond checklists and protocols usually adopted to evaluate sustainability performance of urban areas, in favour of a life-cycle approach. In conclusion both qualitative and quantitative methodologies from the literature review will be used to identify interlinkages and results will be discussed considering possible implication in decision-making process and contribution of local urban policies to the achievement of global targets set by the Agenda 2030..

NAME **Elena GIGLIO**
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COURSE XXXIV cycle - 3rd year

RESEARCH TITLE The Future of Energy Transition between Critical Materials and Geopolitics. Lithium and the South American Context

TUTOR(S) Stefano LO RUSSO, Piero BOCCARDO

ACADEMIC CONTEXT

Fornillo B., J. Zicari. 2019. La Energía Del Litio En Sudamérica.In *La Política Del Ambiente En América Latina*, Universidad Autónoma Metropolitana, Unidad Xochimilco, pp. 185-206

Huisman J., Ciuta T., Mathieux F., Bobba S., Georgitzikis D., Pennington K., 2020. *RMIS - Raw Materials in the Battery Value Chain. Final Content for the Raw Materials Information System - Strategic Value Chains - Batteries Section*. Joint Research Center - European Commission.

Janikowska O., Kulczycka J., 2021. Impact of Minerals Policy on Sustainable Development of Mining Sector - a Comparative Assessment of Selected EU Countries. *Mineral Economics,* 34(2), pp. 305-14.

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EXTERNAL COLLABORATIONS

- CONICET, Argentina

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The energy market is changing: new policies, technologies and sources are prompting us to embark on a long journey towards a new world, an "energy transition" to achieve a sustainable consumption model and solutions to tackle global warming and climate change.

Battery sector is one of the pillars of the low-carbon energy transition with a huge economic impact in the decades ahead.

The issue of energy transition in the automotive sector and battery production is not only technological. The geopolitical aspects are relevant if it is considered the relations between Europe, United States, Russia and China and the geographical division of the world, high-income countries (benefiting from the technology), and low-in-come countries but depositaries of the raw materials needed for that technology.

Nickel, Cobalt, Manganese, Lithium, Aluminum, Graphite and Copper are the most important elements implied for cells units battery (Huisman *et al*. 2020) and lithium is undoubtedly a central element in the production of electric batteries, one of the fundamental materials in the process of ecological transition, particularly in the transport sector. The careful analysis of the geopolitical dynamics around this material are crucial also for the support of ecological and sustainable urban regeneration processes, i.e. "smart cities".

Half of all lithium reserves on the planet are located between Chile, Argentina and Bolivia, the so-called "lithium triangle" but what should be of greatest concern, however, is not the amount of lithium present on the Earth's crust, but its global distribution and its socio-environmental impact on local communities (Fornillo, Zicari 2019).

In line with the climate emergency of these days, the main consideration is that even in the mining sector, business as usual is no longer acceptable. The social, economic, environmental sustainability of this sector is related and interconnected to the global climate issue and cannot be ignored.

Economic, environmental and social needs are considered the three pillars underpinning the principle of sustainable development, the mining industry can contribute to future economic growth and social progress by safeguarding the environment.

A major priority of all those involved in the extractive process must be indeed a social and environmental sustainability(Janikowska, Kulczycka 2021) by developing projects that benefit the local community to achieve the specific Sustainable Development Goals dedicated to the mining sector set by the international community (UNDP. WRF. CCSI 2016).

NAME **Martina GIZZI**
E-MAIL martina.gizzi@polito.it

COURSE XXXIV cycle - 3rd year

RESEARCH TITLE Geothermal Resources Exploitation from Disused Hydrocarbon Wells: an Investigation Tool for the Reuse Strategies Analysis

TUTOR(S) Stefano LO RUSSO, Glenda TADDIA

ACADEMIC CONTEXT

Nian Y.L., Cheng W.L., 2018. Insights into geothermal utilization of abandoned oil and gas wells. *Renewable and Sustainable Energy Reviews*, 87, pp. 44-60
Lo Russo S., Gizzi M., Taddia G., 2020. Abandoned oil and gas wells exploitation by means of closed-loop geothermal systems: A review. *Geoing. Ambient. e Min.*, 160, pp. 3-11
Gizzi M., Taddia G., Lo Russo S., 2021. Reuse of decommissioned hydrocarbon wells in Italian oilfields by means of a closed-loop geothermal system. *Appl. Sci.*, 11, pp. 2411

EXTERNAL COLLABORATIONS

- DENERG, Department of Energy, Politecnico di Torino

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The policy visions of the 2030 UN Agenda for Sustainable Development and the Paris Agreement on Climate Change represent a fundamental contribution to guide the transition towards an economic model aiming not only for profitability but also for social progress and environmental protection.

In order to achieve increased energy efficiency, all nations must change the ways by which they produce and manage natural energy resources, allowing the creation of more sustainable and environmentally resilient communities. The main aims for energy companies are therefore to provide energy solutions that are distant from those based on fossil fuel and to guarantee access to low-cost energy, through technological development and environmental value.

Among available energy resources, geothermal energy is a weather-independent, environmentally friendly resource. It also represents an effective solution for power generation, heating and cooling, and several direct-use applications. Specifically, energy production from available low- to medium-temperature geothermal resources associated with disused wells in Italian oilfields has considerable potential. As a renewable energy source, it could solve problems related to suspended wells near municipalities and allow for longer-term use of hydrocarbon wells, even at the end of their production cycle, which would benefit industry and agriculture districts.

The main aim of the research activity is to develop a simplified investigation tool, potentially applicable in Italy and foreign countries, that can allow comprehending the feasibility of converting a hydrocarbon well into a geothermal one.

The research involves different phases of work:

1) review of the advanced methods and technologies developed for retrofitting dismissed hydrocarbon wells in oilfields (open and closed-loop geothermal systems);

2) analysis of different selected study-sites for the evaluation of site-specific energy potential, by providing an accurate representation of wells' temperature distribution;

3) analysis of plants development scenarios to understand the possibilities to content the energy requests in the territory nearby the production plants (industrial and agricultural districts).

NAME **Pinky KUMAWAT**
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COURSE XXXIV cycle - 3rd year

RESEARCH TITLE Using Attitudes and Green Consciousness as a Determinant of Travel Behaviour and Market Segmentation

TUTOR(S) Cristina PRONELLO, Silvia CHIUSANO (Politecnico di Torino)

ACADEMIC CONTEXT

Kumawat P., Kalani G., Kumawat K. N., 2016. Prediction of ERP Outcome Measurement and User Satisfaction by using Adaptive Neuro Fuzzy Inference System and SVM Classifiers approach. International Congress on Information and Communication Technology. In: *Springer AISC*, 1, pp. 237-238.
Kumawat P., 2018. User Satisfaction Prediction in ERP using KNN Classifier for high Prediction Accuracy. *International Journal on Emerging Trends in Technology (IJETT)*, 5, pp. 2455-0124.
Kumawat P., 2018. High Prediction Accuracy and Low Error for ERP User Satisfaction by Hybrid of ANFIS and KNN classification. *International Journal on Emerging Trends in Technology (IJETT)*, 5, pp. 11005-11009.
Pronello C., Kumawat P., 2021. Smartphone Applications Developed to Collect Mobility Data: A Review and SWOT Analysis. In A*dvances in Intelligent Systems and Computing,* vol. 1251, pp.449-467.

EXTERNAL COLLABORATIONS

- Sorbonne Universités – Université de Technologie de Compiègne, France

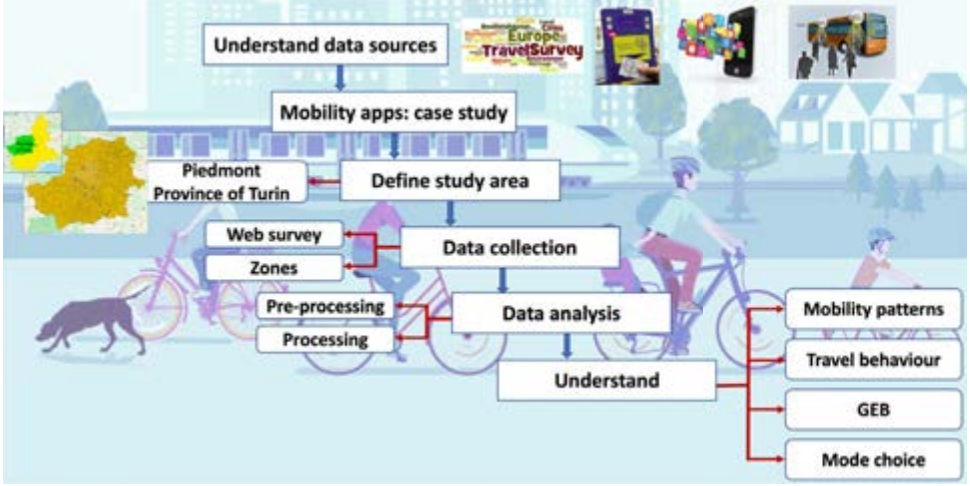
HIGHLIGHTS OF THE RESEARCH ACTIVITY

Nowadays, worldwide availability of massive data are allowing the prediction of people's activities and making obsolete the expensive and time-consuming statistical surveys (Hilbert, 2013). Today there are several data sources useful for the project: open data as well as the directed, automated, or volunteered sources (Kitchin, 2014), including smartphone apps. The impressive growth of data volume generated annually (Manyika et al., 2011) should have largely improved the knowledge of the urban mobility. The understanding of the factors influencing mobility patterns and travel behaviour (Pronello et al., 2011) is the key to ensure the acceptance of innovations and services that could readdress the mobility patterns to more sustainable behaviours and optimize investments in transport systems. The research aims at exploiting the potential of big data to understand mobility patterns and human behaviour (Onnela, 2011). The aim is to propose an innovative approach, less invasive than traditional expensive travel surveys for collecting, analysing, and extracting urban mobility information. Such information is useful to several purposes: the planning and programming of public transport as well as the control of the quality of its services; the management of mobility; the supply of new services for the customers; better understanding of user's needs; the study of the complexity of the interaction between information and travel behaviour; and finally, proposal of policy implications to promote sustainable mobility.

The objectives are:

1) analysis, and extraction of information from travel surveys, mobile devices aimed to build mobility datasets/patterns and behavioural and interactions patterns;

2) evaluation of the collected data in terms of: a) quality and reliability; b) mobility patterns and clusters of users; c) identifying key determinant factors in mode choice.



NAME **Erica MANGIONE**
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COURSE XXXIV cycle - 3rd year

RESEARCH TITLE Housing the Student Population in the Post-Industrial University City

TUTOR(S) Marco SANTANGELO, Loris SERVILLO

ACADEMIC CONTEXT

Smith D., 2005. Studentification: the gentrification factory. In: R. Atkinson, G. Bridge, eds., *Gentrification In A Global Context: The New Urban Colonialism*. London: Routledge, pp. 72-89.
Chatterton P., 2010. The student city: an ongoing story of neoliberalism, gentrification, and commodification. *Environment and Planning*, 42, pp. 509-514.
Moos M. *et al.*, 2019. The knowledge economy city: Gentrification, studentification and youthification, and their connections to universities. *Urban Studies*, 56(6), pp. 1075-1092.
Revington N. *et al.*, 2020. The urban dormitory: planning, studentification, and the construction of an off-campus student housing market. *International Planning Studies*, 25(2), pp.189-205.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

Since university became a mass and global phenomenon, new socio-economic impacts on urban environments are object to scholar's attention. Major western country's universities attract increasing number of young, who contribute to change cities, fostering new consumes and behaviors. On the other hand, municipalities can't do without universities anymore: this are now key players in the urban development policy definition. Such reciprocal university-city relation can be described as a successful one, as well as from an alternative point of view, who concentrates on student population, identifying them as promoter of gentrification processes – the so called "studentification" (Chatterton 2010, Smith 2005). In such academic context, more than one gap need to be filled; not just the one who see at students as aggressive "gentrifiers", but also the rarely appearance of southern Europe university cities in the international debate, despite their involvement in the same global dynamics and urban transformations. Among Italian university cities with higher off campus students' rates, one of the main and most critical issue is about housing. As a matter of fact, international real estate investors are increasingly attracted to Italian university cities; the positive trend of student housing sector and its ongoing commodification, suggest the reality of a potential risk of speculation. This is even more true when the public institution's intervention is observed: specific policies are weak, if not absent. University student housing policies are the topic of the research, with Turin as a case study. A policy is intended as a coordinated action, as the result of a collective and willful process of definition of a clear and common objective. According with such definition, the research starts claiming that no student housing policy is actually carried out in Turin. On the other hand, a complex and complicated network of public and private actors are studied, to frame their independent answer to the housing demand, that is causing relevant but still not studied socio economic impacts. Students can be seen as objects, subjects or even actors in the student housing policy subsector. The research wants to investigate how each of the three point of views on students can lead to different coalitions, decision processes and policies in the student housing sector, but also the development of different spaces and impacts on local communities.

NAME **Danial MOHABAT DOOST**
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COURSE XXXIV cycle - 3rd year

RESEARCH TITLE Social Equity and Urban Resilience: Investigating the Compatibility of Resilience Theory and Practice to Address Social Equity in Cities

TUTOR(S) Angioletta VOGHERA, Grazia BRUNETTA

ACADEMIC CONTEXT

Fitzgibbons J., Mitchell C.L., 2019. Just urban futures? Exploring equity in "100 Resilient Cities". *World development*, 122, pp.648-659.
Meerow S., Pajouhesh P., Miller T.R., 2019. Social equity in urban resilience planning. *Local Environment*, 24(9), pp. 793-808.
Mohabat Doost D., Buffa A., Brunetta G., Salata S., Mutani G., 2020. Mainstreaming Energetic Resilience by Morphological Assessment in Ordinary Land Use Planning. The Case Study of Moncalieri, Turin (Italy). *Sustainability*, 12(11), p. 4443.

EXTERNAL COLLABORATIONS

- R3C, Responsible Risk Resilience Centre: An Interdisciplinary Research Centre, Politecnico di Torino

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Considering the increasing number of urban shocks, it is becoming extremely difficult to ignore the importance of resilience thinking. However, there are two areas of intense debate on the issue. First, the multiple meanings of the term and second, the failure of resilience theory and practice to address social equity. While the focus of this research is on the latter, it will reveal that these two controversial areas are strongly tied to each other. To be more specific, many researchers suggest that currently, communities' resilience is highly unequal. Based on undeniable facts -which verifies this lack- a considerable literature has argued that urban resilience is an inherently conservative concept. They claim that this inherent conservatism stops the radical and systematic transformations, normalizes the crisis, depoliticizes the issue, neglects the structural inequalities, and justifies the increased securitization promoted by formal institutions. Therefore, it is crucial to determine if the current lack of addressing equity within the framework of resilience roots in the concept itself, or this deficiency results from other theoretical misapprehensions. Thus, the primitive aim of this study is to clarify the nexus between the concept of resilience and social equity, by following the recent debates.

In addition to this theoretical gap, what remains unclear is the role of resilience planning on the road to fully consider and subsequently implement the issue of equity. Consequently, to clarify the role of planning toward a more just-resilient future, performing a systematic analysis for different resilience plans and strategies can be helpful. More and more cities are incorporating resilience planning into their strategies and policies. However, a study by Meerow (2019) reveals considerable variation in the extent to which cities focus on equity in their resilience plans. Despite reaching to significant results, such studies are performed only for a limited number of cities (American cities in the over-mentioned article). In addition, to the best of our knowledge, no study has tried to clarify the reason behind this deviation. Consequently, the next step of this research will be the systematic review of the existing resilience plans in some European cities to clarify the extent to what they address equity and the reason behind it.

NAME **Carlotta SCIOLDO**
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COURSE	XXXIV cycle - 3rd year
RESEARCH TITLE	European Transnational Networks between Global Governance and Local Changes in the Cultural and Creative Sector. If Not Harmonizing policies, then What?
TUTOR(S)	Carlo SALONE, Fabrizio DI MASCIO

ACADEMIC CONTEXT

Schmidt V.A. and Radaelli C.M., 2004. Policy change and discourse in Europe: conceptual and methodological issues'. *West European Politics,* 27(2), pp. 183-210.
Wodak R., 2007. Doing Europe: the Discursive Construction of European Identities. In: Mole R.C.M., ed., *Discursive Constructions of Identity in European Politics*. Language and Globalization. Palgrave Macmillan, London.
Barbehön M., 2016. Europeanisation as Discursive Process: Urban Constructions of Europe and the Local Implementation of EU Directives. *Journal of European Integration*, 38(2), pp. 163-77.
Lähdesmäki T., Thoma S., Zhu T. eds., 2019. *Politics of Scale: New Directions in Critical Heritage Studies*, New York, NY: Berghahn Books.

EXTERNAL COLLABORATIONS

- Department of Political Science, School of Public Policy, UCL London, United Kingdom

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The emergence of European transnational networks in different policy sectors depicts a paradigmatic shift in governance landscape more inclined to tackle complex global issues and wicked problems. In the increased network feature of European governance, transnational networks are one variant of the governing process (Kern and Bulkelet 2009) and part of the wider Europeanization process. The literature outlines benefits and challenges of this phenomena: on the one hand enhancing participation in policy making processes - involving new actors such as civil society organizations, municipalities and regions- on the other, thought, the risk of endangering democratic legitimation by reinforcing closed elite cycle in the decision processes (Bulkeley et al. 2003; Khan 2013).

If we look at the European Cultural Policy and its soft mechanisms, transnational networks (TNs) cover a fundamental position in the governance arrangement. Despite the empirical diffusion of the phenomena, though, a systematic body of academic works and an analytical framework to analyse how TNs operate and what they impacts are lacking. Even if a multilevel governance architecture has increasingly characterized the cultural sector since the 90's, both on the global (UNESCO) and on European scales (Council of Europe, European Commission, European Parliament), the EU's heritage policy, politics and implementation of such initiatives remain unexplored in the academic and grey literature (Lähdesmäki et al. 2020). European TNs in the cultural sector remain an under-examined research object (Brki 2019, Stage et al. 2020).

This void implies methodological and operational deficits. The underpinning purpose to undertake this research is to tackle these knowledge gaps, aiming at providing theoretical clarification and operational tools to better understand the European Cultural Governance mechanisms. And more specifically to shed light on how TNs trigger changes both on the EU cultural policy as well as on the local level through their membership. Based on these premises, the primary contribution of this thesis consists in reviewing the available literature on TNs in other policy sectors, mostly on TMCNs in Climate Governance, in order to extract attributes that can then be tested in TNs in the cultural sector; such knowledge will surely play a role in gaining a clearer insight on the regulative, normative, discursive and imaginary European Cultural Governance scope.

Overall, the work, by intensively focusing on TNs, examines how EU heritage discourse arose from the interaction between institutional policy and grassroots heritage actors in specific governance arrangements. In order to unpack these issues, the governance architecture of TNs and the discursive strategies implemented are carefully examined.

NAME	**Francesca TAORMINA**
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COURSE	XXXIV cycle - 3rd year
RESEARCH TITLE	Participation in World Heritage Site's Governance: the Case of the World Heritage Arab-Norman Palermo and the Cathedral Churches of Cefalù and Monreale Serial Site
TUTOR(S)	Sara BONINI BARALDI, Andrea LONGHI (Politecnico di Torino)

ACADEMIC CONTEXT

Kooiman J., 1999. Social-political governance: overview, reflections and design. *Public Management*, 1, pp. 67-92.
Labadi S., 2013. UNESCO, cultural heritage and outstanding universal value. Walnut Creek, CA: AltaMira Press.
Cornwall A., 2008. Unpacking "Participation": models, meanings and practices. *Community Development Journal*, 43(3), pp. 269-283.
Taormina F., 2019. Musei, Patrimonio Digitale e Questioni Organizzative: Stato dell'Arte. Museums. *Digital Heritage and Organizational Issues: State of the Art. DIGITCULT*, 4(2), pp. 51-62.

EXTERNAL COLLABORATIONS

- Future for Religious Heritage (FHR) academic team (Bruxelles)
- MNEMONIC research (Politenico di Torino)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

In the framework of the extensive debate on the UNESCO World Heritage (WH) program, and with a focus on WH serial sites of religious interest, this doctoral thesis aims to critically investigate how the paradigm of the participatory governance is materialized in the practices of local construction and development of a WH site, considering the dimension of sustainable tourism.

Arguing about a clear meaning of participatory governance it is still challenging, both in theory and practice, despite the bulk of literature emerging in political and social science debates. Whether the term governance, in its generic connotation, turns a shift from centralized steering of society by the State to a decentralization of power among a plurality of actors including the private and civil society, the adjective participatory emphasizes the need for enforcing citizen engagement and supporting new forms of power-sharing as a response to a democratic crisis.

In the field of heritage studies, some scholars highlighted the risk of "cosmetic" use of participation, its failure to ensure the promise of democracy, and its elitist nature which might lead to new centralized power structures instead than promoting new forms of collective responsibilities.

This rhetoric use of participatory governance appears dominant in many WH policy documents that advocate balanced participation of a wide variety of stakeholders and rights-holders, as a precondition for a sustainable management and tourism development, tending to idealize the effects of participation and overlooking the risk to obtain opposite outcomes, such as the de-responsibilization of the political class instead than a shared responsibilization of civil society or new impetus for exclusion rather than inclusion.

Based on these premises, within this thesis I intend to contribute to the advancement of the discourse on participatory governance of cultural heritage, trying to overcome the perspective that opposes good practices to bad ones. I propose a micro-level and qualitative analytical approach to the World Heritage serial site Arab-Norman Palermo and the Cathedral Churches of Cefalù and Monreale in order to clarify how, and whether, the establishment of a UNESCO WH site can trigger new participatory governance approaches within the local contexts, inside and outside the boundaries of the site's buffer zones.

XXXV CYCLE - 2nd YEAR STUDENTS

NAME **Martina BOCCI**
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COURSE	XXXV cycle - 2nd year
RESEARCH TITLE	The Role of the Conservation and Transmission of Traditional Construction Techniques in the Local Development
TUTOR(S)	Andrea BOCCO, Carlo SALONE

ACADEMIC CONTEXT

Asquith L., Vellinga M., ed., 2006. *Vernacular Architecture in the twenty-first century*. Abingdon: Taylor & Francis.
Magnaghi A., 2010. *Il progetto locale. Verso la coscienza di luogo*. Torino: Bollati Boringhieri.
Bocci M., Mazelli R., Bocco A., ed., 2021. *Rehabilitation of traditional heritage and local development.* Torino: Politecnico di Torino (in print).

EXTERNAL COLLABORATIONS

- Fundación Altiplano, Arica, Chile
- Tibet Heritage Fund, Germany, India, Mongolia
- Terrachidia, Madrid, Spain
- Medesus, Arequipa, Peru
- Palombar, Portugal
- Dry Stone Walling School, Japan
- Fondacioni Gjirokastra, Albania
- Team Maruyama, Japan
- Architect Aleksandar Radović Foundation, Serbia
- Associazione Canova, Italy

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The research analyses some international case studies of associations and foundations engaged in the rehabilitation of traditional heritage in collaboration with local communities. The common point identified among these initiatives is the conservation and transmission of traditional building techniques. Associations and foundations act in these contexts as facilitators in the recuperation of skills that have been increasingly abandoned and forgotten (due to generational gaps, demographic declines, the transition to modern techniques and materials, or the idea of backwardness that accompanies traditional building techniques). An example of the methods used for this transfer of knowledge is the building site school, often involving the inhabitants themselves.

The first phase of this research has been aimed at establishing a network of contacts and collaborations with associations and foundations working in this field. Seminars and debates have allowed to collect information about these initiatives and to focus on some fundamental issues.

The core of the research will be an in-depth field study of some of these initiatives (1-3), through direct participation in the construction sites, participatory observation and contact with associations/foundations and local communities. On one hand, I aim to analyse the structure and organisational solutions of the processes carried out, the technical and cultural competence of external actors, as well as the engagement and rooting in the local context by associations and foundations. On the other hand, I aim to understand through qualitative analysis the socio-anthropological aspects that link the conservation and transmission of traditional building techniques to positive consequences on the (self) sustainable local development of the contexts under analysis.

The pre-selection of case studies shares some common features as the focus on a "minor" and widespread heritage, and the location in marginal and rural contexts, in relatively isolated settings. These territories are marked by depopulation, deficiencies in infrastructure and basic services and an implicit imaginary of disadvantage. On the other hand, these territories are often dense of culture; they are places where alternative economies, in symbiosis with nature and which preserve biodiversity, may still be able to activate processes of subsistence and self-organization, with an emphasis on crafts based on local resources – both tangible and intangible.

NAME **Daniela DE LUCA**
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COURSE XXXV cycle - 2nd year

RESEARCH TITLE Interactive Digital Service Models for Art and Culture to Support the Healthcare System with VAR Technologies

TUTOR(S) Anna OSELLO

ACADEMIC CONTEXT

Lepouras G., Vassilakis C., 2004. Virtual museums for all: employing game technology for edutainment. *Virtual Reality*, 8, pp. 96-106.
Shams L., Seitz A.R., 2008. Benefits of multisensory learning. *Trens in cognitive sciences*, 12(11), pp. 411-417.
Younes G., Kahil R., Jallad M., Asmar D., Elhajj I., Turkiyyah G., Al-Harithy H., 2017. Virtual and augmented reality for rich interaction with cultural heritage sites: A case study from the Roman Theater at Byblos. *Digital Applications in Archaeology and Cultural Heritage,* 5, pp. 1-9.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

TThanks to the technological and social transformations, the entertainment and show business sector has seen a series of new needs that have outlined the willingness of organizations to invest in new technologies to broaden the target of users. This transformation is bound to a slow generational turnover involving innovative sectors capable of quickly incorporating new languages, combining traditional and advanced technologies. The idea of involving the five senses to immerse the user in the action, which takes place in a simulated environment through innovative tools such as Virtual Reality, is the direction to be developed both in the medical field and for cultural entertainment. Through the re-elaboration of physical space, time and interaction between man and enabling technologies, it is possible to create digital environments with a high degree of innovation to support people with fragility and disability. Sensory experiences, music and art can increase the accessibility of places and experiences. To improve this perception, environments can be promoted in which new sensory experiences can bring the user closer to a new world. Moreover, to improve the psychophysical well-being of patients and their families, opera and virtual tours can generate moments of entertainment, playful and modular using VR and AR technologists. The main aims of the research topic focuses on the definition of the useful requirements to connect the Virtual Reality system with a BIM models for implement a Care System and to increase the accessibility of art and entertainment facilities also to people with disabilities.

In particular, the research focuses on:

- Standard definition of a digital model to create immersive virtual tours of theaters and art spaces that cannot be physically visited;
- Interactions with Virtual Reality tools to amplify emotions through sensory stimulation.

From the study of users' reactions using these technologies to increase the cultural background, it is possible to define a protocol that can help multiple users to mitigate their psychophysical state. By comparing traditional methods with innovative tools, new standards can be defined to monitor the emotional state of the user. In summary, the research work aims to combine more competences in heterogeneous disciplines in the field of digital modeling and in the cultural sector to define new medical strategies to improve care services and accessibility to entertainment services. The main result is the creation of dashboards and tools that exploit the potential of virtual reality in hospitals where art and music become fundamental elements for social inclusion and the diffusion of our artistic heritage. The applications developed within specific case study, will highlight different methods of digital model development and points of view to investigate specific musical, sound and visual aspects that approach a wide and heterogeneous user target.

NAME **Karl Benjamin KRÄHMER**
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COURSE XXXV cycle - 2nd year

RESEARCH TITLE Scales of Degrowth: Reflecting about (De)Growth in Planetary City-Hinterland Relations in the Case of a Global Fruit Geography

TUTOR(S) Marco SANTANGELO

ACADEMIC CONTEXT

Cook I. *et al.*, 2004. Follow the Thing: Papaya. *Antipode,* 36, pp. 642-664.
Massey, Doreen. 2005. *For Space*. London: Sage.
D'Alisa G., Demaria F. and Kallis G., eds., 2014. *Degrowth: A Vocabulary for a New Era*. Abingdon: Routledge.
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Brenner N., Schmid C., 2015. Towards a New Epistemology of the Urban?. *City,* 19 (2-3), pp.151-82.
Brand U., 2020. Sozial-ökologische Transformation konkret: Die solidarische Postwachstumsstadt als Projekt gegen die imperiale Lebensweise. In: A. Brokow-Loga, F. Eckardt, eds. *Postwachstumsstadt. München: oekom verlag*, pp. 30-42.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

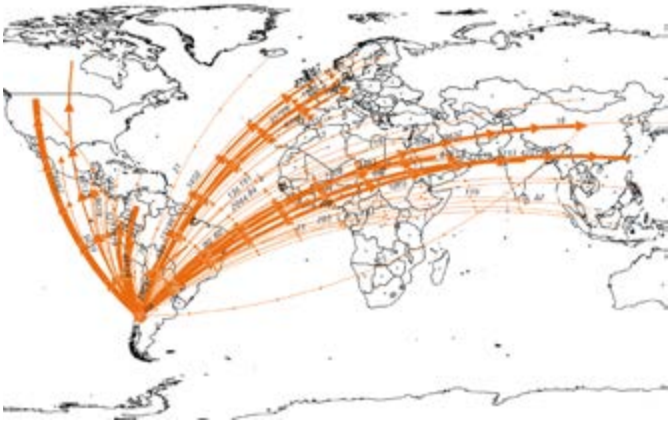
Cities, or, maybe better, urban life, depends on hinterlands, on places where to get resources from, extending the effects of urbanisation far beyond conventional city limits. How can these relations be shaped?

I investigate this in the case of a global fruit geography. Between supermarkets in Turin and Chile's orchards I am reconstructing a geography of fruit grown at one end of the world an consumed at the other. Chile is one of the world's most important fruit producer and Europe is one of its main destinations. I am investigating the social, economic and ecological relationships in and between the places where their production, logistics, consumption occurs.

This empirical research is part of a tradition to investigate the geographies of commodities in order to understand the relations between places, first proposed by Hopkins and Wallerstein in the context of world-systems theory. Studying fruit is not an end in itself. Rather, my research connects to emerging research on degrowth, space and spatial politics. Degrowth is a political project, social movement and academic debate based on the idea that living with less can be a good life, while less production and consumption is necessary for ecological sustainability. Sustainable development instead aims at decoupling economic growth from social and ecological impact: a strategy that has failed, also due to the externalisation of social and ecological impacts.

In response, a typical degrowth strategy has been the idea of relocalisation of political and, in particular, economic relations. There are good reasons for this strategy if we consider the injustices and ecological impacts associated to global economic relations. But is it realistic in front of the complexity of the complexity of today's global geographies? In my research, I try to adopt a relational perspective on space, studying a global fruit geography not simply to define it as "bad" but in order to understand in detail the goods and bads of such a relation in a degrowth perspective. Because finally degrowth will need to develop answers on how such relations could and should be transformed. With the goal of politicising them in the cities that depend on them. To build "solidary degrowth cities", in which there are limits to the total quantity and speed of relations and thus of their urban metabolism but in which also there are just and sustainable modes of governing those relations that exist, independently of their geographical extension.

Chile: Apple Exports and Imports in 2019. In Tonnes. Source: FAO



NAME	**Marco MASSANO**
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COURSE	XXXV cycle - 2nd year
RESEARCH TITLE	GIS-Based Co-Simulation Platform for Smart Energy and Renewable Technologies Integration in Energy Communities
TUTOR(S)	Enrico MACII, Edoardo PATTI and Andrea LANZINI (Politecnico di Torino)

ACADEMIC CONTEXT

Bottaccioli L., Patti E., Macii E., Acquaviva A., 2018. Distributed Infrastructure for Multi-Energy-Systems Modelling and Co-simulation in Urban Districts. In: *7th International Conference on Smart Cities and Green ICT Systems*.
Massano M., Patti E., Macii E., Acquaviva A., Bottaccioli L., 2020. An Online Grey-Box Model Based on Unscented Kalman Filter to Predict Temperature Profiles in Smart Buildings. *ENERGIES*, 13(8), p. 2097

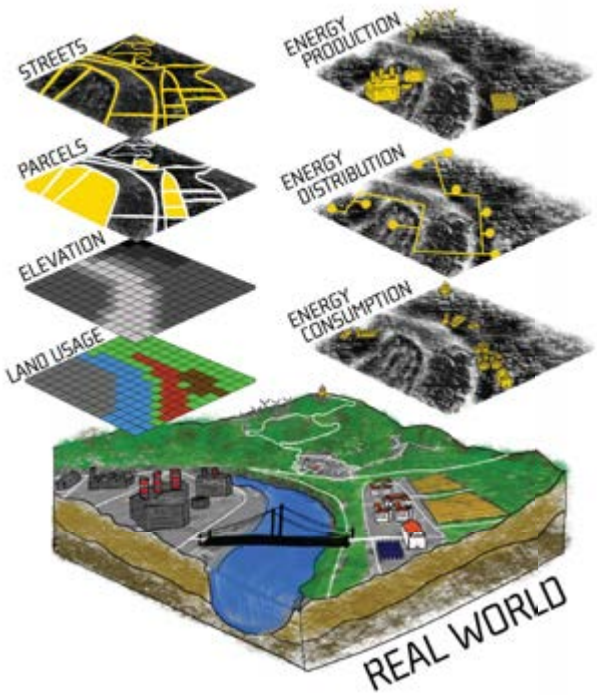
EXTERNAL COLLABORATIONS

- Energy Center Lab – Politecnico di Torino

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The rising awareness of environmental issues and the increase of renewable energy sources allowed to start shifting energy production to Renewable Energy Sources (RES), such as Photovoltaic (PV) systems. This increase in RES production brings to a change in the way of producing energy. Shifting toward a Distributed Generation model of energy production is becoming increasingly important, requiring a production system where energy is generated, stored, and consumed locally. Besides the mere self-consumption of locally produced electricity within the individual households, more advanced concepts, such as Renewable Energy Communities (RECs), have been developed. A REC is a micro-system able to self-produce renewable energy that covers its own energy needs. This novel concept (or actuation) of the smart grid promotes novel services for intelligent management of both energy loads and production. In the development of simulation and modeling tools for the distributed energy systems, a fundamental aspect to consider is the Geographic Information Systems (GIS) environment. GIS provides the geographical basis for describing the environment of the area of interest.

In this work, a methodology that integrates GIS-based PV potential assessment procedures with models for the estimation of both energy generation and consumption profiles in a high spatio-temporal resolution is presented. The methodology is based on open-source GIS solutions and it generates also additional open-source data sets, with the integration of a technique to simulate realistic synthetic populations. An innovative co-simulation infrastructure is created. The proposed solution is composed of a modular framework that allows to perform different power grid scenarios and simulations. This work assesses the PV integration on building rooftops together with the analysis of households' electricity demand. The high spatio-temporal discretization employed by the proposed methodology enables to make accurate estimations on both energy profiles and environmental indicators. Such a solution supports drawing concrete recommendations to promote the understanding of Urban Energy Systems and the integration of RES in the context of future smart cities. In addition, it enables further considerations on the design and the maintenance of a REC (e.g., quantitative analysis of decentralized storage systems scenarios, considerations on the strengthening of the distribution network).



NAME **Cecilia MEREGHETTI**
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COURSE	XXXV cycle - 2nd year
RESEARCH TITLE	Social Impact of Cultural Programs in Urban Areas Analyzing the "Capitals of Culture" Using Data Science
TUTOR(S)	Sara BONINI BARALDI, Carlo SALONE

ACADEMIC CONTEXT

Ballas D., 2013. What makes a 'happy city'?. *Cities*, 32, pp. S39-S50.
DiMaggio P., Nag M., Blei D., 2013. Exploiting affinities between topic modeling and the sociological perspective on culture: Application to newspaper coverage of US government arts funding. *Poetics*, 41(6), pp. 570-606.
European Commission, 2018. *European Capitals of Culture (ECoC) 2020-2033: Guidelines for the cities' own evaluations of the results of their ECOC*.
Steiner L., Frey B.S., Hotz S., 2015. European Capitals of Culture and Life Satisfaction. *Urban studies*, 52(2), pp. 374-394

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

Cultural programs have increased in both numbers and importance in recent years, to boost local economies and promote development. The present research strives to embrace a different perspective on the assessment of such initiatives. Looking at the social sphere, the goal is to appraise how cultural programs affect development in the territories involved, particularly investigating the dimension of subjective wellbeing. The research focuses on the "Capitals of Culture", a well-known initiative that allows cities to implement for one year a set of cultural activities to promote development on their territory. The analysis will involve two case studies.

Understanding the need to find new tools and narratives to assess the program's results, I propose a mixed methodology based on the use of textual data analytics. The main techniques involved are topic modeling – a machine learning technique used to detect the topics and emerging patterns in large corpora of text – and sentiment analysis – useful to capture the perception and "feeling" behind written words. The main source of data required for the analysis is solicited and unsolicited written content produced by different actors both online and offline (i.e., official documentation, newspaper articles and social media posts and comments). To contextualize and improve interpretability of the produced output, more traditional techniques (i.e., surveys and focus groups) will integrate the analysis.

The outcome will contribute to the ongoing debate on the impacts of the program, also responding to the need for innovation in their evaluation highlighted by the EU itself.

NAME **Francesco NURRA**
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COURSE XXXV cycle - 2nd year

RESEARCH TITLE Halal Landscapes: between Clustering and Segregation?

TUTOR(S) Ugo ROSSI, Francesco CHIODELLI

ACADEMIC CONTEXT

Akbar A., 2018. *Journey into Europe: Islam, Immigration, and Identity*. Washington: Brookings Institution Press
Pullés S.A., Lee J., 2019. Ethnic Enclave. In: The Wiley Blackwell Encyclopedia. *Urban and Regional Studies* 1(6).
Modai-Snir, Tal, 2021. Increasing Inequality and the Changing Spatial Distribution of Income in Tel-Aviv. In: van Ham, Tammaru, Ubareviciene, Janssen, ed. By, *Urban Socio-Economic Segregation and Income Inequality.* The Urban Book Series. Springer

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

The research aims to present the halal sector in relation to mosques within the city of Turin. A mixed-method approach is used. The mixed methodology consists of photographic, cartographic, and ethnographic methods.

Neighbourhoods presenting the so-called clustering phenomenon of halal butchers in relation to the presence of mosques are analysed with a critical approach towards ethnic enclaves and the phenomenon of segregation. On the more political and social side, these areas present a phenomenon of concentration of the Muslim population, which also has a tendency towards diffusion in almost the whole context of the city of Turin and whose more institutional and political side is sometimes open to participation and to what is happening in the city and the neighbourhood. From a spatial economic point of view, the link of spatial proximity between halal butchers and mosques is largely secularised. However, butchers' shops continue to respond to a religious need for consumption.

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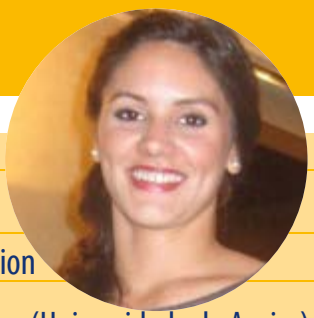


COURSE	XXXV cycle - 2nd year
RESEARCH TITLE	Spatial Biophysical and Economic Assessment through Integrated Ecosystem Services Modelling for Coastal Urban Climate Change Adaptation
TUTOR(S)	Alessandro PEZZOLI, Elena COMINO (Politecnico di Torino), Peter Roebeling (Universidade de Aveiro), Marco Maria BAGLIANI (Università di Torino)

ACADEMIC CONTEXT

Voskamp I. M., Van de Ven F. H. M., 2015. Planning support system for climate adaptation: Composing effective sets of blue-green measures to reduce urban vulnerability to extreme weather events. *Building and Environment*, 83, pp. 159-167.
Grêt-Regamey A., Altwegg J., Sirén E.A., van Strien M.J., Weibel B., 2017. Integrating ecosystem services into spatial planning - A spatial decision support tool. *Landscape and Urban Planning*, 165, pp. 206-219.
IPCC, 2019. Summary for policymakers. In: Pörtner, H.-O. *et al.,* eds., *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*.

EXTERNAL COLLABORATIONS

- CESAM, Centre for Environmental and Marine Studies, University of Aveiro, Portugal

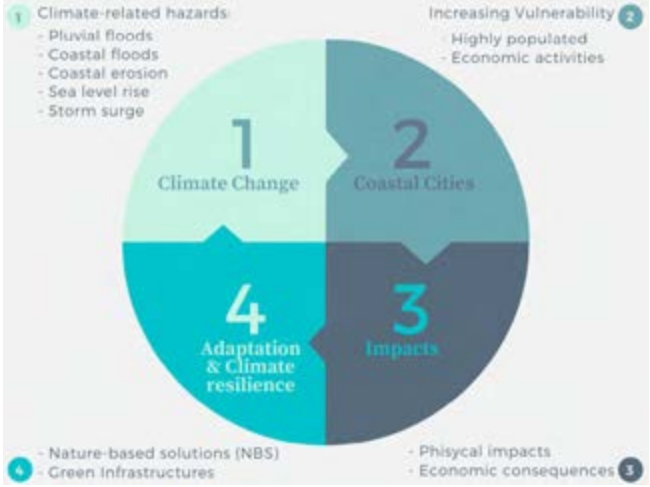
HIGHLIGHTS OF THE RESEARCH ACTIVITY

Climate Change is considered the major present and future threat to the stability of the cities, especially through the amplification of related impacts. Out of all natural disasters those related to hydrometeorological phenomena (e.g. coastal and flash-floods, storm surges, hurricanes/typhoons) have shown the fastest rate of increase in their frequency and intensity.

One of the key objectives of the EU Adaptation Strategy (2013) is the need for addressing knowledge gaps about adaptation focusing on the city-level strategies through the Global Covenant of Mayors for Climate & Energy initiative. Moreover, as recommended by the EU Directive (2007), the vulnerability along the coasts must be assessed through spatial analysis depicted in maps (EU, 2007). Despite having various international and national climate change frameworks it is vague and without practical effects on concerns of spatial planning tools.

In the context of climate change as the driver and the urban resilience as the response for achieving rapid long-term adaptation, the contemporary urban de-sign principles must include Ecosystem-based approaches overcoming the traditional mitigation method. How to transform the knowledge systems that support decision-making while translating the integrated spatial climate-ecosystem models used for vulnerability assessment into local adaptation planning measures?

This research contributes towards understanding climate change vulnerability by developing a spatial dynamic assessment for coastal cities through integrated ecosystem services modelling in a context of climate change scenarios. This has been undertaken by employing the most recent modelling release of the software InVEST including the Coastal Vulnerability model and Urban Flood Risk Mitigation model integrated into a GIS environment. The output of study cases enables site-specific spatial knowledge of the most critical areas. A second step includes the adoption of future climate scenarios through the development of a methodology based on short-, medium-, long-term coastal vulnerability assessment highlighting the identification of most sensitive regions in the face to climate change. The expected results of this work concern the provisioning of policy implication scenarios expressed in biophysical and monetary term sup-porting ecosystem- and performance-based adaptation strategies while defining the major transformations mainstreaming the climate resilience of coastal urban regions.



NAME **Manuela RONCI**
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COURSE XXXV cycle - 2nd year

RESEARCH TITLE Urban Biodiversity: Strategies for Aware Planning and Landscape Design

TUTOR(S) Federica LARCHER, Bianca Maria RINALDI (Politecnico di Torino), Andrea BOCCO

ACADEMIC CONTEXT

Nassauer J.I., 1995. Messy Ecosystems, Orderly Frame. *Landscape Journal*, 14(2), pp. 161-169.
Prominski M., 2019. Come Together. Enhancing Biodiversity in High-Density Cities by Giving Space to Humans and Non-Humans. In: B.M. Rinaldi, P.Y. Tan, eds., *Urban Landscapes in High-Density Cities. Parks, Streetscapes, Ecosystems*. Basel: Birkhäuser, pp. 190-203.
Tan P.Y., 2019. Meeting Old Friends and Making New Ones: Promoting Biodiversity in Urban Landscapes. In: B.M. Rinaldi, P.Y. Tan, eds., *Urban Landscapes in High-Density Cities. Parks, Streetscapes, Ecosystems*. Basel: Birkhäuser, pp. 204-215.
Randrup T.B., Buijs A., Konijnendijk C.C., Wild T., 2020. Moving beyond the nature-based solutions discourse: introducing nature-based thinking. *Urban Ecosystems*, 23, pp. 919-926.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

Due to increasing urban population and anthropic pressure, urbanisation has become the main cause of worldwide environmental damages. From climate change to biodiversity loss, it is clear that cities are the key places to face the biggest challenges.

Focusing on biodiversity conservation in the European urban context and considering the Rio Convention on Biological Diversity (1992) as timescale and founding act of a new environmental consciousness, the research starts with the understanding of the city as an ecosystem. The doctoral thesis aims at examining how landscape design might enhance or trigger the mechanisms regulating the development of urban biodiversity, discussing the relationship between spatial/compositional arrangements of urban green open spaces and their biological heterogeneity and quality.

Scholars agree that one of the major issues in designing for biodiversity is to balance human and nature needs. Getting out of an anthropocentric view, a novel "nature-based thinking" (Randrup *et al.*, 2020) can be applied, shifting the attention from the mere benefits provided by nature to humans, towards a vision including man within nature. The aim of designing for biodiversity, limiting the loss of ecological variety within cities, can be pursued by establishing a new accepted and shared urban aesthetics, based on an approach that applies ecosystem functions and patterns to define spaces that are attractive to both the public and wildlife. Following this attitude (as many successful examples of contemporary practice show), environmental, social, economic, functional, and aesthetic issues can be addressed and integrated in urban design and management.

The final goal of the research is to define an inventory of possible solutions able to support landscape planning and design in building inclusive spaces for humans and non-humans. To this end, a multiscale critical review is being developed, addressing plans and projects implemented in five European cities (Amsterdam, Berlin, Lisbon, Paris and Sheffield) to design biodiversity-friendly urban open spaces. On-site surveys to the design case studies are also being carried out, as well as interviews to the professionals involved. The work intends to provide a set of useful strategies to imagine future scenarios able to respond to the needs of the many living dwellers of the city, balancing planning, design, form, defined functional programmes, spontaneous colonisation and temporary uses of the open spaces.

NAME **Federica ROTONDO**
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COURSE XXXV cycle - 2nd year

RESEARCH TITLE Intermediaries and Intermediation in the Governance of Urban Energy Transition

TUTOR(S) Giancarlo COTELLA, Isabella LAMI

ACADEMIC CONTEXT

Hodson M., Marvin S.,2012. Mediating Low-Carbon Urban Transitions? Forms of Organization, Knowledge and Action. *European Planning Studies,* 20, pp. 421-439.
Valkenburg, G., Cotella, G., 2016. Governance of energy transitions: About inclusion and closure in complex sociotechnical problems. *Energy, Sustainability and Society*, 6(20).
Luque-Ayala A., Marvin S., Bulkeley H., 2018. *Rethinking Urban Transitions: Politics in the Low Carbon City.* Routledge: Abingdon, UK.
Rotondo F., Abastante F., Cotella G., Lami I.M., 2020. Questioning Low-Carbon Transition Governance: A Comparative Analysis of European Case Studies. *Sustainability*, 12, 10460.

EXTERNAL COLLABORATIONS

- Erasmus+ project LOTUS, Locally Organized transition of Urban Sustainable Space

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The topic under investigation stands at the intersection between urban transformations, urban governance and transition studies. It takes into accounts social relations, institutional aspects and contextual factors in the low-carbon transition of cities. It also touches upon multilevel governance studies, as it explores the possible relations between local contexts and the strategies and policies developed at the European and the national levels.

To achieve international emission reduction targets for cities, the dominant techno-centric approaches to urban planning, policies and projects have not proven exhaustive. In particular, whereas these approaches focus on energy and the environment as fields to approach through continuous technical innovations, little attention is given to social practices and organisational asset that could have a role in favouring and supporting the transition towards a low-carbon society. In order to shed light on the matter, this research shifts the focus to current governance practices and, in particular, on the involved actors and their relation across variable scales and timings. More specifically, a particular emphasis is given to "energy intermediaries", as emerging figures in facilitating the transition acting as bridges among a variety of actors and interests and enabling public engagement along the process.

In this context, the main research questions of the present thesis revolve the relational perspectives and the politics of interaction among different actors involved in the low-carbon transition process of metropolitan contexts. A limited number of case studies in Italy are explored and compared in light of the main research questions that focus on: (i) the historical and political context of the selected case studies and the contextual conditions where intermediaries emerged; (ii) the dynamic of intermediation and the relations among different public and local actors in dealing with urban-energy issues; (iii) the spatial configurations and the governance implications of the considered initiatives/projects. Expected outcomes move from mapping the actors' network of the case studies to the identification of levers and catalysts to trigger process innovation in the shaping of urban policies and plans for low-carbon transition in cities.

NAME	**Ornella SALIMBENE**
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COURSE	XXXV cycle - 2nd year
RESEARCH TITLE	Combination of Traditional Indicators of Air Quality with a Traffic Proxy Indicator to Support Risk Assessment Analysis to Ultrafine Particulate Exposure
TUTOR(S)	Andrea M. LINGUA, Deborah PANEPINTO (Politecnico di Torino), Francesco PILLA (UCD College of Dublin)

ACADEMIC CONTEXT

Pilla F., Broderick B., 2014. A GIS model for personal exposure to PM_{10} for Dublin commuters. *Sustainable city and society*, 15, pp.1-15.
Salimbene I., Affuso F., Salimbene O., Marasco S., Schettini C., 2015. Asthma and rhinitis: clinical and physiological correlation, possible environmental factors. *European Respiratory Journal*, 46.
Salimbene O., Salimbene I., Pilla F., Ragosta M., Comino E., 2018. Sleep disordered breathing and relationship with Pm_{10}. *European Respiratory Journal*, 52.
Ragosta M., D'Emilio M., Giorgi G., Salimbene O., Riccio P., 2019. Application of MCA for studying as the lifestyle and the air quality can affect form of sleep disordered breathing. *Fresenius Environmental Bulletin*, 25, pp. 1-7.

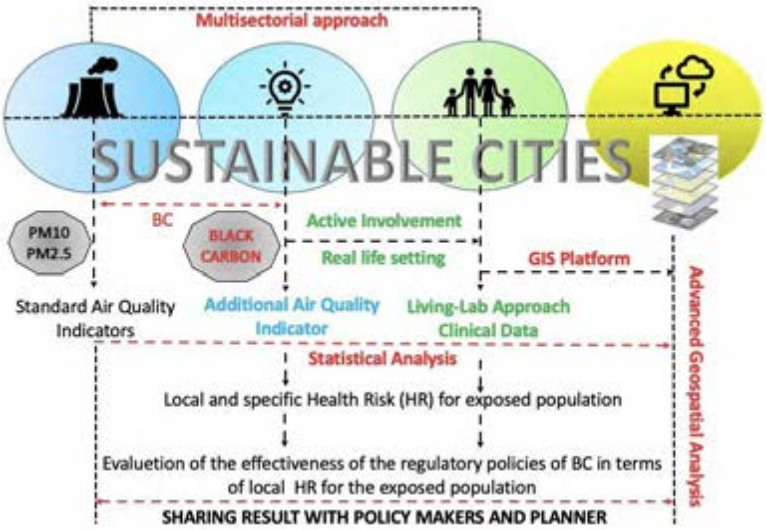
EXTERNAL COLLABORATIONS

- University College Dublin, School of Architecture Planning and Environmental Policy, Richview Sch of Architecture Belfield Dublin 4
- University of Castilla La-Mancha. Departamento de Química-Física. Escuela de Ingenieria Industrial y Aeroespacial de Toledo

HIGHLIGHTS OF THE RESEARCH ACTIVITY

My research is focused on smart cities and on specific geospatial analysis in the modeling of urban dynamics related to air pollution. Through the application of GIS models and decision support tools, I try to deepen the knowledge of the impacts deriving from the interactions of air pollution with the human population. In my research work I use many local scale pervasive monitoring applications, in order to combine traditional air quality indicators (PM2.5) with a promising traffic proxy (BC) indicator of the pollution source. BC is considered a valuable additional air quality parameter for assessing the health risks of primary combustion particles from traffic, including organic products (WHO, 2013). Therefore

better understanding the potential of additional atmospheric indicators such as Black Carbon, would make it possible to evaluate the effectiveness of the regulatory policies of this important emission source also in terms of local and specific health risk for the exposed population. I am currently adopting this approach in Turin, one of the Italian cities most oppressed by smog and among the top hundred urban areas with the highest number of deaths due to respiratory diseases caused by transport (ICCT, 2019). My effort is to implement in the GIS platform, the standard data collected by the national monitoring network with the pervasive data detected by mobile instruments (environmental and clinical) so as to deepen the spatial dynamics in the urban context. This integrated approach allows me to bring a multidisciplinary dimension to my research and to integrate social and clinical information into the co-design of the air pollutant monitoring system through the promotion of participatory science activities (Living Lab). Living Lab's activities make it possible to promote the effective implementation of the principles of sustainable development of the objectives proposed by the UN Agenda 2030, an action plan and local sustainable development cannot be separated from the participatory consent of citizens.



NAME **Ingrid VIGNA**
E-MAIL ingrid.vigna@polito.it

COURSE XXXV cycle - 2nd year

RESEARCH TITLE Forest Socio-Ecological System Modelling for Wildfire Risk Management

TUTOR(S) Angelo BESANA, Alessandro PEZZOLI, Elena COMINO (Politecnico di Torino)

ACADEMIC CONTEXT

Ostrom E., 2009. A General Framework for Analyzing Sustainability of Social-Ecological Systems. *Science*, 325, pp. 419-422.
Ruankaew N., Page C.L., Dumrogrojwattana P., Barnaud C., Gajaseni N., Paassen A. van and Trébuil G., 2010. Companion Modelling for Integrated Renewable Resource Management: A New Collaborative Approach to Create Common Values for Sustainable Development. *Int. J. Sustain. Dev. World Ecol.*, 17, pp. 15-23.
Ascoli D., Barbati A., Colonico M., Tomao A., Colaço C., Acàcio V., Sequeira A.C., Serra M., Plana E., 2020. Soluzioni intelligenti per la prevenzione integrata degli incendi boschivi. *Sherwood*, pp. 33-37.
Vigna I., Besana A., Comino E., and Pezzoli A, 2021. Application of the Socio-Ecological System Framework to Forest Fire Risk Management: A Systematic Literature Review. *Sustainability*, 13(4), 2121.

EXTERNAL COLLABORATIONS

- Consorzio Forestale del Canavese
- DISAFA, Dipartimento di Scienze Agrarie, Forestali e Alimentari, Università degli Studi di Torino

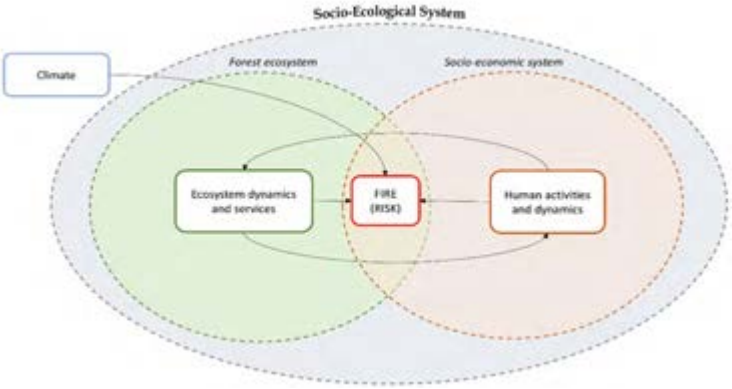
HIGHLIGHTS OF THE RESEARCH ACTIVITY

Forests play a fundamental role in providing several ecosystem services. Recently, their ability to regulate the carbon cycle and, therefore, to influence climate change trends has become clear to the public opinion. However, climate change, together with other direct and indirect human impacts, is threatening forests ecosystems' health worldwide. Wildfires are one of the results of these driving pressures on the fragile ecological equilibriums and wildfires risk is likely to increase in most Europe. The drivers of wildfires risk are not limited to climatic and meteorological factors: the forest management techniques, the presence of tourists, the typical rural abandonment of some areas with the consequent aging of the population and the characteristics of the Wildland-Urban Interface have a major role in forest fire spread. It is clear, therefore, that the changes in the socio-economic system need to be deeply investigated, with reference to their interconnection with the ecological environment and to the climate. Recent studies have started to assess this correlation. However, a comprehensive understanding of the interactions between the diverse drivers of change is still needed both at the global level and at the local level.

This PhD research addresses this gap from a local point of view, adopting a Socio-Ecological System approach. It analyses a case study located in a South-Western European Alpine valley (Valchiusella), by involving the needs and perspective of the local community in the research. In the framework of common resources management, in fact, justice issue is a reference during the entire research process.

An interdisciplinary approach, combing qualitative and quantitative analysis, is adopted. The methodology involves the use of targeted semi-structured interviews, the simulation of fire behaviour through FlamMap software and the organisation of focus groups. Finally, a participatory approach based on the development of an agent-based model will be used for the involvement of the local community in the definition of integrated wildfire prevention strategies, following Companion Modeling approach. These integrated strategies will aim at incorporating fuel management activities in broader rural development guidelines, based on green economy.

This research contributes to the scientific debate about sustainable wildfire risk management, proposing a common resource management point of view on the topic.



XXXVI CYCLE - 1st YEAR STUDENTS

NAME **Marco ALIONI**
E-MAIL marco.alioni@polito.it

COURSE	XXXVI cycle - 1st year
RESEARCH TITLE	(Im)mobile Lives in the Time of COVID-19. A Field Research on Mobilities Regimes, Infrastructural Development, and Mobility Justice
TUTOR(S)	Camillo BOANO, Antonio DI CAMPLI

ACADEMIC CONTEXT

Graham S., Marvin S., 2002. *Splintering Urbanism: Networked Infrastructures, Technological Mobilities, and the Urban Condition*. Routledge.
Marvin S., McFarlane C., 2014. *Infrastructural lives. Urban Infrastructure in Context*. 1-14. Routledge.
Robinson J., 2015. Thinking cities through elsewhere: comparative tactics for more global urban studies. *Progress in Human Geography*, 40(1), pp.1-27.
Sheller M., Hannam K., Adey P., Tyfield D., 2021. Pandemic (im)Mobilities. *Mobilities*, 16(1), pp.1-19.

EXTERNAL COLLABORATIONS

- Department of Global Urban Studies – Rutgers University, Newark, New Jersey, US
- Dipartimento di Ingegneria Civile, Architettura, Territorio, Ambiente, Matematica, Università degli studi di Brescia, Italy

HIGHLIGHTS OF THE RESEARCH ACTIVITY

My research is situated in a Western world still perturbed by the emergency policies related to the COVID-19 outbreak. Throughout the past year, it has been widely argued that this pandemic is both reinforcing and producing old and new forms of socioeconomic inequality. These inequalities are also expected to worsen and polarize, in the next future, several crucial domains of life, both at the individual and social levels. The research has three main goals. First, it investigates what models of urban proximity are being implemented and promoted in two selected cities (Brescia, Italy, and Newark, New Jersey, US) in the time of COVID-19. Second, this research explores the roles played by infrastructures and mobility regimes in the realization of these models of proximity, in particular in terms of the conditions of socio-spatial inequalities produced by the contemporary patterns of urban development. Third, the analysis takes into account how these conditions of inequalities are (re)produced, contested, and negotiated through the residents' everyday life mobility practices. The research has two main aspirations. On one hand, the knowledge produced through this research will enrich the current debates on infrastructural development, mobilities, and the roles played by the built environment in the production of conditions of socio-spatial inequalities. On the other hand, it is expected that this research will contribute to the planning processes happening in the two cities, promoting fair and equal distribution of resources and opportunities across the cities. This will be done by discussing the more problematic aspects of the pandemic planning, as well as by reconstructing the intra- and extra-governance processes that brought to the development of specific plans and projects. The projects taken into consideration are infrastructures, opportunities of urban mobility, and long-term plans developed in the time of COVID-19, that are expected to deeply transform the urban structures of the two cities. Ethnography and policy-analysis will be the main two methods applied, further informed by the current debates promoted by scholars such as Jennifer Robinson about 'ordinary urbanism'. In this way, the methodological choices on which this research is grounded will increase its overall value, by situating it within current debates about the global production of urban knowledge and its featuring power relations.

NAME **Deepan ANBARASAN**
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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Estimation of Passenger Occupancy and Mobility Patterns on Public Transport Using Electronic Devices

TUTOR(S) Cristina PRONELLO

ACADEMIC CONTEXT

Saponara S., Pilato L., Fanucci L., 2016. Exploiting CCTV camera system for advanced passenger services on-board trains. *IEEE International Smart Cities Conference (ISC2)*. Trento, Italy 12-15 Sept. 2016, pp. 1-6.
Myrvoll T. A., Håkegård J. E., Matsui T. and Septier F., 2017. Counting public transport passenger using WiFi signatures of mobile devices. *IEEE 20th International Conference on Intelligent Transportation Systems (ITSC)*. Yokohama, Japan, 16-19 Oct. 2017. pp. 1-6.
Yang Y., Dwyer T., Goodwin S. and Marriott K., 2017. Many-to-Many Geographically-Embedded Flow Visualisation: An Evaluation. *IEEE Transactions on Visualization and Computer Graphics,* 23(1), pp. 411-420.

EXTERNAL COLLABORATIONS

- Direction de la Météorologie Nationale au Niger
- FAO, Angola

HIGHLIGHTS OF THE RESEARCH ACTIVITY

There are many systems currently in place to count the number of passengers on board, to understand the occupancy rates. Current Automatic Passenger Counting (APC) systems are primarily based on stereoscopic cameras or infrared detectors above the doors. A less expensive method, in the context of recent trends, is to count the number of electronic devices, including smart phones, on board a PT system. This will serve as an indicative measure of people getting on and off at bus stops and bus occupancy between stops. This when presented with clarity and in an actionable way will greatly assist transport planners in understanding the mobility patterns.

The focus of this thesis is to research ways to utilise Information and Communication Technology (ICT) including IoT (Internet of Things) and data analytics with the goal of counting passengers on public transport systems and present the results in an actionable manner. Based on the state-of-the-art analysis and available systems, we decided to use the data from a device that detects Wi-Fi signatures and has a built-in global navigation satellite system (GNSS) receiver. In addition to this we had information regarding the bus, routes and stops received from the public transport authorities through open data systems.

NAME **Fabio BALLATI**
E-MAIL fabio.ballati@polito.it

COURSE XXXVI cycle - 1st year

RESEARCH TITLE Mobility Patterns Definition of Public Transport Users through IoT and Data Analytics

TUTOR(S) Cristina PRONELLO, Lorenzo CARLI and Alessandro MANNELLI (Leonardo)

ACADEMIC CONTEXT

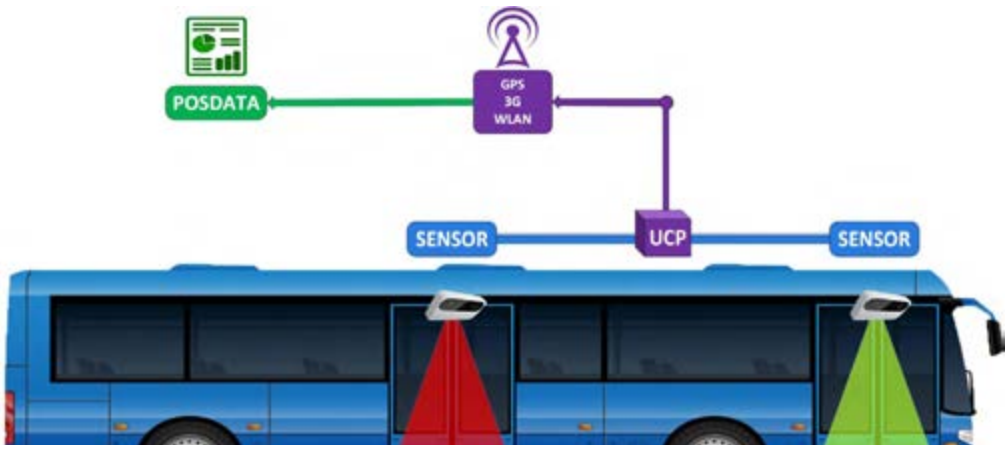
Qureshi K., Abdullah H., 2013. A Survey on Intelligent Transportation Systems. *Middle-East Journal of Scientific Research*, 15. pp. 629-642.
Olivo A., Maternini G., Barabino B., 2019. Empirical Study on the Accuracy and Precision of Automatic Passenger Counting in European Bus Services. *The Open Transportation Journal*, 13, pp. 250-260
Castrogiovanni P., Fadda E., Perboli G., Rizzo A., 2020. Smartphone Data Classification Technique for Detecting the Usage of Public or Private Transportation Modes. *Open Access Journal*, 8, pp. 58377-58391

EXTERNAL COLLABORATIONS

- Leonardo SpA

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The objective of the research work will be to analyse different systems to collect data on-board public transport systems that will help in understanding passenger count.
This could be focused in the form of analysing both the features of the different systems on board and those in development (where available), to analyse the collected data and quantify their accuracy when they infer information like vehicle load, important stops, routes based on time of the day, week and so on. This data, in fact, could be useful to measure the impact of changes made to the transport infrastructure. The work will also focus on the analysis of how those data are delivered to users and understand which is the best way to disseminate such information to make it effective.



NAME **Simone BELTRAMINO**
E-MAIL simone.beltramino@polito.it

COURSE XXXVI cycle - 1st year

RESEARCH TITLE Strategic Planning for Energy-Resilient Territories and Cities

TUTOR(S) Guglielmina MUTANI, Grazia BRUNETTA

ACADEMIC CONTEXT

Sharifi A., Yamagata Y., 2016. Principles and criteria for assessing urban energy resilience: A literature review. *Renewable and Sustainable Energy Reviews*, 60, pp.1654-1677.
De Pascali P., Bagaini A., 2019. Energy Transition and Urban Planning for Local Development. A Critical Review of the Evolution of Integrated. *Spatial and Energy Planning*, 12, pp. 35.
Brunetta G., Caldarice O., Tollin N., Rosas-Casals M., Morató J., 2020. Urban resilience for Risk and Adaptation Governance. *The Resilient Cities book*.
Mutani G., Santantonio S., Brunetta G., Caldarice O., Demichela M., 2021. An energy community for territorial resilience: Measurement of the risk of an energy supply blackout. *Energy and Buildings*, 240, pp. 110906.

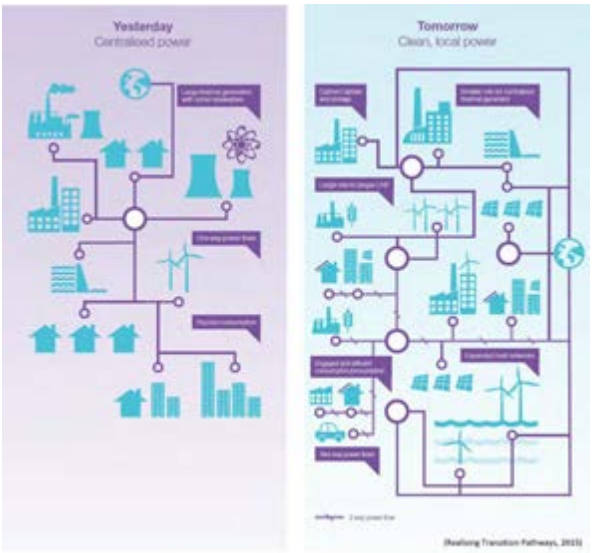
EXTERNAL COLLABORATIONS

- R3C, Responsible Risk Resilience Centre, Politecnico di Torino
- Environment Park, Science and Technology Park, Torino
- Institut Dalle molle d'Intelligence Artificielle Perceptive, Idiap, Martigny
- EPFL, Ecole Polytechnique Fédérale de Lausanne
- University of Maryland
- Ryerson University, Toronto

HIGHLIGHTS OF THE RESEARCH ACTIVITY

In line with the climate-neutral 2050 strategy, the energy transition is the main theme to be addressed, integrating the development of energy systems within urban areas, in order to mitigate the climate change and to achieve the decarbonization goals. The importance of incorporating the energy issue into the decision-making process is widely recognized, in particular by the 2016 Urban Agenda within the framework of the EU SDGs.

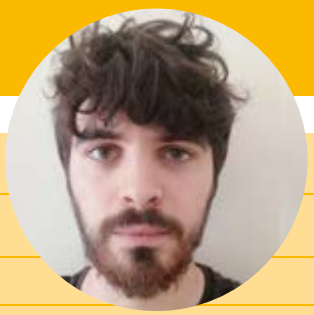
The EU Clean Energy for All Europeans package facilitates the energy transition through various measures aimed at improving the security, sustainability and competitiveness of the energy system. These measures include adequate physical and regulatory infrastructures to satisfy the energy market, integrate renewable energies and ensure the security of the energy supply system. These aspects are closely related to the importance of the spatial proximity of energy supply and demand. In this perspective, the Renewable Energy Communities (RECs) respond to the needs of energy security and accessibility towards a clean energy economy, making urban areas more self-sufficient and therefore resilient.



This new union of users is fundamental to promote energy sustainability, bring energy consumption together with energy production, with the aim of "producing energy where there is a demand of energy" that implies a spatial component. Therefore, Renewable Energy Communities increase the integration grade between energy and spatial planning, in order to face the current urban challenges such as climate changes and catastrophic events.

In particular, the research work will focus on the construction of models and tools useful for the analysis of energy systems at urban scale with a place-based approach. The goal is to combine the technical analysis of databases with the construction of energy-spatial strategies, in order to improve the multilevel coordination between public authorities. The aim is to define policies that encourage the creation of energy communities through the studies of future scenarios which identify the most effective energy policy for different kind of territory.

NAME **Luca BERTOCCI**
E-MAIL luca.bertocci@polito.it



COURSE	XXXVI cycle - 1st year
RESEARCH TITLE	The Sweet Shipwreck. Issues of Critical Geography and Planning in the Ecological Crisis Era
TUTOR(S)	Marco SANTANGELO, Camillo BOANO

ACADEMIC CONTEXT

Brenner N., 2014. *Implosions/explosions. Towards a study of planetary urbanization*. Berlino: Jovis.
Moore J. W., 2015. *Ecologia-mondo e crisi del capitalismo*. Verona: Ombre Corte.
Assennato M., 2019. *Progetto e metropoli. Saggio su operaismo e architettura*. Macerata: Quodlibet.
Bertocci L., Panosetti G., Pirone T., Spanu G., 2020. Urbanizzazione planetaria e Covid19: nuove geografie per convivere con la natura?. *Documenti Geografici. Geografie del Covid-19*, 1, pp. 605-618.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

As many scholars and thinkers in various disciplines have shown in the last decades, western modernity has conceived the nature as an externality with respect to Society. More recently, Moore (2015) has studied the crisis of this – as he calls it – external nature. Within the urban studies there is a huge debate about the so called planetary urbanization (Brenner, 2014). Generally speaking, this variegated space of discussion reflects upon the possibility of non-binary urban theories. Namely, it search and propose research methodologies, approaches and geographical models without resorting the oppositional pair city-countryside. The Urban Political Ecology (UPE) is the sector of critical urban theory which studies this merging of the nature and the city. My research takes a stand in this theoretical framework and in the historical context of climate change.

The central assumption of my project is that a critical perspective is possible if we consider the two movements (planetary urbanization and exceeding-nature) as ambivalent. Namely, if we recognize them as both a product of neoliberalism and at the same time an opportunity for a real socialization of societies within natures or – with Moore's words – through the web of life. Therefore, with my research I propose to let those movements radically discuss some pillars of the modern urban and geographical thinking. That is, first of all, the cartographic reason and the methodological cityism it produces. Which models, approaches and theories we are in need of to critically think, imagine and act within the excess of both the city and the nature? Merging strands from radical political philosophy, critical theory, decolonial studies, urban planning and geography I will study some urban projects in Europe (Rotterdam) and elsewhere (Singapore, Georgia) which immediately deal with that excess. How is it possible a critical planning practice (Assennato, 2019) in the context of planetary urbanization and climate change?

NAME **Francesco BRUZZONE**
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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Green and Equitable Mobility: Solutions for Peripheral Areas

TUTOR(S) Federico CAVALLARO, Silvio NOCERA (IUAV)

ACADEMIC CONTEXT

Cavallaro F., Bruzzone F., Nocera S., 2020. Spatial and social equity implications for High-Speed Railway lines in Northern Italy. *Transportation Research Part A: Policy and Practice*, 135, pp. 327-340.
Bruzzone F., Scorrano M., Nocera S., 2021. The combination of e-bike-sharing and demand-responsive transport systems in rural areas: A case study of Velenje. *Research in Transportation Business & Management*, 40, p. 100570.
Bruzzone F., Cavallaro F., Nocera S., 2021. The integration of passenger and freight transport for first-last mile operations. *Transport policy*, 100, pp. 31-48.

EXTERNAL COLLABORATIONS

- Research and teaching assistant at IUAV University of Venice

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The transport sector is required to contribute to local and global sustainability objectives. Its contribution to atmospheric pollution and its de-carbonization potential have been recognized and a number of policy, programming and funding initiatives has been set up to ensure that mobility's footprint will be lower in the future. The social sustainability and equity of transport systems, instead, is a less debated topic, despite being of fundamental importance to ensure the attractiveness and livability of peripheral areas in particular. The concept of "equity" is vast and comprehends social and spatial aspects, with sociodemographic, market-related and policy factors composing a complex and indented framework with significant impacts on people's quality of life.

My research investigates social and spatial equity implications of mobility systems, with a specific emphasis on economically suffering territories, discussing the link between transport infrastructure and services, attractiveness and competitiveness at a local level, and the contribution of mobility in sharpening or alleviating societal and distributive inequality.

In the initial phases, the research explores some main aspects of the macro-topic of equity and mobility: the implications of (operational and planned) high-speed railways on excluded territories, so to understand how to guarantee equitable access to transport infrastructures; the issues of the first and last mile and the potential of passenger and freight flows integration, to enhance regional accessibility and discuss mobility's contribution to the retainment of local competitiveness, environmental and social quality as well as attractiveness for residents; and possible solutions to ensure equitable and accessible transport options to low-demand areas, initially focusing on flexible (on-demand) transport systems and sharing schemes. The general goal is to contribute to the definition of methods and tools to estimate and evaluate equity implications of different mobility projects and plans, and to highlight possible equity and accessibility enhancement strategies for different types of peripheral areas. The outcomes of the research should be useful to researchers and transport planners to foster the transition towards more sustainable, inclusive and integrated mobility as required by EU and national programs and targets and by the next-generation EU fund.

NAME **Donato CASAVOLA**
E-MAIL donato.casavola@polito.it

COURSE XXXVI cycle - 1st year

RESEARCH TITLE Governing the Metropolitan Dimension

TUTOR(S) Giancarlo COTELLA

ACADEMIC CONTEXT

Crivello S., Staricco L., 2017. Institutionalizing Metropolitan cities in Italy. Success and limits of a centralistic, simplifying approach. *Urban Research & Practice,* 10(2), pp. 228-238.
Fricke C., Gualini E., 2018. Metropolitan regions as contested spaces: the discursive construction of metropolitan space in comparative perspective. *Territory, Politics, Governance*, 6(2), pp.199-221.
De Donno M., 2019. *La riforma del governo locale nella legge Delrio: qualche riflessione cinque anni dopo*. Federalismi.it, 7.
Zimmermann K., Galland D., Harrison J., 2020. *Metropolitan regions, planning and governance*. Springer.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

The study of the metropolitan dimension constitutes one of the most complex challenges today. Metropolitan areas have always represented new paradigms for interpreting the development processes of territorial policies. The focus of this doctoral work concerns the governance of metropolitan areas within the Italian context. In particular, starting from the Delrio reform of 2014, one of the main aims is to investigate how this reform has been implemented by local and regional authorities, and to assess the impacts it has generated, its strengths and limitations, and to examine how Italian metropolitan cities actually work and how the governance of the metropolitan level is structured. Before deepening this, obviously, it will be very important to try to understand what does 'metropolitan' mean, how is this scale/level defined, according to what phenomena and criteria etc. One of the first points to be stressed is the historical moment in which the Delrio reform was born. In fact, the reform was born in a historical context in which the concept of metropolis is no longer definable and one of its main objectives was to regulate a series of contradictions that have accumulated over time in Italian cities. What is shared by all is that global metropolises, and to a certain extent also Italian ones, are in continuous evolution because they are constantly seeking a balance between the advantages deriving from urban concentration and the disbenefits it entails for those who live in them. In Italy, these imbalances are accentuated by the significant differences between the various metropolitan centres, which require careful reflection on future prospects. The law gives the metropolitan city high and 'wide-ranging' objectives, making it take on a decisive role not only in the management of services, infrastructure and networks, but also calling on it to be a promoter of economic development, an attractor of strategic investments and a generator of social cohesion. The expected results are mainly related to obtaining a comprehensive view of territorial governance and planning at the metropolitan level within the Italian context (after the Delrio reform), and through the in-depth case studies, identify policy approaches, governance system, process, that can help to develop more effective metropolitan spatial planning policy. The research project is primarily aimed at policymakers and in particular all those who gravitate around metropolitan governance.

NAME **Valerio DELLA SALA**
E-MAIL valerio.dellasala@polito.it

COURSE	XXXVI cycle - 1st year
RESEARCH TITLE	The Olympic Villages and Olympic Urban Planning. Analysis and Evaluation of the Impact on Territorial and Urban Planning (XX-XXI centuries)
TUTOR(S)	Egidio DANSERO, Francesc MUÑOZ RAMIREZ (UAB)

ACADEMIC CONTEXT

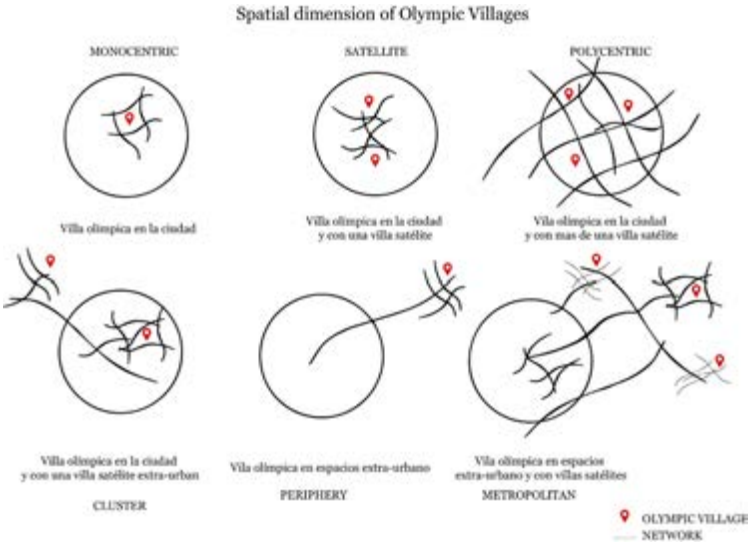
Muñoz F., 1997. *Historic evolution and urban planning typology of Olympic Village, in Hundred years of urban planning and shared experiences*, International Symposium on Olympic Villages. IOC, pp. 27-51
Chalkey B., 1999. Urban development through hosting international events: a history of the Olympic Games. *Planning Perspectives*, 14(4), pp. 369-394.
Dansero E., Segre G., Mela A., 2002. Spatial and Environmental Transformations Towards Torino 2006: Planning the Legacy of the Future, in *The legacy of the Olympic Games 1984-2000.* International Symposium Lausanne. IOC, pp. 83-92
Kovac I., 2002. The Olympic Territory: A Way to an Ideal Olympic Scene, in *The legacy of the Olympic Games 1984-2000.* International Symposium Lausanne. IOC, pp. 110-117

EXTERNAL COLLABORATIONS

- Sport Research Institute (IRE-UAB), Autonomous University of Barcelona, Olympic Studies Center Barcelona (CEO-UAB)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

One of the key elements of my work is due to the relationship between urban transformation and its future implications in the territory, promoted by Olympic urban planning. Not being fully analyzed at the academic level and observing the lack of previous and comparative studies on the subject, it is stated that, given the complexity of the subject, a theoretical framework has been formulated that pursues the following research objectives. In the first place, the territorial impact of the Olympic Games will be analyzed from a historical perspective through the contributions of Chalkey and Essex (2010), which is of fundamental importance to deepen the evolution of the developments associated to the Olympic Games. However, this analysis is incomplete in the observation of the Olympic villages and the territorial models of the works related to the Olympic event. For this reason, the contribution of Muñoz (1995) will be used, on the classification and urban analysis of the Olympic villages developed for the summer games until 1996, observing how the Olympic villages can be defined as a specific urban instrument in the territory. Affirming the importance of Olympic urbanism as a catalyst for the development of candidate cities, the study will be supported by the multidisciplinary contributions on the Olympic Games of the following authors: Preuss, 2001; Hiller, 2015; Liao and Pittis, 2006; Kassen-Noor, 2012; Gold, 2016; Andranovich, 2001. Observing the territorial impact of the Olympic villages in the city, the introduction of new models of organization and financing of the Olympic event, is considered essential in the analysis of the territorialization and deterritorialization processes linked to the territory and its transformation throughout the weather.



NAME **Juan Pablo EDWARDS**
E-MAIL juan.edwards@polito.it

COURSE XXXVI cycle - 1st year

RESEARCH TITLE Cultural Heritage for Territorial Development. Impacts of Extended Urbanization on Biocultural Heritage: Towards New Sustainable Development Strategies

TUTOR(S) Andrea BOCCO

ACADEMIC CONTEXT

Harvey D., 1996. Cities or urbanization? *City*, 1(1), pp. 38-61.
Comíns J.S., Moreno D.R., 2012. La delimitación del ámbito rural: una cuestión clave en los programas de desarrollo rural. *Estudios Geográficos*, 73(273), pp. 599-624.
Brenner N., Schmid C., 2014. The "urban age" in question. In: N. Brenner, ed. *Implosions/Explosions*. Berlin: jovis Verlag, pp. 310-337.
Leiva F., Diaz P., 2020. Patrimonialization, Territorial Development and New Governance Models. the Case of the Talca-Constitucion Railway Branch in the Maule Region, Chile. *Opera-Colombia*, (26), pp. 37-53.

EXTERNAL COLLABORATIONS

- Geoinformatics Z_GIS, University of Salzburg, Austria

HIGHLIGHTS OF THE RESEARCH ACTIVITY

In Man and Nature, George Perkins Marsh described the destructiveness of man, and how humans were subverting the balance of nature to their own detriment. Since then, the emergence of post-industrial society has been accompanied by new processes of population's settlement; the confirmation of large metropolitan areas and the spread of "urbanization" to a large part of the territory are two of its main characteristics. (Comíns and Moreno, 2012).

In the attempt to understand current dynamics of neoliberalization around the world, the literature characterizes the current stage of capital expansion as one of "accumulation by dispossession", a process that has produced new turns and displacements, placing the question of territory and environment at the center of the dispute.

This raises the need for a comprehensive look at heritage that, on the one hand, takes charge of the "biocultural" dimension of human activity, that is, the way in which communities "interact with their own local ecosystem, and with the combination of landscapes and the biodiversity contained in them, in such a way that the result is a complex and wide range of fine and specific interactions"; and, on the other, pay attention to the way in which patrimonialization policies can facilitate and enhance processes of spatial planning and territorial development, seeking to improve the conditions of well-being and quality of life of the communities that have produced and sustained the value by which certain cultural landscapes are recognized. (Leiva and Diaz, 2020)

Questioning the urban age thesis, the emphasis of the investigation is putted on assessing the influence of the latter on the Chilean legal framework; the country's current urbanization processes and the impact of this approach on long-term sustainable territorial development, understanding biocultural heritage as the manifestation of the relationship between communities and their natural surroundings, conceiving environmental sustainability as the necessary pre-condition for social and economic equilibrium.

The investigation delves into the impact of extended urbanization on biocultural heritage in Chile through case studies to be determined. The methodology will consist of filmed interviews to local population with an anthropological approach. Also, the interviews will include governmental authorities, stakeholders and policymakers.

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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Evaluation of Zero-Carbon Development Strategies for Social Housing Projects in the Post-Pandemic Context

TUTOR(S) Patrizia LOMBARDI

ACADEMIC CONTEXT

Torabi Moghadam S., Lombardi P., 2019. 'An interactive multi-criteria spatial decision support system for energy retrofitting on building stocks using CommunityVIZ to support urban energy planning'. *Building and Environment*, 163. Corburn J. *et al.,* 2020. 'Slum Health: Arresting COVID-19 and Improving Well-Being in Urban Informal Settlements'. *Journal of Urban Health*, 97(3), pp. 348–357.
Sharifi A., Khavarian-Garmsir A. R., 2020. 'The COVID-19 pandemic: Impacts on cities and major lessons for urban planning, design, and management'. *Science of the Total Environment*. Elsevier B.V., p. 142391.
Guzman L.A., *et al.,* 2021. 'COVID-19, activity and mobility patterns in Bogotá. Are we ready for a "15-minute city"?', *Travel Behaviour and Society*, 24, pp. 245-256.

EXTERNAL COLLABORATIONS

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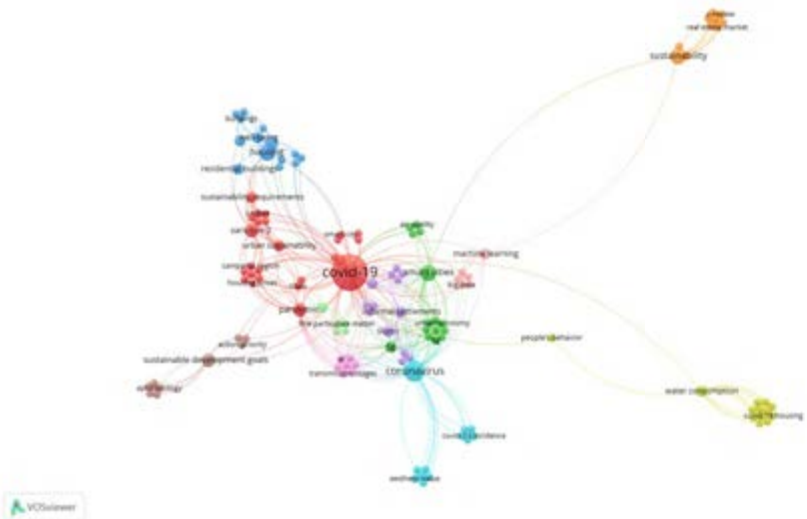
HIGHLIGHTS OF THE RESEARCH ACTIVITY

In the context of post-pandemic plans for socioeconomic recovery, housing projects and urban development projects play a key role. Several studies have been developed around the impacts of the pandemic on life in the cities at operational, organizational, and social levels (concerning their inhabitants). In this regard, different scholars have concluded that low-income people, who before the pandemic were under multidimensional high vulnerability, are part of the communities most affected by the pandemic. These people have been affected by high rates of contagion; high mortality rates due to inaccessibility or lack of infrastructure and health services; social problems such as unemployment, increased penetration of poverty in households, and mental health issues.

Some studies also highlighted that developing countries are the most affected by the effects of the pandemic and possible post-pandemic effects. These conditions support the reason why countries such as Colombia, have placed the human settlements and housing developments as a priority inside their post-covid recovery plans in the short and medium-term. In this regard, it is important to highlight the importance of these recovery projects to be framed in the sustainability agenda to "leave no one behind", considering the lessons learned from the behavior of the cities in the pandemic. In the same way, strategies must be rethought to also reach the goal of carbon neutrality in the operation, and therefore throughout its entire life cycle, aiming to achieve net-zero carbon cities.

All in all, this framework is the motivation for this research to focus on the evaluation of strategies for the development of social housing and the urban development projects that are deployed around them, through a multicriteria approach. Thus, this research aims to develop a decision support tool based on the systemic behavior of social housing plans to reach carbon neutrality and social equity in the post-pandemic context.



NAME **Allegra EUSEBIO**
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COURSE XXXVI cycle - 1st year

RESEARCH TITLE An Integrated Spatial Data Management System in Support of Emergency Management and Territorial Planning

TUTOR(S) Piero BOCCARDO

ACADEMIC CONTEXT

Giardino M., Perotti L., Lanfranco M., Perrone G., 2012. GIS and geomatics for disaster management and emergency relief: A proactive response to natural hazards. *Applied Geomatics*, 4(1), pp. 33-46.
Ajmar A., Boccardo P., Disabato F., Tonolo F. G., 2015. Rapid Mapping: Geomatics role and research opportunities. *Rendiconti Lincei*, 26, pp. 63-73.
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EXTERNAL COLLABORATIONS

- Rete SET
- Università degli Studi di Napoli Federico II

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The purpose of the research presented is to investigate on possible optimized solutions for a spatial data management system able to facilitate the integration of emergency management, disaster risk reduction policy and ordinary territorial planning.

Since their very first appearance in the early '60s, Geographical Information Systems have in fact proved to be incredible assets for geographers, planners and actors involved in territorial governance and planning thanks to the possibility of joining maps and data, make analysis on them and visualize the results which facilitate the process of territorial knowledge and management. With the technological advance of geomatics techniques, the availability and quantity of geospatial data is growing, making them an even more relevant resource for territorial governance and emergency management. This growing amount of data needs to be treated with protocols and methodologies that permits to maximize their potentialities; consequently, it is necessary to extract from those data high valued products, accurate and truthful, able to provide straightforward and never redundant information.

Considering the great fields of applications in which the use of geospatial data is gaining relevance, the present work decided to focus the attention on the implication in the emergency management area, especially applied on the Italian situation. A further objective of the research is in fact to analyse the potential link that shared databases, spatial infrastructure and optimized production model can create between two different fields of territorial governance, namely the emergency (and risk prevention) and the ordinary planning. Although the rise of disastrous events and natural exceptional phenomena is stressing the urgency of thinking about territorial planning with a special focus on methods for disaster prevention and management and risk mitigation, there is still a great gap between these areas, concerning both the stakeholders involved and the instruments used in the process. While being aware that solutions to fill this gap necessarily invest different disciplines, norms and organization, this research will try to define if and how an integrated and optimized geospatial data management system can help in this work of cooperation.

NAME Mauro FONTANA
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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Spatial Justice and Territorial Welfare: Socio-Institutional Governance for Marginalised Territories

TUTOR(S) Loris A. SERVILLO

ACADEMIC CONTEXT

Reynaud A., 1984. *Disuguaglianze regionali e giustizia socio-spaziale*. Milano: UNICOPLI.
De Rossi A., Barbera F., 2018. *Riabitare l'Italia le aree interne tra abbandoni e riconquiste*. Roma: Donzelli.
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EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

Moving from a cultural and political perspective that flips the attention from an urban-centric vision forward to a metro-rural and metro-mountain vision, the research activity works on this transition by focusing on the processes of social infrastructure and welfare of inner and marginalized areas. Moreover, the recent pandemic has highlighted some structural problems of these territories: abandonment, marginalization, and socio-spatial inequalities, which undermine the fundamental rights of citizenship also set forward in the Italian Constitution.

Over the last few years, we have also observed the crisis of the welfare systems of European nation states: austerity policies and the concentration of most political, economic and cultural attention on large urban and metropolitan areas, have left crucial territories vital to the overall functioning of a country uncovered. The results of these actions become evident in a greater rarefaction of welfare in territories the further we move away from urban areas: territories that are not necessarily economically poor but socially fragile.

The proposed research aims to develop a new understanding of socio-spatial inequalities and of welfare in marginalized territories, evaluating the experience of the National Strategy for Inner Areas (SNAI) in the Piedmont area, and in particular in the Maira and Grana Valleys sector and in the South-Western Alps of Piedmont, with a view to a reorganisation and wider implementation of the territorial strategies concerning this territory characterised by a high level of fragility and by long-lasting processes of marginalisation. The specificity of the project consists in using the SNAI experience as a starting point for a more complex reflection on the socio-spatial dynamics of the metro-mountain and metro-rural territories under analysis and on the existing multi-scalar territorial planning of the places, in order to support new socio-institutional processes of reconfiguration, new integrated strategies and new form of territorial welfare.

NAME Marika GABALLO
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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Indicators for Assessing the Sustainable Urban Development in Covid-19 Times: A SDG11 Framework Implementation Methodology

TUTOR(S) Isabella Maria LAMI, Francesca ABASTANTE

ACADEMIC CONTEXT

Bossel H., 1999. *Indicators for Sustainable Development: Theory, Method, Applications. A Report to the Balaton Group*. Winnipeg: IISD.
Hansson S., Arfvidsson H., Simon D., 2019. Governance for sustainable urban development: the double function of SDG indicators. *Area Development and Policy*, 4(3), pp. 217-235.
Abastante F., Lami, I.M., Mecca B., 2020. How Covid-19 influences the 2030 Agenda: do the practices of achieving the Sustainable Development Goal 11 need rethinking and adjustment?. *Valori e Valutazioni*, (26), pp. 11-23.
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EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

The strong impacts of the Covid-19 pandemic on cities in terms of sustainable development have led researchers to the awareness of a necessary realignment of the Sustainable Development Goals (SDGs) of the 2030 Agenda and the consequent revision of their indicators, with particular reference to SDG11 on making cities more sustainable. This awareness is also the subject of the departmental research project "QUICHE. Which measures for which policies: towards Sustainable Development Goal 11" in which this research is framed.

Focusing on the Italian pandemic context, this research considers both the three SDG11 targets investigated within QUICHE (11.1 on affordable housing, 11.3 on inclusive and sustainable urbanization and 11. A on strong national and regional development planning) and two SDG11 targets on which the pandemic in Italy had strong impacts (ISTAT, 2020) (11.2 on mobility and 11.7 on public spaces). Furthermore, as part of the current debate on spatial territorialization in providing a basis for the development of more global processes and to understand how to construct urban sustainability indicators, this research explores different existing approaches with a multi-scalar perspective, going from the neighborhood scale related to the techniques used within the Sustainability Protocols as urban sustainability assessment tools, to the broader territorial scale considering Geographic Information Systems (GIS) tools.

The research follows the general objective of investigating which analytical, technical and operational approaches can really contribute to the assessment of sustainable urban development after the pandemic. In particular, considering the identified targets, aims to understand how urban sustainability indicators are defined, as well as through which methodologies it is possible to develop furthers implementing the SDG11 assessment framework.

In terms of expected outcomes, the research could provide a framework of effective analytical approaches, operational indicators and information systems for the contingent needs of the pandemic in order to be useful for urban policy-making, as well as contribute to the ongoing debate at both international and national level on the realignment of SDG11 indicators following the pandemic. Finally, the new indicators developed through the combined use of measurement techniques and spatial tools could be used by both public administrations and researchers.

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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Mobility Patterns Definition through Data Fusion of Passengers' Travel Information and Data Analytics

TUTOR(S) Cristina PRONELLO

ACADEMIC CONTEXT

Fiorini M. *et al.*, 2015. The importance of ITS in urban movement. In: Lin J-C. . ed. *Clean mobility and intelligent transport systems*. London, England: The Institution of Engineering and Technology, pp. 1-3.
Perallos A., Hernandez-Jayo U., Onieva E., García I., 2015. *Intelligent Transport Systems: Technologies and Applications*. United Kingdom: Wiley.
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EXTERNAL COLLABORATIONS

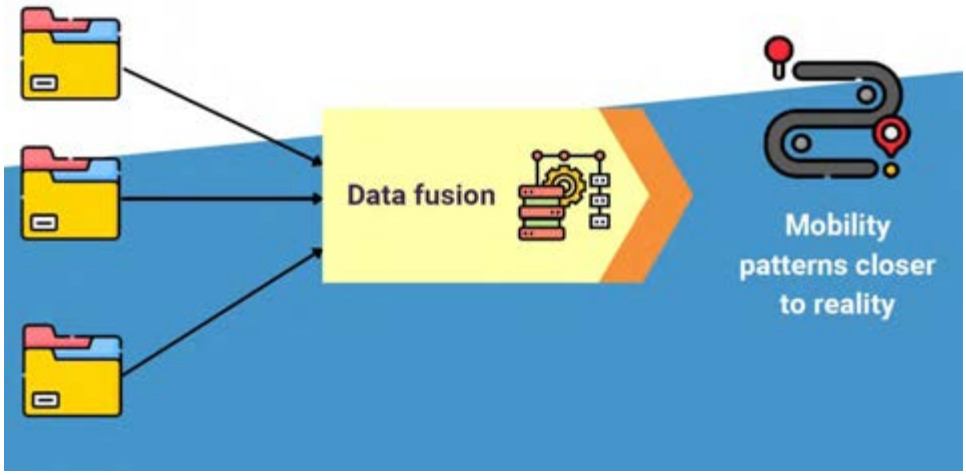
- Leonardo SpA

HIGHLIGHTS OF THE RESEARCH ACTIVITY

There have been multiple ways of collecting and understanding mobility patterns of the users. Even though the most used tools have been the traditional methods such as travel surveys by phone calls, nowadays the intelligent transport systems (ITS) implementation is bringing new technologies for both data collection and processing. Just to make a few examples, we can mention mobile app applications that automatically collect data, Geographic Information Systems (GIS) for information of the territories, diffusion of IoT devices, inception of 5G mobile network connectivity, etc. In comparison with the traditional methods, these technologies reduce the costs in data collection improving the quality of data and increasing its quantity.

Estimating mobility patterns might need information such as trip information and location collected during different periods of the day. Therefore, to analyse the best combination of factors, a good data collection from different sources and processing must be done. Since large amount of data would be collected, these datasets might be fragmented, and would not provide a full picture of the reality. Thus, new data analysis approaches have been developed to understand the important features from the data lake, and to shape its reality in a model. Here is where the big data and learning models in a data fusion context appeared.

This research is aimed to understand how much a fused dataset can provide a better insight into the intricacies of mobility patterns. Thus, the development and implementation of machine learning and deep learning algorithms might help to model mobility patterns closest to the real world.



NAME Alessio GENTILE
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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Water Pathways through the Catchments and Plants

TUTOR(S) Stefano FERRARIS

ACADEMIC CONTEXT

Kendall C., McDonnell J.J., 1998. *Isotope tracers in catchment hydrology*, Amsterdam: Elsevier
McDonnell J.J., 2014. The two water worlds hypothesis: ecohydrological separation of water between streams and trees? *WIREs Water*, 1, pp. 323–329.
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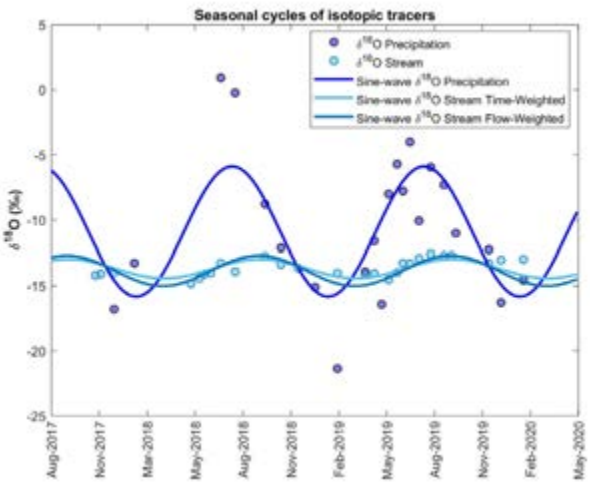
Borga M., Penna D., Paolo N., Francesco C., Ferraris S., Rigon R., Allocca C., Amin A., Bertoldi G., Brighenti S., Canone D., Cassiani G., Censini M., D'Amato C., Fabiani G., Gentile A., Marchina C., Romano N., Luisa S., Giulia Z., 2021. WATZON: the Italian network of ecohydrology and critical zone observatories, online, *EGU General Assembly 2021, 19-30 Apr 2021*.

EXTERNAL COLLABORATIONS

- WATer mixing in the critical ZONe: observations and predictions under environmental changes (WATZON)- PRIN 2017.
- Institute of Geography, University of Bern.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The use of tracers in hydrology and ecohydrology has provided new horizons for understanding the age, the origin, and pathways of water in natural environments (Kendall and McDonnell, 1998). Among tracers, stable water isotopes (18O and 2H) have been used for these aims because they are constituent part of natural water molecules (Kendall and McDonnell, 1998). They are applied naturally during precipitation events, they are conservative at ambient temperatures and only the mixing of different water sources can alter isotopic concentration (Kendall and McDonnell, 1998). In other words, stable water isotopes are the fingerprints of water. One of the most revolutionary results in hydrology has been obtained applying the isotope hydrograph separation, i.e., a conservative mixing model, that let to separate event (rainfall or snowmelt) water from pre-event (storage) water. It has showed that pre-event water discharges often make up a substantial share of streamwater (Jasechko, 2019 cum bibl.). This result raises serious questions about the knowledge of water pathways in natural environments, that is fundamental for studying catchments' dynamics, flood forecasting, pollutant contamination, nutrient loss, and water resources. Various research have been carried out to know the water transit times through the catchments, but the methods used to calculate them are still subject of debates (McGuire and McDonnell, 2006, Kirchner 2016 a, b). Tracers can also be used for evaluating the seasonal origin of streamwater and xylem water, that is crucial for realizing how water resources vary with precipitation variability (Allen et al., 2019). Stable water isotopes have long been used for understanding from where plants take up water. But what water do they use? From recent studies, "streams and trees appear to return different pools of water to the hydrosphere" (McDonnell, 2014, Evaristo et al., 2015). So, one might wonder if there is ecohydrological separation of water between streams and trees, that is well-known as the "two-water worlds hypothesis" (McDonnell, 2014). The research will be predominantly of an experimental type collecting isotopic data from Colle del Nivolet, Valsavaranche (AO) and Bussoleno (TO) sites. The general aims of the present research are to better understand how catchments store and release water and to investigate the validity of the "two water-worlds" theory in high-elevation catchments for which data are still rare.



NAME	**Lorenzo MAULONI**
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COURSE	XXXVI cycle - 1st year
RESEARCH TITLE	Inhabiting the Makeshift Space. Migrants, Urban Borders and Forms of Encampment Surrounding Tiburtina Station in Rome
TUTOR(S)	Marco SANTANGELO, Silvia ARU

ACADEMIC CONTEXT

Attili, G., 2007. *Rappresentare la città dei migranti*. Milano: Jaca Book.
Lancione, M., 2016. *Rethinking life at the margins: the assemblage of context, subjects, and politics*. London: Routledge.
Martin, D., Minca, C. and Katz, I., 2019. Rethinking the camp: On spatial technologies of power and resistance. *Progress in Human Geography*, 44(4), pp. 1-26.
Medici Senza Frontiere, 2018. *Insediamenti Informali. Marginalità sociale, ostacoli all'accesso alle cure e ai beni essenziali per migranti e rifugiati*.

EXTERNAL COLLABORATIONS

- Baobab experience Onlus, Rome

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Since the beginning of the so-called 'refugee crisis' in 2015, the general worsening of migration policies and their related bordering practices led to the rose of several forms of migrants' encampments across frontiers and cities. In Rome, such forms of makeshift spatialities became highly visible and politicized in the urban realm, where unused buildings gave refuge to many, while others dwell around the two main stations, Tiburtina and Termini. These sites do represent important hubs for these subjects, also due to an infrastructure of care (food distribution, legal support and provisional shelters) that appeared in supporting them, whether for those in transit or for those struggling to start a new life away from home.

However, cities are contested places, where eviction mechanisms and discourses of public security and decorum constantly threaten migrants' stay, and people with no options are abandoned to a life on the street. The research starts from this point, in a constant change of the field, and wants to understand how adaptive forms of inhabiting are assembled, maintained and re-produced in the urban mechanosphere. In fact, if structural conditions are undeniably producing certain conditions of marginality, micro-dynamics internal to the margins need further investigation, especially those related to migrants. The aim is to reframe sedentary migrants as urban dwellers, trying to grasp their rhythm of endurance in inhabiting Rome. What are these spaces of inhabitation telling us about the urban?

The research engages with a grounded approach of the margin, using an ethnographic inquiry of space as the main tool of investigation. The initial part of the fieldwork has started participating in a post-eviction scenario of Baobab experience in Rome, a makeshift camp nearby Tiburtina station, which sustains migrant subjects with various forms of assistance. This grounded methodology allows the researcher not only to read the interrelated dynamics of space and the multiple processes governing it, but also to establish relationships of trust and empathy with the subjects/collaborators. That becomes vital for the success of the research. The goal is to let subalterns' subjectivities emerge and speak for themselves, mapping their everyday usage of space and using life stories in order to understand how the urban is shaped.

NAME Beatrice MECCA
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COURSE XXXVI cycle - 1st year

RESEARCH TITLE The Role of Evaluation in Architectural Design:
How to Support the Development of Sustainable Architectural Alternatives

TUTOR(S) Isabella M. LAMI

ACADEMIC CONTEXT

Samset K., 2010. *Early Project Appraisal, Making the Initial Choices*. Londra: Palgrave Macmillan.
Fattinnanzi E., Acampa G., Forte F., Rocca F., 2018. La valutazione complessiva della qualità nel Progetto di Architettura, *Journal Valori e Valutazioni*, 21, pp. 3-14.
Lami I.M., Mecca B.,2021. Assessing Social Sustainability for Achieving Sustainable Architecture. *Sustainability*, 13, pp. 1-21.

EXTERNAL COLLABORATIONS

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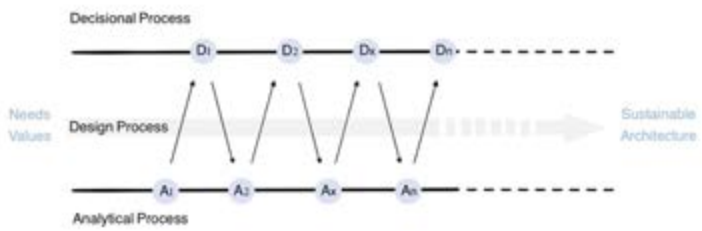
HIGHLIGHTS OF THE RESEARCH ACTIVITY

In the current climate emergency, architectural choices, together with the urban ones, need to fulfil the sustainability objectives of the Agenda2030 (United Nations General Assembly 2015), aiming at an innovative and sustainable future. These choices prove to be challenging as the architectural and urban context of reference is complex and characterised by multiple dimensions, objectives, interests, uncertainties and preferences to be considered and managed simultaneously. From the perspective of sustainable development, choices must be made as clearly as possible to orient transformations towards environmental, economic and social sustainability.

Thus, an important issue is to understand the mechanisms of value creation and therefore how architectural sustainability can be developed, measured and evaluated.

The objective of the research is to investigate the role of evaluation in the development of sustainable architectural designs and more specifically to understand how it is possible to support the development, measurement and evaluation of architectural design alternatives to make them fulfil the concept of sustainable architecture. The research intends to investigate the logic of value creation (economic, social and environmental) of the architectural transformation alternatives that will be introduced into the market, identifying possible methodological paths to support their structuring and evaluation. These paths will be the output of the research and will be identified investigating evaluation tools and soft Operational Research (soft OR). For instance: from the conceptual point of view of structuring the problem and constructing alternatives, soft OR tools such as Problem Structuring Methods (PSMs) could be useful, since, depending on the different type of tool considered, they provide more or less strong support for the problem structuring phases; from the technical perspective of the evaluation in the construction of alternatives, the analysis would be related to the evaluation approaches that can support the decision-making process from the financial, socio-cultural, environmental and strategic point of view. The potential usefulness of the methodological paths could be in the "pre-preliminary" phase of the project, supporting public and private investors in the identification of valuable and sustainable preliminary architectural scenarios.



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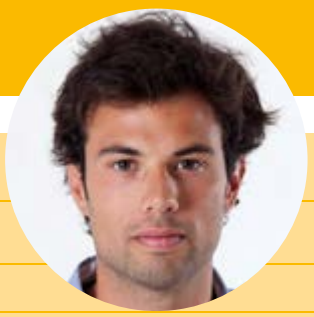

COURSE XXXVI cycle - 1st year

RESEARCH TITLE Cryosphere Processes and Hydrogeological Systems: Analysis and Interactions

TUTOR(S) Stefano LO RUSSO, Monica PAPINI, Glenda TADDIA

ACADEMIC CONTEXT

Gleick P., 1993. *Water in Crisis: A Guide to the World's Fresh Water Resources*, New York: Oxford University Press.
ISTAT, 2021. *Italia seconda in Europa per il prelievo di acqua potabile per abitante. Le statistiche dell'ISTAT sull'acqua*.
Leone G., *et al.* 2021. A hundred years of Caposele spring discharge measurements: trends and statistics for understanding water resource availability under climate change. *Stochastic Environmental Research and Risk Assessment*, 35(2), pp. 345-370.

EXTERNAL COLLABORATIONS

- Politecnico di Milano
- AINEVA
- Fondazione Montagna Sicura

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The cryosphere collectively describes all forms of frozen water at the Earth's surface such as sea ice, ice sheets, ice caps, glaciers, snow cover, river and lake ice, permafrost, seasonally frozen ground and solid precipitation. It is an important component in the context of climate change as it affects weather conditions and in turn is affected by them. Moreover, the importance of cryosphere is related to its crucial role within the global water balance, in fact, it retains almost 70% of global fresh water (Gleick, P., 1993).

Snow and ice melting in mountain area is very important actor within the hydrogeologic cycle. For instance, in our country high contribute of drinkable water come from cryosphere melting, thanks to which liquid water generated flows out through downstream springs (ISTAT, 2021).

Increasing water exploitation and climate change conditions are affecting water balance, in particular influencing pluviometric regimes and accelerating melting cycles, which lead to widespread drought and instability problems. As reported by (Leone et al., 2021), the trends of the main climate variables, rainfall, snow and temperature, have direct control over groundwater storage conditions as well as spring discharge.

This study will investigate cryosphere melting known as "wet metamorphism" under new climate condition in order to forecast evolution of hydrogeological systems to optimize water exploitation and improve early warning system of catastrophic phenomena associated to this environmental transition.

Hydrogeologic equipment will be necessary to establish new relationship between snow melting and the effective water release from the mantle. Therefore, this study will bring the attention to Aosta Valley region, where several accessible weather stations and monitored springs will ensure the comprehension of cryosphere evolution and hydrogeological processes.

In addition, technological support will enable to study physical properties of cryosphere and conditions that bring it to wet metamorphism and the release of water from the frozen layer toward the surrounding environment.

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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Spaces of Differential Sovereignty. A Geo-Historical Archive

TUTOR(S) Camillo BOANO, Angelo SAMPIERI

ACADEMIC CONTEXT

Weizmann E., Sheikh F., 2015. *The Conflict Shoreline. Colonization as Climate Change in the Negev Desert*, Göttingen: Steidl Books
Ben-Dor Benite Z., Geroulanos S., Jerr N. eds., 2017. *The Scaffolding of Sovereignty, Global and Aesthetic Perspectives on the History of a Concept*, New York: Columbia University Press.
Mezzadra S., Neilson B., 2019. T*he Politics of Operations*, Durham: Duke University Press.
Billé F. ed., 2020. *Voluminous States Sovereignty, Materiality, and the Territorial Imagination*, Durham: Duke University Press.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

This research tackles certain spatial complexities that are prompted by the contemporary condition of state sovereignty, that of an alternating waning or intensification of its powers. The aim is to illustrate these diverging conditions of state sovereignty through the influence of other forms of sovereignty, and to analyse crystallizations in space that result from the latter's agency.

This dichotomic fluctuation in power is seen as the result of three dynamics: the acceleration of late capitalism, secessionisms and the role of supranational law and organisations. These are considered to be what challenges the traditional notion and strength of state sovereignty, as well as being the forces framing pressing contemporary issues of climate change, structural technological transformations, global terrorism and cross-border migration. The research posits a conceptual and analytical register to guide the investigations: the concept of differential sovereignty, in order to describe different nuances of sovereign power which cannot be equated with that of the state alone. Due to such conditions, sovereignty emerges as a delicate and transcendental concept, which has often been confused with that of state sovereignty. The research addresses this gap.

What are the spaces produced by differential sovereignty? And what might be their political, and therefore spatial, interactions with state territory? This research sets out to apply these questions in the context of contested geographical settings: where sovereignty, territory and population are overtly disputed, and such interaction more visible.

Implicit in this research is the theory that borders are the fundamental infrastructure of sovereignty and that the redrawing of these lines, spaces and volumes ignites, and at the same is a product of, contestation.

Therefore, addressing contested settings through the spaces of differential sovereignty and their borders entails studying how they impinge on the resolution of conflict, or, in other words, whether it can be said that spaces of differential sovereignty have contributed to the de-legitimation of struggles for liberation, and thus of its spaces.

Methodologically, the research stands at the intersection of more disciplines, and it thus intends to apply mixed methods at three different scales of analysis: geomorphological mapping, spatial narratives and ethnography.

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COURSE XXXVI cycle - 1st year

RESEARCH TITLE The Role of Local and Global Energy Interconnections in the Energy Transition Framework

TUTOR(S) Piero BOCCARDO, Stefano Paolo CORGNATI (Politecnico di Torino), Maria GAETA (RSE)

ACADEMIC CONTEXT

Bridge G., Bouzarovski S., Bradshaw M., Eyre N., 2013. Geographies of energy transition: Space, place and the low-carbon economy. *Energy Policy*, 53, pp. 331-340.
Acar C., Dincer I., 2019. Review and evaluation of hydrogen production options for better environment. *Journal of Cleaner Production*, 218, pp. 835-849.
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EXTERNAL COLLABORATIONS

- RSE - Ricerca sistema energetico

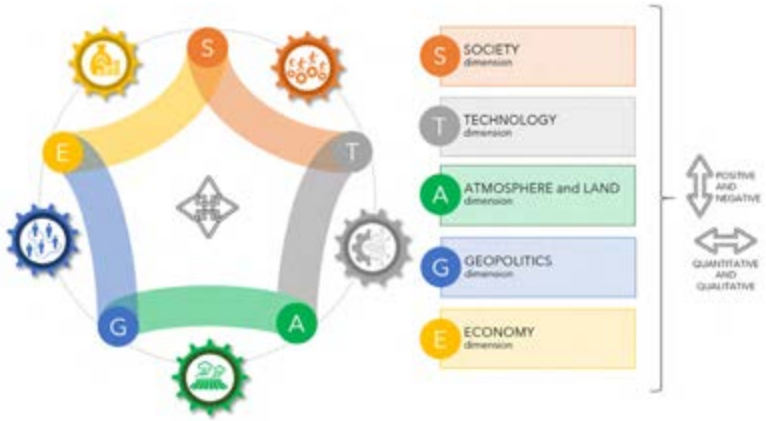
HIGHLIGHTS OF THE RESEARCH ACTIVITY

In the energy transition framework, long-term strategies play a crucial role in assessing the opportunities and challenges of the standstill of fossil fuels, the faster uptake of renewables, the exploitation of multi-energy systems, the huge infrastructure development and spread of new technologies to reach the climate neutrality target set by Europe for 2050.

The analysis of energy interconnections, from a local to a global scale, asks to face and manage not only the technical issues concerning the energy planning, but also the socio-economic, environmental, geopolitical aspects strictly related to the challenges of interest – intrinsically multi-level and multi-disciplinary – towards a strategic assessment. In a world that will be completely reshaped by decarbonization targets, through the development of new identities and priorities, the PhD research aims to identify a science-based decision-making approach to strategic planning, aiming to consider what could happen "on STAGE" (i.e. Society, Technology, Atmosphere and land, Geopolitics, Economy), if new technologies and interconnections are developed.

Ad-hoc case studies will allow the integration of different instruments, as geo-referenced data and analysis, qualitative and quantitative indicators, multicriteria decision methods, able to tackle the multi-disciplinarity of the problem and to explore and assess the influence that drivers, barriers and interferences "playing on STAGE" might have on alternative energy transition pathways. A crucial feature of the expected outcomes is related to the need of proposing clear and transparent results, aiming to fill the gap between science and stakeholders; in other words, a science-based approach in support of decision-makers must be able to provide understandable and usable knowledge, useful for policy makers to make informed decisions and to adopt real solutions for future.

Among the possible energy transition pathways, attention will be devoted to hydrogen. In particular, focusing on the uptake of green hydrogen technologies and on the potential cross-border cooperation coming from its production, transport, storage and usage, the study of possible interconnections among Italy and North African countries is a valuable opportunity to effectively develop and test an adequate multi-step methodological approach aiming to support policy makers, increase awareness among citizens and boost up the spread of new technologies, like green hydrogen.



NAME	**Caterina POZZOBON**
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COURSE	XXXVI cycle - 1st year
RESEARCH TITLE	Water, Gender and Space in Tanzania: An Intersectional Geography of Water
TUTOR(S)	Elisa BIGNANTE

ACADEMIC CONTEXT

Linton J., Budds J., 2013. The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water. *Geoforum*, 57, pp. 170-180
Masanyiwa Z. S., Niehof A., Termeer C. J., 2014. Gender perspectives on decentralisation and service users' participation in rural Tanzania. *The Journal of Modern African Studies*, 52(1), pp. 95-122.
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EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

The management of natural resources such as water in a complex continent as Africa is a relevant topic as it is connected with a broad range of dimensions including economic, political, social ones. More or less effective management systems of this resource have played and still plays a transversal role in the continent's development trajectories, contribute at some extent to the shaping of its internal and external power relations, and interact with socio-cultural values and structures. Often, the inadequate way in which water services are organized and managed can lead to issues such as irreparable depletion and destruction of the sources, but mostly to an economic water scarcity which deprives already fragile populations, communities and groups. Among these, women surely represent one of the more vulnerable categories. Therefore, the three themes this study will focus on are water, participatory management dynamics and the role of women in order to understand how unequal gender power relations spatialise and reproduce in local water management practices. Tanzania is the country on which the study will be focused; first, because it has a highly decentralized water management system, second, because it is characterised by water scarcities patterns and finally, because of my previous research activities in the area, which focused on investigating the functioning and the characteristics of rural community-based organizations responsible for water services. The research will explore the gender dynamics related to local management of water resources and the overall approach will be drawn from feminist critical geography, which values a reflection on the researcher positionality and offers interesting theoretical inputs such as the one of intersectionality. This last element would allow the study not to be blind to the variety of dimensions that contribute to define the social condition of the women in question in rural and peri-urban areas in Tanzania. The methodology adopted will be a qualitative one, specifically based on ethnographic and participatory approaches aimed at mitigating both the vertical relationship between the researcher and the participants and an extractive knowledge approach. Therefore, the aspect of power relations between the researcher and participants will be taken into consideration through a particular care of the ethical implications of the research and the choice of the most appropriated methods. These methods will include the use of documental analysis, interviews (semi-structured/ life stories), focus groups, participatory mapping, and I am also considering the employment of visual methodologies.

NAME **Mattia SCALAS**
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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Framing the Local Resilience Unit

TUTOR(S) Angioletta VOGHERA

ACADEMIC CONTEXT

Brunetta G., Ceravolo R., Barbieri C.A., Borghini A., de Carlo F., Mela A., Beltramo S., Longhi A., De Lucia G., Ferraris S., Pezzoli A., Quagliolo C., Salata S., Voghera A., 2019. Territorial Resilience: Toward a Proactive Meaning for Spatial Planning. *Sustainability,* 11(8), pp. 11-19.
Voghera A., La Riccia L. eds., 2019. *Spatial Planning in the Big Data Revolution*. Hershey, IGI Global.
Moreno C., Allam Z., Chabaud D., Gall C., Pratlong F., 2021. Introducing the "15-Minute City": Sustainability, Resilience and Place Identity in Future Post-Pandemic Cities. *Smart Cities*, 4(1), pp. 93-111.
Scalas M., Faravelli M. eds., 2021. *Strategic Planning for Resilience. A Study Experience in Copenhagen | Pianificazione Strategica per la Resilienza. Un'esperienza didattica a Copenaghen*. Torino, Politecnico di Torino.

EXTERNAL COLLABORATIONS

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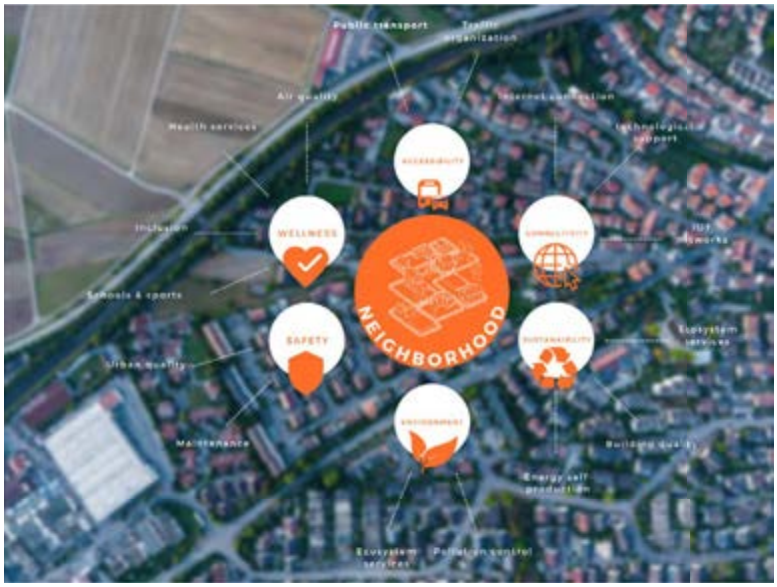
HIGHLIGHTS OF THE RESEARCH ACTIVITY

In this first year of activity, I mainly dedicated myself to the Post Un-Lock project, whose main objective is to define an ideal-typical model of spatial organization of the city, the Local Resilience Unit, based on the availability of proximity services (also ecosystems) and a strong ability to adapt. In this project I was able to explore the issue of planning for resilience from a post Covid-19 perspective, with a particular focus on the neighborhood. In fact, the pandemic has reduced the space for movement and has led us to a "rediscovery of proximity", which makes it necessary to ask ourselves how to improve neighborhoods, taking into account the general objectives established by the SDGs. In this sense, it is necessary to understand that the post-pandemic restart can act as a catalyst for a series of urban phenomena that will have to be correctly interpreted, such as smart working or e-learning. The reduction in commuting, which could persist even after the end of the emergency, makes it necessary to turn to neighborhood planning: literature offers numerous models such as the neighborhood unit, the Superblock or the 15-minute City, but with the Local Resilience Unit we want to take a step further, including in the definition of the models a resilient approach aimed at adaptation. So it is not just a question of optimal distribution of services and organization of mobility, but of the ability of the Local Resilience Unit to adapt and face the many challenges our settlements will be subjected to in the future. Some examples have been found, such as the adaptive measures developed by the City of Copenhagen. The theoretical research was carried out in parallel with two more operational projects, always in the context of planning for resilience: on the one hand, support for the analytical studies for the Mappano (TO) master plan, and on the other, support for the research center R3C for the definition of the vulnerability matrix in a case study on the Municipality of Moncalieri: in these two activities I made extensive use of GIS software. As regards the learning activities, I mainly focused on courses aimed at enhancing my software skills, with attention to the management of spatial data, databases (SQL) and coding rudiments with Python and R.



NAME **Agostino STRINA**
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COURSE	XXXVI cycle - 1st year
RESEARCH TITLE	On Logistics of Fruits and Vegetables Distribution. Spaces, Places, Actors
TUTOR(S)	Angelo SAMPIERI, Francesca GOVERNA

ACADEMIC CONTEXT

Iannone F., 2009. *Sistemi di Logistica e Trasporto per il Settore Agroalimentare in Italia, Quaderni/45*. CNR e IRAT, EnzoAlbanoEditore.
LeCavalier J., 2016. *The Rule of Logistics: Walmart and the Architecture of Fulfillment*. Minneapolis: University of Minnesota Press.
Pettenari G., Toldo A., 2018. *Il cibo tra azione locale e sistemi globali. Spunti per una geografia dello sviluppo*. Milano: FrancoAngeli.
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EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

My research investigates the spaces of fruit and vegetables large-scale distribution and focuses on the logistics system phase preceding the delivery of products to the stores.

Taking Italy as a case study, in my research I investigate two main forms of distribution spatialized in two specific areas: Mass Market Retailers (MMR, GDO in Italian) with its Distribution Centers (Ce.Di.), and the traditional distribution organized through the Agro-Food Centers. These spaces, which are heterogeneous in their size, organization, and location, constitute interesting cases not only because they occupy a space (including a physical one) that is increasingly relevant in contemporary territories, but also because they are undergoing important transformations, going beyond the specificity, and specialty, of their boundaries and organization (usually aimed at a strong increase in automation).

The aim of my work is to investigate these spaces, which appear to be crucial in the relationship between production and consumption. In my research I propose the hypothesis that precisely this centrality may play an important role in the revision of the neoliberal organization, in which the contemporary agri-food system is still inscribed. Regarding this condition, however, many rigidities and inertia persist, despite the great technical innovations and the growing demand for product quality expressed by the market. Similarly, the large, equipped platforms remain inflexible and monofunctional, impermeable to heterogeneous forms of urbanity and relationships with the spaces in which they are included.

The goal of my research is to highlight the weakest issues of the current system, rather than formulating hypotheses to solve such problems, and to identify operable spaces.

Starting from specific areas in Italy where a concentration of food distribution is in place, my attempt is to use the Ce.Di. and Agro-Food centers as "spatial devices" to understand the functioning of a territory and the practices that make it work. These spaces require different scales investigations, from the macro scale of relations and flows implied by large-scale distribution (infrastructural relations between city and countryside, urban, suburban, rural, etc.), to the micro scale of workspace (both in the logistics platform and in spaces of production and consumption that logistics activities convey).

NAME **Cristina VIANO**
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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Blockchain Tools for Civic Initiatives in the Urban Space

TUTOR(S) Marco SANTANGELO, Chiara CERTOMÀ (Università di Torino), Guido BOELLA (Università di Torino)

ACADEMIC CONTEXT

Calzada I., Cobo C., 2015. Unplugging: Deconstructing the Smart City. *Journal of Urban Technology,* 22, pp. 23-43. Ash J., Kitchin R., Leszczynski A., 2018. Digital turn, digital geographies? *Progress in Human Geography,* 42, pp. 25-43.
Balbo S., Boella G., Busacchi P., Cordero A., De Carne L., Di Caro D., Guffanti A., Mioli M., Sanino A., Schifanella C., 2020. CommonsHood: A Blockchain-Based Wallet App for Local Communities. *2020 IEEE International Conference on Decentralized Applications and Infrastructures, DAPPS 2020*, pp. 139-144.
Gloerich I., De Waal M., Ferri G., Cila N., Karpinski T., 2020. The City as a License. Implications of Blockchain and Distributed Ledgers for Urban Governance. *Frontiers in Sustainable Cities 2*, Dec. 2020.

EXTERNAL COLLABORATIONS

- University of Turin, Department of Computer Science

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The Blockchain technology offers a new paradigm for storing, validating, transferring information and values, and has recently started to be experimented in the social, public services and civic sectors. In the technical and policy debates on alternative organization and exchange models, many see its features (openness and disintermediation, transparency and immutability, trustless interactions, and the "smart contracts" that automatically execute transactions) as promising for supporting collaborative and decentralized socio-economic processes; others consider it controversial in relation to the unpredictable nature of the social exchanges.

This research focuses on emerging Blockchain initiatives in the civic domain in urban contexts. It adopts an Urban Studies perspective and a critical approach, which is relevant for exploring the potentialities and risks of the application of new digital technologies that declare the local urban contexts as their privileged focus.

The purpose is to study the mutual relationships between the technology and the socio-spatial dynamics of the local urban contexts of applications: to which extent and at which conditions these Blockchain solutions actuate their desired transformative approaches; how they keep into account the local contextual factors how they re-shape the local physical social and economic dynamics. The research addresses issues that emerge from both the digital geography literature and the literature on Blockchain, related to the novelty of the technology and the scarcity of empirical evidence on its actual societal implications.

The research originates from the researcher's work in the Computer Science Department (University of Turin) in some experimentations of civic uses of the Blockchain. Among these, a Blockchain-based wallet app will be the main case study; it aims at making the Blockchain functionalities available to citizens, by supporting social and economic exchanges in local communities.

This work will contribute to a mutual enrichment between the two disciplinary domains of Computer Science and Urban Studies. The former misses a geographical and critical analysis of the contextual factors and implications of its technology developments; the latter has not considered in depth newest technologies such as the DLTs yet. On the application level, the objective is to test a methodology for informing the technological experimentations with an iterative feedback from the urban context addressed.

NAME **Valeria VITULANO**
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COURSE XXXVI cycle - 1st year

RESEARCH TITLE Urban Green Infrastructure and Spatial Planning
A Key Driver for Regenerating the Contemporary City?

TUTOR(S) Carolina GIAIMO, Carlo GASPARRINI (Università degli Studi di Napoli Federico II)

ACADEMIC CONTEXT

Tzoulas K., Korpela K., Venn S., Yli-Pelkonen V., Kazmierczak A., Niemela J., Jame P., 2007. Promoting ecosystem and human health in urban areas using Green Infrastructure: a literature review. *Landsc. Urban Plan*., 81, pp. 167-178.
Gasparrini C., 2019. Infrastrutture verdi e blu. Una priorità nazionale per la pianificazione urbanistica e la coesione territoriale nei prossimi anni. *Urbanistica Informazioni*, 282, pp. 45-47.
Novarina G., 2020. Dalla pianificazione al progetto. La rete verde e blu a Lione. In C. Giaimo ed., Tra spazio pubblico e rigenerazione urbana. Il verde come infrastruttura per la città contemporanea. *UrbanisticaDossier* on line, 17, pp. 129-133.
Francini M., Tondelli S., Giaimo C., La Greca P., 2021. Per una riforma urbanistica: i risultati del Gruppo di lavoro Censu/Inu/Siu. *XXIII Conferenza Nazionale SIU, DOWNSCALING, RIGHTSIZING. Contrazione demografica e riorganizzazione spaziale*. Torino, 17-18 giugno 2021.

EXTERNAL COLLABORATIONS

- Università degli Studi di Napoli Federico II

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Starting with the assumption that spatial planning in Italy represents an activity of land government that serves to establish frameworks by which implement policies and identify actions and projects consistently, the general aim of the research concerns the investigation of the innovation prospects of the national spatial planning system. The traditional model can no longer be related to the Law no. 1150/1942, since the institutional background and the challenges of the contemporary city have changed considerably.

According to a new theorized epoch named "Anthropocene", where human being represents both the reason and the recipient of the pressures generated by socio-economic and environmental alterations, urban planning disciplines needs to orient itself towards new development trajectories. Covid-19 pandemic and its implications confirmed the need to ensure new feasible conditions of urbanity and well-being for citizens, especially to head urbanization processes towards an ecological transition.

In order to plan a re-urbanization of the contemporary city sustainably, the category of public spaces allocated to green areas is explored as an essential component to offer a wide range of benefits for humans and urban environment. The research focus on Green Infrastructure (GI) as a complex paradigm that has the potential to meet the multilayered quality of green areas and to 'structure' the new form and nature of the local plan.

At the international level, in addition to an extensive production of EU policies and strategies about GI, many experiences produced examples of urban-territorial regeneration. Within the scientific literature, GI's theoretical framework appears to be widespread and based on different principles, with issues to establish a unique approach. While GI finds ample space in the cultural debate in Italy, urban planning practice still struggles to concretely translate it into specific tools.

Assuming GI primarily as a spatial planning concept, the research has laid the foundations to select and explore local and international case studies on GI planning to collect a state of the art on the most recent and innovative experiences where the GI component plays a role in the city project.

The planned research developments will seek to clarify whether and how, for the foreseeable future, the strategy of GI can be one of the structuring design criterion to guide actions and policies of the urban plan towards perspectives of wellbeing, equity and environmental quality.

PAST CYCLES

XXXIII CYCLE

Vanessa ASSUMMA

Assessing the Resilience of Socio-Ecological Systems (SES) to Shape Scenarios of Transformation

Maurizio BACCI

Multi-Hazard Risk Analysis in Developing Countries under Climate Change

Andrea BARBERO

BIM Methodology tandardization for Facility Management: Data Organization, Integration and Visualization for a New Concept of Stadium

Elena BELCORE

Generation of Land Cover Atlas of Environmental Critic Zones using unconventional tools

Giacomo CAZZOLA

Back to the Roots of Socially Constructed Disaster Risk. Envisioning and Revisioning Disaster Aid and Governance

Sara CRAVERO

Sustainable Cities as Serious Games. How Games Application Can Contribute to Achieving Sustainable Urban Development

Maria Valentina DI NICOLI

The Role of the Build Environment and the Human Dimension Towards a Sustainable Energy Transition

Agata ELIA

Geospatial Data and Information in Emergency. Information for Displacement Contexts

Davide GISOLO

Water, Carbon and Energy Fluxes on Grasslands of an Alpine Region

Chiara IACOVONE

Airbnb in the Real Estate Financial Chain - Housing and Policies in Southern Europe Post-Crisis Territories

Eloy LLEVAT SOY

Spaces for Production in a Service Society

Viola MARI

Working a Way Out? Geographies of Women at the Margins

Francesca MATRONE

Deep Neural Networks for Cultural Heritage Point Cloud Semantic Segmentation

Maria Angela MUSCI

Automatic Data Extraction Using Remote Sensing for Service Robotics

Giuditta SOCCALI

The Neoliberal Heritage City between Abuse and Reclaim.Insights from Varanasi (Benares), India

Roberta TARAMINO

Consumers, City Networks and Commercial Patterns. An Investigation of Retail locations in the City of Turin, Italy

Alberto VALZ GRIS

Urban Metabolisms of the Green Transition. The Commodity Chain of Lithium-Ion Batteries from the Atacama Plateau to Zero-Emission Cities

XXXII CYCLE

László CSEKE

Securing and optimising more-than-human value production in the 'mozzarella landscape' in Italy Campania Italy

Federico DELL'ANNA

Energy and Economic Evaluations to Desig Urban Tranformation and Requalification Programs

Massimiliano GRANCERI

Mainstreaming Climate Change Adaptation into Local Planning. Insights from Barcelona and Turin municipalities

Fabio IAPAOLO

De-Individuation of the Moderm Subject in the Age of Artificial Intelligence. The case of Self-Driving Cars and Algorithms for Decision Making

Lucia LUPI

Mirroring the City Toward Web-Based Technologies to Support City Stakeholders in the Orchestration of Local Development Actions

Andrea MORA

Collective labour in practice. Infrastructures and facilities in Lima neoliberal stage of popular urbanizations

Qi MU

Built Heritage Conservartion in Perspective of Development

Maurizio PIOLETTI

Spatial governance in the Latin American and Caribbean region: a survey on metropolitan areas in Brazil, Bolivia and Cuba

Federico PIOVESAN

Spaces of Participation Commoning and the Shared Management of Urban Spaces

Leonardo RAMONDETTI

The Enriched Field. Urbanising the Central Plains of China

Niccolò RAPETTI

BIM implementation for infrastrucutre projects. Methods and tools for information modeling and management.

Pablo Angel RUFFINO

Digital built heritage: use cases of existing building through BIM-based approach

Astrid Coromoto SAFINA ALMEIDA

Beyond globalized visions .Problematizing urban theory through spatial readings of the Pearl River Delta

Francesco SEMERARO

The Building Information Modelling and Management approach for Public Contracting Authorities of infrastructure projects

XXXI CYCLE

Samantha CENERE

Making in the making. Performing new forms and spatialities of production

Merve DEMIRÖZ

Conservation of Izmir Historical City from Traditional Plans to Entrepreneurial Governance

Vincenzo DI PIETRA

Seamless Positioning and Navigation in Urban Environment

Camilla GUADALUPI

Undisciplined expertise. Reflections on an emerging profession within Tactical Urbanism

Luca LAZZARINI

Urban/rural co-productions. Planning and governance approaches for improving the relationships among city and countryside in Italy and England

Davide LONGHI

Mobility as a Service (MaaS) in suburban and rural areas: concept design and challenges

Erminia MARTINI

Power dynamics and aid governance in a post disaster context: a case study of Haiti's recovery

Valerio OPERTI

Travellers' Preferences and Attitudes to understand Travel Behaviour and define Market Segmentation

Constantin SANDU

Feature Extraction from Remotely Sensed Imagery for Emergency Management and Environmental Assessment

Diego Danilo VITELLO

Planning for the New Geography of Manufacturing

XXX CYCLE

Emere ARCO

Geomatics for Mobility Management. A comprehensive spatial database model for Mobility Management

Chiara BASILE

Making arrival, making the city. Newcomers' becoming through and with Brussels

Erblin BERISHA

The evolution of spatial planning systems in the Western Balkan Region. Between international influences and domestic actors

Amandine DUBOZ

Willingness to use real-time multimodal information to change travel behaviour. The use of psycho-social variables for the market segmentation

Benedetta GIUDICE

Ecological planning strategies for a qualitative land take

Nives GRASSO

Visibility analyses using 3D urban models generated by low-cost multi-sensor approaches

Gian Gavino PAZZOLA

The socio-spatial relations of innovative artistic production in Piedmont and Liguria

Anna Paola QUAGLIA

The politics of innovation, entrepreneurship and community as a discursive practice. Researching a startup incubator in Milan

Alys SOLLY

Spatial Planning and Well-being: a Survey on the Swiss Case

Sara TORABI MOGHADAM

A new integrated multi-criteria spatial decision support system for urban energy planning in the built environment

Francesca Maria UGLIOTTI

BIM and Facility Management for smart data management and visualization

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