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PhD in Urban and Regional Development
IN VARIETATE CONCORDIA

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INTRODUCTION

This report contains information on all the Ph.D. students enrolled in the interuniversity Ph.D. Programme in Urban and Regional Development (URD). The Ph.D. programme is hosted at the DIST, the Interuniversity Department of Urban and Regional Studies and Planning of the *Politecnico di Torino* and *Università degli Studi di Torino*.

The programme is designed to train highly qualified doctors in **socio-spatial dynamics of development**. It is offered in English and it has a **multi-disciplinary approach that combines social and technical sciences** (SSH and STEM).

The Ph.D. programme aims at attracting motivated and qualified **Ph.D. students from all over the world**, offering courses and a research environment which corresponds to the highest academic and professional standards.

The Ph.D. programme is meant to promote individual talents by providing training and research opportunities in a wide variety of scientific fields that are grouped in **three main research areas**:

- Social, economic, and political sciences.
- Spatial planning and design, sustainability assessment and urban management.
- Techniques and technologies for a spatial-based sustainable development.

Ph.D. students attend soft and hard skills courses and each student, supported by members of the Academic Board, can design a specific study plan to match their research and academic interests. The Ph. D. programme includes frequent contributions from scholars of other universities and promotes research and training activities in highly qualified institutions across the globe. As part of the programme, Ph.D. students are encouraged to organise seminars, promote events, and open the programme to the department, the academic community, and the society as a whole. The programme is based on the acknowledgement of the Ph.D. students' ambition to think beyond borders, both while completing their educational and academic training, and while searching for a job. Our Ph.D. may start an academic career or search for management positions in public or private structures, related to the planning and management of spatial transformation processes. **Career opportunities** offered by doctoral training can be summarized as follows:

- Public and private scientific research carried out at national, European, and international level.
- University education.
- Spatial and urban management in national, state, regional and local administrations.
- Employment in transports and/or environmental protection organisations.
- Construction companies, real estate market.
- Local development agencies, urban development companies.
- Engineering companies and architecture consulting and professional offices.

The Ph.D. programme is focused on topics that are developed across the three main research areas. Furthermore, such topics can be related to four **Sustainable Development Goals** (SDGs) adopted by the United Nations Member States in the Agenda 2030:



SDG 11 Sustainable cities and communities

- Urban and regional governance
- Spatial planning
- Urban studies
- Human, economic, and political geography
- Built environment
- Real estate
- Natural environment
- Landscape
- Cultural heritage
- Social innovation



SDG 13 Climate actions

- Climate change
- Sustainable land use and territorial resilience
- Risk prevention and management
- Geomatics



SDG 9 Industry, innovation and infrastructure

- Transport systems
- Building information modeling
- Big data for spatial development
- Virtual and augmented reality for spatial development



SDG 7 Affordable and clean energy

- Renewable energy and energy transition
- Water management



CONTENT

XXXV CYCLE - 3rd YEAR STUDENTS

p. 8

Martina BOCCI
Daniela DE LUCA
Karl Benjamin KRAEHMER
Marco MASSANO
Cecilia MEREGHETTI
Francesco NURRA
Carlotta QUAGLIOLO
Manuela RONCI
Federica ROTONDO (missing information)
Ornella SALIMBENE
Kibrom TEFAY (missing information)
Ingrid VIGNA

XXXVI CYCLE - 2nd YEAR STUDENTS

p. 19

Marco ALIONI
Deepan ANBARASAN
Fabio BALLATI
Simone BELTRAMINO
Luca BERTOCCI
Francesco BRUZZONE
Donato CASAVOLA
Juan Pablo EDWARDS CAREY
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Caterina POZZOBON
Mattia SCALAS
Agostino STRINA
Cristina Maria Dorina VIANO
Valeria VITULANO



XXXVII CYCLE - 1st YEAR STUDENTS

p. 44

Farzaneh ALIAKBARI
Arthur BOHN
Giorgio CAPELLO
Giulio CAVANA
Marco DEL NIBLETTO
Juri Igor FARDIN
Feiran HUANG
Redina MAZELLI
Alessandra MOSSA
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Elia SILVESTRO
Anthony SUPPA
Giorgio TOSATO
Matteo TRANE
Anna TREVES

PAST CYCLES

p. 68



XXXV CYCLE - 3rd YEAR STUDENTS

NAME **Martina BOCCI**
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COURSE XXXV cycle - 3rd 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. and Vellinga M., eds., 2006. *Vernacular Architecture in the twenty-first century*. Abingdon: Taylor & Francis.
Bocci M., in press. "Is there a future for marginal communities?" In: *HERITAGE2022 International Conference on vernacular heritage: culture, people and sustainability*. Valencia, Spain. 16-17 September 2022.
Bocci M., Mazelli R. and Bocco A., eds., in press. *Rehabilitation of traditional heritage and local development*. Torino: Politecnico di Torino, ISBN: 978-88-85745-50-6.
Magnaghi A., 2010. *Il progetto locale. Verso la coscienza di luogo*. Torino: Bollati Boringhieri.

EXTERNAL COLLABORATIONS

- Fundación Altiplano (Chile) - host for research period
- Tibet Heritage Fund (Germany, India, Mongolia); Terrachidia (Spain); Medesus (Peru); Palombar (Portugal); Dry Stone Walling School (Japan); Fondazioni Gjirokastra (Albania); Team Maruyama (Japan); Architect Aleksandar Radović Foundation (Serbia); Associazione Canova (Italy), Boulouki (Greece) – collaboration in the research

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).

Ten international associations and foundations (from North and West Africa, South-East Asia, Latin America and Southern Europe) were invited to take part in the three seminars 'Rehabilitation of traditional heritage and local development - RTHLD', which took place between 2019 and 2021. The documentation collected in the lectures and round tables, was supplemented through a systematic review of publications, websites, and social networks, and through interviews, and analysed through the use of matrices.

This horizontal and transversal analysis, summarised by the cross-cultural comparison in Bocci (in press) was combined with field research on one of the case studies, Fundación Altiplano, which has been engaged in rehabilitation work in the villages of the Arica and Parinacota highlands (Chile) for more than twenty years. The fieldwork involved participatory observation of the different activities carried out by the foundation, focusing on construction sites, and interviews with the foundation members.

To understand the socio-cultural context of reference, unstructured interviews were also conducted with some of the inhabitants of the communities who have decided to (re)live and take care of their territories and villages.

Among the aspects analysed: community dynamics and the feeling of belonging and identity; the type of heritage - minor, widespread and very often private, but with an important collective value - and the role of traditions; the organisation and structure of associations and foundations; the technical methodology adopted in the recovery interventions, with particular emphasis on the mobilisation and transmission of traditional knowledge and skills. Finally, empirical examples were sought of the generative potential that the different initiatives were able to activate.



NAME **Daniela DE LUCA**
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COURSE XXXV cycle - 3rd 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. and Vassilakis C., 2004. Virtual museums for all: employing game technology for edutainment. *Virtual Reality*, 8, pp. 96-106.
Shams L. and Seitz A.R., 2008. Benefits of multisensory learning. *Trends in cognitive sciences*, 12(11), pp. 411-417.
Younes G., Kahil R., Jallad M., Asmar D., Elhadj I., Turkiyyah G. and 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.

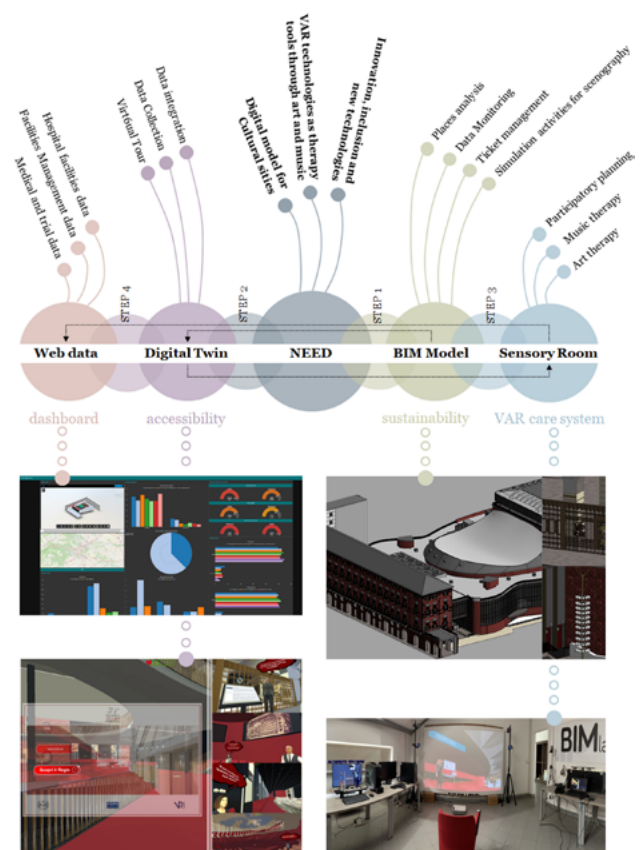
HIGHLIGHTS OF THE RESEARCH ACTIVITY

Thanks 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 technologies. 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 KRAEHMER**
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COURSE XXXV cycle - 3rd year
RESEARCH TITLE Degrowth at a global scale? Geographies of Chile's fruit production and export between extractivism and socio-ecological transformation
TUTOR(S) Marco SANTANGELO, Sofia BOZA

ACADEMIC CONTEXT

Brenner N. and Schmid C., 2015. Towards a New Epistemology of the Urban?. *City*, 19(2-3), pp.151-82.
D'Alisa G., Demaria F. and Kallis G., eds., 2014. *Degrowth: A Vocabulary for a New Era*. Abingdon: Routledge.
Krähmer K., 2022. Degrowth and the city: multiscalar strategies for the socio-ecological transformation of space and place. *City*, 26(2-3), pp. 316-345.
Massey D., 2005. *For Space*. London: Sage.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Cities depend on hinterlands where to get resources from, extending the effects of urbanisation far beyond conventional city limits. How can these relations be shaped?

This geography of fruit produced in Chile for global markets shows that these relations do not always work with the same modalities. Much of this fruit production follows the logics of extractivism, i.e. an instrumental exploitation of territories of production as surfaces to produce economic growth, in which export is a panacea for regional economies that, supposedly, need "development". But in other cases producers try to establish different ways of producing for export. The extractivist model is characterised by unbalanced power relations with large producers and multinational export and import companies,

together with supermarket chains in China, the US and Europe determining the rules of the game. Water is massively used and the longstanding drought affecting Chile's agriculture is considered only as a technical challenge. Labour is precarious, badly paid and often done by migrants and women. Pesticide use is widespread and abundant.

"Alternative" practices here are not perfect examples of a "good" model opposed to a radically "bad" one. But they try to develop alternative ways to produce and trade



that do not necessarily negate all aspects of the extractivist agro-export model but attempt to frame them differently. In different cases, people search for more sustainable ways of production in the field following the principles of agroecology. They establish different relations between producers and traders through the cooperation of small producers and following fair trade principles. And they consider export not necessarily as a panacea but rather as a possible additional source of income while actively building robust and solidary local economies. Necessarily therefore, alternative, more just and ecologically sustainable ways of agricultural production may include some production for export but with much lower volumes for export.

This analysis hints to a differentiated understanding for trajectories of change of global relational spaces in the project of socio-ecological transformation that degrowth proposes: a quantitative tendency of relocalisation of economies instead of a radical project of localism as the ultimate goal, combined with an attention to the specific qualities of how the relations in global spaces are shaped in different cases.

NAME **Marco MASSANO**
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COURSE XXXV cycle - 3rd year
RESEARCH TITLE GIS-based co-simulation platform for smart energy and renewable technologies integration in Energy Communities
TUTOR(S) Enrico MACII, Andrea LANZINI, Edoardo PATTI

ACADEMIC CONTEXT

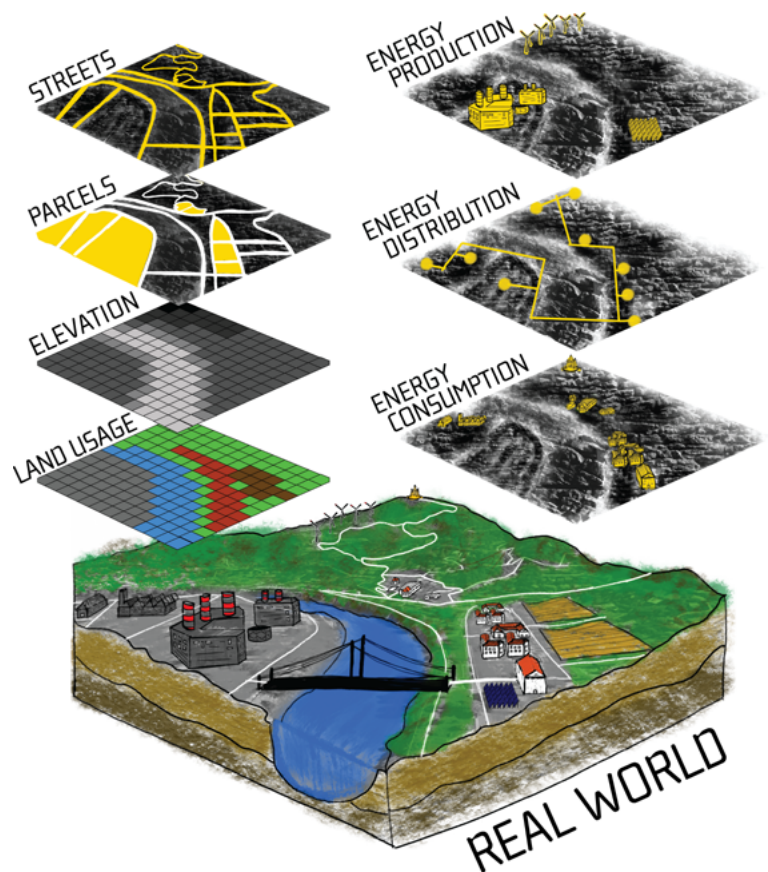
Massano M., Macii E., Lanzini A., Patti E. and Bottaccioli L., 2022. A GIS Open-Data Co-Simulation Platform for Photovoltaic Integration in Residential Urban Areas, *Engineering*, <https://doi.org/10.1016/j.eng.2022.06.020>.
Massano M., Macii E., Patti E., Acquaviva A. and Bottaccioli L., 2019. A Grey-box Model Based on Unscented Kalman Filter to Estimate Thermal Dynamics in Buildings, *2019 IEEE International Conference on Environment and Electrical Engineering (EEEIC 2019)*, Genoa, Italy, pp. 1-6.
Massano M., Patti E., Macii E., Acquaviva A. and Bottaccioli L., 2020. An Online Grey-Box Model Based on Unscented Kalman Filter to Predict Temperature Profiles in Smart Buildings, *Energies*, 13(04), p. 2097.

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 shift toward a Distributed Generation model of energy production, requiring a production system where energy is generated, stored, and consumed locally. Advanced concepts such as Renewable Energy Communities (RECs), represent micro-systems able to self-produce the renewable energy that covers their own energy needs.

In this work, we presented a methodology that integrates GIS-based PV potential assessment procedures with models for the estimation of both energy generation and consumption profiles. Our model relies on high spatio-temporal resolution, enabling accurate estimations of both production and consumption energy profiles. In particular, we created an innovative infrastructure which co-simulate the PV integration on building rooftops together with the analysis of households electricity demand. Such 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.

The proposed methodology is tested and validated within the Municipality of Turin, Italy. For the whole Municipality, we estimated both the electricity absorbed from the residential sector (simulating a realistic synthetic population), and the electrical energy that can be produced installing PV systems on building rooftops (considering two different scenarios, the former uses only rooftops of residential buildings; the latter uses all the available rooftops). The capabilities of the platform are explored, through an in-depth analysis of the obtained results. Generated power and energy profiles are presented, emphasizing the flexibility of both spatial and temporal result resolutions. Additional energy indicators are presented, regarding self-consumption of produced energy and CO2 emissions avoided.



NAME **Cecilia MEREGHETTI**
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COURSE XXXV cycle - 3rd 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.
Di Maggio P., Nag M. and 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. and Hotz S., 2015. European Capitals of Culture and Life Satisfaction. *Urban studies*, 52(2), pp. 374-394.

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 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).

The outcome of the research 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.



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COURSE XXXV cycle - 3rd year
RESEARCH TITLE Food, multiculturalism, space: a *halal* perspective
TUTOR(S) Francesco CHIODELLI, Ugo ROSSI

ACADEMIC CONTEXT

Gale R., 2007. The Place of Islam in the Geography of Religion: Trends and Intersections. *Geography Compass*, 1(5), 1015-1036.
Kong L. and Woods O., 2019. Disjunctures of belonging and belief: Christian migrants and the bordering of identity in Singapore. *Population, Space and Place*, 25(6), e2235.
Simone A., 2022, *The Surrounds*. Durham and London: Duke University Press.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The research aims to present the Muslim spaces in Turin including the non-worship ones, how they are related to each other, and their supposed secularisation. To this end, while considering the ongoing debate about secularised and sacred spaces, and the relational perspective between spaces, this study investigates the presence of official sacred spaces such as mosques in relation with unofficial sacred spaces such as *halal* butchers and kebab shops within the urban context of Turin. These spaces are investigated through photos, maps, and interviews. The results of this study indicate that the secularisation of some spaces happened within the evolution of relations between these spaces, and not because of state or local intervention. Besides, the results indicate that the sacredness of a space depends on the emotional/personal value given by space users. Does it make sense at this point to talk about secularisation if the asymmetrical power relationship between the state or local institutions and religion is lost or becomes less visible? The results of this study lead to the definition of secularisation from below. This secularisation does not occur univocally, not all spaces that are not officially religious move towards this secularisation. However, these spaces move towards this type of secularisation by following the evolution of relations with other Muslim religious spaces and not by following a regulation imposed at the state or local level. The progressive secularisation of these unofficial religious spaces, in addition to being the result of the evolution over time of relations with official religious spaces, has a relative interpretative nature, that is, those who use these spaces can interpret them as religious or differently. The attempt made with this study is to open new possibilities in the studies of religious spaces related to urban contexts by taking into account the presence of secularization by relationality. The long-time debate on secularism and secular spaces does not consider the relativity of religion and sacredness, in other words the kaleidoscopic point of view on unofficially sacred spaces is important to understand the functioning and significance of these spaces inside the urban context. They are not isolated spaces, but they become places with a meaning or a constant shifting meaning thanks to their relationship between each other and the city.



NAME **Carlotta QUAGLILO**
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COURSE XXXV cycle - 3rd year
RESEARCH TITLE **Spatial biophysical and economic assessment related to Nature-Based Solutions (NBS) for coastal Urban Climate Change Adaptation**
TUTOR(S) **Alessandro PEZZOLI, Elena COMINO, Peter ROEBELING**

ACADEMIC CONTEXT

Grêt-Regamey A., Altwegg J., Sirén E.A., van Strien M.J. and Weibel B., 2017. Integrating ecosystem services into spatial planning – A spatial decision support tool, *Landscape and Urban Planning*, 165, pp. 206-219.
Quagliolo C., Comino E. and Pezzoli A., 2021. Experimental Flash Floods Assessment Through Urban Flood Risk Mitigation (UFRM) Model: The Case Study of Ligurian Coastal Cities. *Frontiers Water*, 2021, 3:663378.
Quagliolo C., Comino E. and Pezzoli A., 2021. Nature-based Simulation to Address Climate Change-Related Flooding. Preliminary Insights on a Small-Sized Italian City. In: O. Gervasi et al. (eds.) *Computational Science and Its Applications – ICCSA 2021*. Springer Nature Switzerland AG, pp. 1-10.
Voskamp I. M. and 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.

EXTERNAL COLLABORATIONS

- University of Aveiro - CESAM – Centre for Environmental and Marine Studies (Portugal).

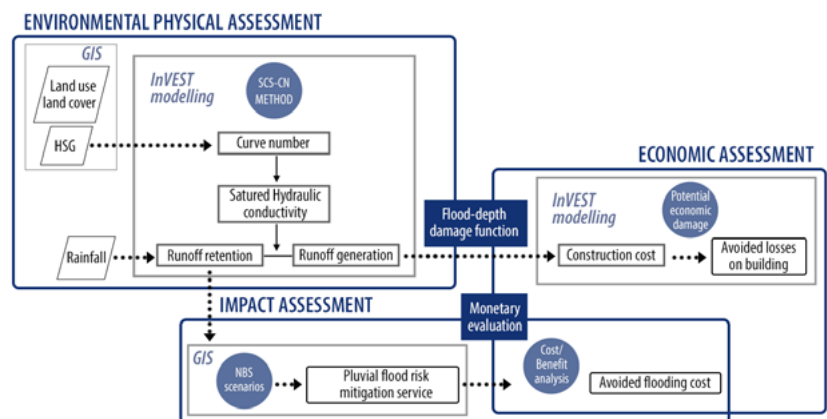
HIGHLIGHTS OF THE RESEARCH ACTIVITY

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 design 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 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. By developing a cost-benefit analysis (CBA) of Nature-Based Solutions (NBS) implemented, a monetary quantification of the best solution scenario has been performed. The expected results of this work concern the provisioning of policy implication scenarios expressed in biophysical and monetary term supporting 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 - 3rd year
RESEARCH TITLE **Urban Biodiversity: strategies for aware planning and landscape design**
TUTOR(S) **Federica LARCHER, Bianca Maria RINALDI, Andrea BOCCO**

ACADEMIC CONTEXT

Nassauer J.I., 1995. Messy Ecosystems, Orderly Frame. *Landscape Journal*, 14(2), pp. 161-169.
Prominski M., Maaß M. and Funke L., 2014. *Urbane Natur gestalten. Entwurfsperspektiven zur Verbindung von Naturschutz und Freiraumnutzung*. Basel: Birkhäuser.
Randrup T.B., Buijs A., Konijnendijk C.C. and Wild T., 2020. Moving beyond the nature-based solutions discourse: introducing nature-based thinking. *Urban Ecosystems*, 23, pp. 919-926.
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.

EXTERNAL COLLABORATIONS

- Department of Landscape Architecture of the University of Sheffield (UK), Supervised by Prof. Anna Jorgensen (host for visiting postgraduate research period, May-June 2022)

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 and aims at examining how landscape design might enhance or trigger the mechanisms regulating the development of urban biodiversity. In this sense, scholars agree that one of the major issues is to balance the needs of both human and other-than-human species. 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 mankind, towards a vision including man within nature.

The final goal of the research is to define an inventory of possible solutions able to support landscape planning and design in building spaces suitable for human recreation and wildlife conservation. To this end, a multiscale critical review of plans and projects has been developed in five European cities (Amsterdam, Berlin, Lisbon, Paris and Sheffield), where on-site surveys and interviews to different professionals were also carried out.

While conservation of biotopes, implementation of ecosystem services, and stakeholder engagement are recurring objectives of local plans, each Municipality applied a different perspective based on diverse socio-political contexts and distinct experience in urban ecology and planning.

With regards to the design case studies, four categories of open spaces representing heterogeneous urban conditions have been selected for each city: riverfronts, urban parks with a rich functional programme, urban parks mainly dedicated to passive recreation, residential or corporate micro-spaces. Each project is being analysed in terms of ecological connections with its surroundings, spatial composition, biodiversity-aimed strategies, and links with the local biodiversity plan.

The thesis 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 functions, spontaneous colonisation and temporary uses of the open spaces.



Par'k am Nordbahnhof, Berlin, June 2022 (Ph. Manuela Ronci)

NAME	Ornella SALIMBENE	
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COURSE	XXXV cycle - 3 rd year	
RESEARCH TITLE	Combination of traditional indicators of air quality with an additional traffic proxy indicator: Black Carbon	
TUTOR(S)	Andrea Maria LINGUA, Deborah PANEPINTO, Francesco PILLA, Maria Teresa B. ROMERO	

ACADEMIC CONTEXT

Salimbene O., Boniardi L., Lingua A.M., Ravina M., Zanetti M. and Panepinto D., 2022. Living Lab Experience in Turin: Lifestyles and Exposure to Black Carbon. *International Journal of Environmental Research and Public Health*, 19(7), 3866. <https://doi.org/10.3390/ijerph19073866>.

Salimbene O., Romero M.B., Pilla F., Zanetti M., Lingua A.M. and Panepinto D., 2022. Citizen Science for monitoring air pollution: Challenges and experiences from Torino Living Lab. *International Aerosol Conference, IAC 2022*, 4-9 September, Athens.

Salimbene O., Morreale S. and Pilla F., 2021. Health risk assessment and black carbon: state of the art and new prospective. *Wit Transaction on Ecology and the Environment*, 252, pp. 149-159.

Salimbene O., Salimbene I., Pilla F., Ragosta M. and Comino E. 2018. Sleep disordered breathing and relationship with Pm10. *European Respiratory Journal*, 52(62), p.423. DOI: 10.1183/13993003.congress-2018.PA423.

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 Ingeniería Industrial y Aeroespacial de Toledo.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

My research is focused on smart cities and citizen science as a useful tool for modeling urban dynamics related to air pollution. Through an empirical approach 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 different European cities.

In my research activities, I use many local scale pervasive monitoring applications in order to combine traditional air quality indicators (PM2.5-PM10) with a promising traffic proxy indicator: Black Carbon. BC is considered by the international scientific community to be a valuable additional parameter of air quality not yet regulated at European level.

Based on this evidence, I developed three pilot studies in the city of Turin, one of the Italian cities, most oppressed by smog and among the top hundred urban areas with the highest number of deaths from respiratory diseases caused by transport (ICCT, 2019). My effort is to integrate the standard data collected by the national monitoring network with the data collected by citizens using mobile sensors (environmental and clinical) to deepen the dynamics of their exposure in an urban context. This integrated and pervasive approach allows me to bring a multidisciplinary dimension to my research and to integrate social and clinical information in the co-design of the air pollutant monitoring system at local scale. Through Living Lab's activities it is possible to promote the effective implementation of the sustainable development principles of the objectives proposed by the United Nations 2030 Agenda, an action plan and local sustainable development in terms of air quality, cannot ignore the citizen involvement.



NAME **Ingrid VIGNA**
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COURSE XXXV cycle - 3rd year
RESEARCH TITLE **Forest Socio-Ecological System modelling for wildfire risk management**
TUTOR(S) **Angelo BESANA, Alessandro PEZZOLI, Elena COMINO**

ACADEMIC CONTEXT

Ascoli D., Barbati A., Colanico M., Tomao A., Colaço C., Acàcio V., Sequeira A.C., Serra M. and Plana E., 2020. Soluzioni intelligenti per la prevenzione integrata degli incendi boschivi. *Sherwood*, pp. 33-37.
Ostrom E., 2009. A General Framework for Analyzing Sustainability of Social-Ecological Systems. *Science*, 325, pp. 419-422.
Ruankaew N., Page C.L., Dumrogrjwattana P., Barnaud C., Gajasen N., Paassen A. and 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, doi:10.1080/13504500903481474.
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
- King's College London and Leverhulme Centre for Wildfires, Environment and Society (host for visiting period)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Forests play a fundamental role in providing several ecosystem services. However, climate change, together with other direct and indirect human impacts, is threatening forest ecosystems' health worldwide. Wildfires are one of the results of these pressures on the fragile ecological equilibriums. The drivers of wildfires risk are not limited to climatic and meteorological factors: the forest management techniques, the presence of tourists, the rural abandonment of some areas with the consequent ageing 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 and their interconnection with the ecological and climate factors need to be taken into consideration while addressing fire risk. Recent studies have started to assess these interactions. However, a comprehensive understanding is still needed both at the global and local levels.

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). It focuses on the role of the local community, by considering its needs and perspectives in the research process, thanks to a well-structured participatory approach.

An interdisciplinary methodology, combining qualitative and quantitative analysis, is adopted. Firstly, targeted semi-structured interviews were used for analysing the characteristics of the local Socio-Ecological System. Then, the fire behaviour was simulated through FlamMap software for assessing the fire hazard in the area. Following the Companion Modeling approach, a role-playing game about forest and pasture management in the context of fire prevention was also developed, based on an agent-based model. The game was used as an instrument for supporting the discussion among the local stakeholders. Finally, a participatory mapping activity was carried out for assessing the distribution of cultural ecosystem services in the valley. The aim of this last step was to identify important locations from an ecosystem services point of view, to which to direct potential fire prevention activities. 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 - 2nd YEAR STUDENTS

NAME **Marco ALIONI**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE (IM)MOBILE LIVES. A field research on mobilities regimes, infrastructural development and mobility justice in Brescia (Italy) and Newark (New Jersey, US)
TUTOR(S) Camillo BOANO, Antonio DI CAMPLI, Barbara BDIANI

ACADEMIC CONTEXT

Boano C. and di Campli A., eds., 2022. *Decolonizzare l'urbanistica*. LetteraVentidue.
Esperdy G., 2020. *American Autopia: An intellectual history of the American roadside*. University of Virginia Press.
Giloi E., 2020. The beauty of blight: Creating insiders and outsiders through aesthetic invectives in 1960s Newark. *Saeculum*, 70(1), pp. 117-146.
Marvi, S. and Macrorie R., 2019. Bifurcated urban integration. The selective dis- and re-assembly of infrastructures. *Urban Studies*, 56(11), pp. 2207-2204.
McFarlane C., 2021. *Fragments of the city. Making and remaking urban worlds*. University of California Press.
Sheller M., 2018. *Mobility Justice. The Politics of Movement in an Age of Extremes*. Verso.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

In 2013, the first subway line of Brescia eventually came into operation. The subway dramatically changed the urban structure of the city. Indeed, by reinforcing the axis of its corridor, the subway has been infra-structuring a system of urban centralities, configuring a socio-spatial hierarchy within the city, where the historical center and the areas within the corridor are at the top. The system is composed by *gravitational* centralities, to which both the mobility infrastructural networks of the city, as well as the flows of capitals and investments, are attracted and gravitate around. The subway can therefore be described as a *wholing force*, although it simultaneously reveals the fragmented character of the infrastructural system, materially featured by interruptions, glitches, and holes. Questions raise from this situation: how do urbanites living in the areas outside the corridor deal with the interrupted infra-structure? How do they re-route the infra-structural fragments, in order to connect themselves to the opportunities concentrated in areas from which they are infra-structurally excluded? The ethnographic research that I've been carrying out in the city suggests that urbanites develop practices of urban navigation that either manipulate or reproduce the logics of the infra-structural system, challenging the socio-spatial politics of (dis)connectivity and (dis) integration implemented through the subway. The *geometrical ecologies* produced by the exclusionary urban

structure of the city are negotiated, contested, and re-territorialized through everyday practices of urban navigation, according to routes and trajectories that socio-spatially re-map the forms of inclusion and (dis)connection to the urban fabric.

By comparing the situation in Brescia with the American city of Newark, New Jersey, several questions raise about the different conditions representing the territories for the relationships between social injustice and space to be developed. What can we learn from the similarities and differences between Brescia and Newark? What does the transformation in the urban structure through the development of mobility opportunities imply for urbanites? What forms of exclusion are emerging in Newark, and how they differ from the ones in Brescia?



NAME **Deepan ANBARASAN**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE **Impact of automation and digitalisation on the transport sector. Focus on ICT technologies and specifically APC systems' impact in the transport sector and discussing methods of improving accuracy of a proposed APC system**
TUTOR(S) **Cristina PRONELLO**

ACADEMIC CONTEXT

Li Y. *et al.*, 2020. A Case Study of WiFi Sniffing Performance Evaluation, *IEEE Access*, 8, pp. 129224-129235. <https://doi.org/10.1109/ACCESS.2020.3008533>.
Mccarthy C. *et al.*, 2021. A Field Study of Internet of Things-Based Solutions for Automatic Passenger Counting, *IEEE Open Journal of Intelligent Transportation Systems*, 2, pp. 384-401. doi: 10.1109/OJITS.2021.3111052.
Mikkelsen L. *et al.*, 2016. Public transport occupancy estimation using WLAN probing, in *Proceedings of 2016 8th International Workshop on Resilient Networks Design and Modeling, RNDM 2016*. Institute of Electrical and Electronics Engineers Inc., pp. 302-308. <https://doi.org/10.1109/RNDM.2016.7608302>.
Myrvoll T. *et al.*, 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. <https://doi.org/10.1109/ITSC.2017.8317687>.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Automation and digitalisation have seen an unprecedented increase in recent years. This process has been termed the Fourth Industrial Revolution (4IR or Industry 4.0). The high-level focus of this thesis will be on understanding the effects of automation and digitalisation caused by fourth industrial revolution with primary attention to transport sector. Specific focus of this thesis will be on a technology through which the utility of Public Transport (PT) systems and their usage is analysed – Automatic Passenger Counting (APC) systems.

A case study on APCs is done along with the different types of APCs in use now, used in the past, and that could be potentially used in the future. Then, the analysis of their impacts in terms of effectiveness, cost and accuracy will be analysed, focusing specially on the crucial aspect of accuracy. Very high level of accuracy is claimed by many APC providers in the market based on their testing conditions, but do these existing systems actually provide such a high level of accuracy in real-world scenarios is something that's not clear.

Finally, low-cost APC systems, that leverage Industry 4.0 and modern advances in automation and digitalization, are investigated to understand if the accuracy of such low-cost modern systems can be improved by modern ICT paradigms. The methodology follows a six step process.

- Information collection: a "smart-search" tool is developed to support the data collection for literature review. This section describes the tool and its use in detail and information collection through interviews with Public transport (PT) companies.
- Selection of key technology: based on the Information collection, a key modern technology is identified for further validation as an effective APC system.
- Field study: a field study is done to validate the accuracy of the existing APC systems. This section details how the field study was carried out, the data collected and the validation methodology.
- Data collection: details the methodological steps involved in preparing the database to be used for validation of the selected key technology.
- Accuracy verification and statistical analysis: performed on the constructed database to understand base accuracy and correlation.
- Accuracy improvement: to identify methods to improve the accuracy obtained for the key modern technology selected.



NAME **Fabio BALLATI**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE Automatic passenger counting and smart ticketing system analysis and evaluation in MaaS context
TUTOR(S) Cristina PRONELLO, Lorenzo CARLI

ACADEMIC CONTEXT

- Grgurević I., Juršić K. and Rajić V., 2022. Review of Automatic Passenger Counting Systems in Public Urban Transport. *Springer International Publishing*, 978-3-030-67240-9, pp. 1-15.
- Kozłak A. and Pawłowska B., 2019. Mobility-as-a-service for improving mobility in smart cities – a comparative analysis of selected cities. *Prace Naukowe Uniwersytetu Ekonomicznego We Wrocławiu*, 63, pp. 31-46.
- Olivo A., Maternini G. and 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.
- Qureshi K. and Abdullah H., 2013. A Survey on Intelligent Transportation Systems. *Middle-East Journal of Scientific Research*, 15. pp. 629-642.

EXTERNAL COLLABORATIONS

- Leonardo SpA
- MOBYFORALL S.r.l.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Mobility as a Service (MaaS) is an integrated platform enabling through a single online interface commuters to plan, book, and pay for trips needing multiple mobility providers. This new MaaS paradigm provide tools for data collection and analysis to better understand mobility needs and provide tailored information to users, as shown by recent studies in the field of Intelligent Transport Systems (ITS).

Among ITS, two tools provide a large amount of useful data for mobility patterns definition of public transport users: the automatic Passenger Counting (APC) system and the Smart Ticketing system.

The APC systems are used onboard public transport vehicles to understand vehicle load and the relevance for users of stops and routes through analysis of these data. Many different solutions have been developed. For example, weight-based systems, device-based technologies (Wi-Fi and Bluetooth), and infrared and video image recognition solutions.

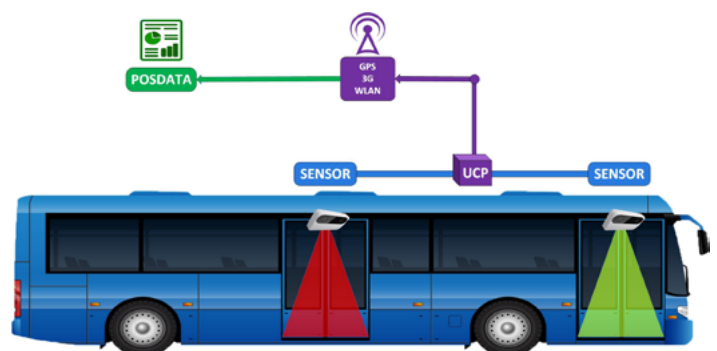
Smart ticketing aims at facilitating seamless transport of people, reducing travel time, facilitating a multimodal journey, and saving money. Quick response code (QR code), Near Field Communication (NFC), EMV payment (Europay, Mastercard, and Visa) smart ticketing technologies help transport operators and authorities to deliver a better transport ticketing service for their passengers.

In this study, both APC and Smart Ticketing systems are compared using the benchmark analysis, a structured approach developed to enhance the performance of an organization, process, or product.

After identifying the object of comparison and collecting the data, the benchmark analysis is structured in three steps: 1) identification of the criteria for characterise the systems (e.g., implemented technology, accuracy, robustness, interface, etc.); 2) definition of KPIs (key performance indicators) to allow to measure the performance of those systems and support the companies in their selection; 3) assessment of the systems according to defined criteria and KPIs.

The outcome if the research will result in two classifications that will allow companies to more easily and accurately identify which e-ticketing and APC systems to adopt, considering the constraints related to the budget they have available and the laws and rules in force in their country.

By using and merging the data from the two systems, it will be possible to obtain more detailed information that will enable the rescheduling of public transport routes with a data-driven approach.



NAME **Simone BELTRAMINO**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE **Spatial planning for energy-resilient territories and cities**
TUTOR(S) **Guglielmina MUTANI, Grazia BRUNETTA**

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. and Voghera A., 2019. Territorial Resilience: Toward a Proactive Meaning for Spatial Planning. *Sustainability*, 11(8), pp. 11-19.
De Pascali P. and 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.
Mutani G., Santantonio S., Brunetta G., Caldarice O. and Demichela M., 2021. An energy community for territorial resilience: Measurement of the risk of an energy supply blackout. *Energy and Buildings*, 240, pp. 110906.
Sharifi A. and Yamagata Y., 2016. Principles and criteria for assessing urban energy resilience: A literature review. *Renewable and Sustainable Energy Reviews*, 60, pp.1654-1677.

EXTERNAL COLLABORATIONS

- R3C – Responsible Risk Resilience Centre, Politecnico di Torino. Co-financer of the PhD grant.

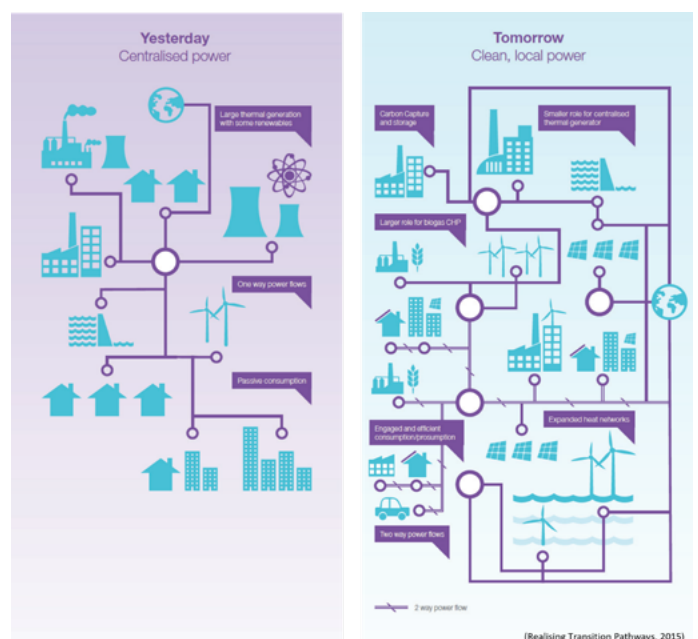
HIGHLIGHTS OF THE RESEARCH ACTIVITY

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, to mitigate climate change and 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 energy supply and demand spatial proximity. 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 promoting energy sustainability, bringing 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 are an opportunity to increase the integration grade between energy and spatial planning, to face the current urban challenges such as climate changes and catastrophic events.

In particular, the research will focus on constructing models and tools useful for analysing energy systems at an urban scale with a place-based approach. The goal is to combine the technical analysis of databases with the construction of energy-spatial strategies 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 in the framework of territorial resilience.



(Realising Transition Pathways, 2015)

NAME **Luca BERTOCCI**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE **Territories of exodus. Urban ambivalences under the ecological crisis**
TUTOR(S) **Marco SANTANGELO, Camillo BOANO**

ACADEMIC CONTEXT

Arboleda M., 2020. *Planetary Mine: Territories of Extraction Under Late Capitalism*. New York: Verso Books.
Brenner N., 2014. *Implosions/Explosions: Towards a Study of Planetary Urbanization*. Berlino: Jovis.
Moore J., 2015. *Ecologia-mondo e crisi del capitalismo*. Verona: Ombre Corte.
Negri T., 2007. *Dalla fabbrica alla metropoli*. Roma: Datanews.

EXTERNAL COLLABORATIONS

- PortCityFuture (<https://www.portcityfutures.nl/home>)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Many authors (Moore, 2015; Arboleda, 2020) have highlighted the relationship of co-production between climate change and planetary urbanization under the pressure of capitalist and colonial political-economic forces. Regarding the ecological crisis, I particularly focus on one aspect: flooding risks due to sea level rising or river overflowing. I propose to read those symptoms as the exceeding, hyper-objectual self-showing of non-human natures. As far as planetary urbanization is concerned, I am interested in the overcoming of the city as an ideology and a practice (Brenner, 2014). These two movements – beside being cause, result and mean of the neoliberal production of space – also radically question its colonial matrix of power by producing what I call “territories of exodus”. Uncertainty and excess are the main characteristics of such territories in the movement, where the non human surplus fosters and produces the human one. At this point, I suggest that a critical reading of climate change as an emancipatory opportunity is possible. Specifically, I study the design thinking and some water management plans developed where, materially, the natural excess produces relevant urban transformations. In particular, I focus on the Netherlands, where rising sea levels and river’s water radically challenge and transform urban geographies. Projects of floating urbanization at different scales are considered, as well as some national strategic planning programs of sea and rivers water management. Some of the specific projects they are composed of are also taken into account. In depth interviews have been and will be conducted with members of landscape architecture firms involved in such projects and with members of the governmental department for water management. This research does not elaborate upon the possibility of a new metabolism between society and nature. It instead explores – through the concept of exodus proposed by Negri (2007) – how climate change could be an opportunity for thinking emancipation (and urbanization) in the web of life. Basic assumption of my research is that planetary urbanization embodies both (human and non-human) exploitation and the exodus from it. Main attempt is to use urban political ecology and critical urban geography to study how some dutch planning strategies and the territories they produce fall into this ambivalence. Theoretical aim is to build a bridge between critic in geography and critic in planning.



NAME **Francesco BRUZZONE**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE Green and equitable mobility: solutions for peripheral areas
TUTOR(S) Federico CAVALLARO, Silvio NOCERA

ACADEMIC CONTEXT

Bruzzo F., Cavallaro F. and Nocera S., 2021. The integration of passenger and freight transport for first-last mile operations. *Transport Policy*, 100, pp. 31-48. Available at: <https://doi.org/10.1016/j.tranpol.2020.10.009>.
Cavallaro F., Bruzzone F. and 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.
Cavallaro F., Bruzzone F. and Nocera S., 2022. Effects of high-speed rail on regional accessibility. *Transportation* [Preprint]. Available at: <https://doi.org/10.1007/s11116-022-10291-y>.

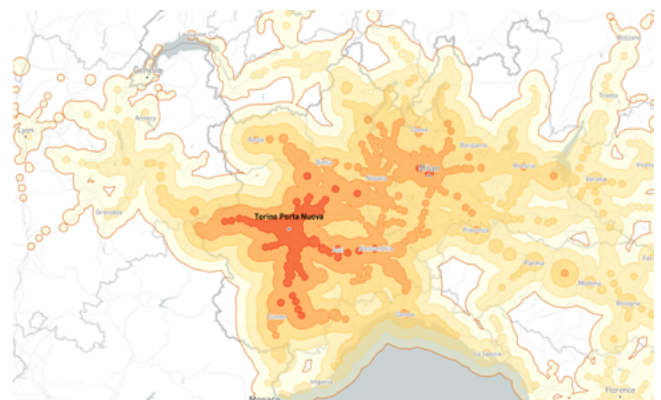
EXTERNAL COLLABORATIONS

- 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.

The transport sector plays a fundamental role in ensuring the achievement of sustainability goals at global and local level. Mobility, now greatly contributing to the pauperization of resources, can instead be one of the main drivers for global progress towards the greener and more equitable urban world imagined by the United Nations' Sustainable Development Goals. The concept of equity within the transport sector has often been addressed as the study of accessibility and cohesion; however, the study of the link between equity and sustainability in transport still leaves wide open research gaps. In my work, I discuss transport equity, exploring the amplitude of the concept and its practical implications for transport planning and policymaking. 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. In its first sections, then, 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. Moving on, I then highlight the link between transport equity and sustainable development, and explore methods for assessing equity implications of transport projects and plans, in particular within the urban sustainability framework. Finally, through a selection of case studies, I estimate and evaluate equity implications of different mobility projects and plans, as well as 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 (urban) mobility as required by global, EU and sectorial strategies.



NAME **Donato CASAVOLA**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE **Characters in search of an author. Unfolding the territorial governance of Italian Metropolitan Cities**
TUTOR(S) **Giancarlo COTELLA**

ACADEMIC CONTEXT

Crivello S. and Staricco L., 2017. Institutionalizing Metropolitan cities in Italy. Success and limits of a centralistic, simplifying approach. *Urban Research & Practice*, 10(2), pp. 228-238.

De Donno M., 2019. La riforma del governo locale nella legge Delrio: qualche riflessione cinque anni dopo. *Federalismi.it*, 7/2019.

Fricke C. and 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.

Vinci I., 2019. Governing the Metropolitan Dimension: A Critical Perspective on Institutional Reshaping and Planning Innovation in Italy. *European Journal of Spatial Development*, 17(1), pp. 1-21.

Zimmermann K., Galland D. and Harrison J., 2020. *Metropolitan regions, planning and governance*. Springer.

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. 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. 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. Comparing the 14 Italian metropolitan cities, the picture that emerges is one of absolute heterogeneity. Heterogeneity in demographic size, economically, socially, territorially and in terms of planning instruments. In order to adequately investigate three contexts that are different from each other but with elements that are useful to each other, the choice of case studies fell on the Metropolitan City of Turin, the Metropolitan City of Bari and the Metropolitan City of Bologna. The research project is primarily aimed at policymakers and in particular all those who gravitate around metropolitan governance.



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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE Cultural heritage for territorial (sustainable) development
TUTOR(S) Andrea BOCCO, Carlos MAILLET

ACADEMIC CONTEXT

Antrop M., 2006. Sustainable landscapes: contradiction, fiction or utopia?. *Landscape and Urban Planning*, 75(3-4), pp. 187-197. <https://doi.org/10.1016/j.landurbplan.2005.02.014>.
Brenner N. and Katsikis N., 2020. Operational Landscapes: Hinterlands of the Capitalocene. *Architectural Design*, 90(1), pp. 22-31. <https://doi.org/10.1002/ad.2521>.
Katsikis N., 2016. From Hinterland to Hinterglobe. Urbanization as geographical organization. Harvard GSD.
Rees W. and Wackernagei M., 1996. Urban Ecological Footprints: Why cities cannot be sustainable and why they are a key to sustainability. *Environmental Impact Assessment*, 16, pp. 223-248. [https://doi.org/10.1016/S0195-9255\(96\)00022-4](https://doi.org/10.1016/S0195-9255(96)00022-4).

HIGHLIGHTS OF THE RESEARCH ACTIVITY

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. As urbanization becomes generalized and globalized, the condition of geographical interdependence tends to integrate the whole used area of the planet (Katsikis, 2016).

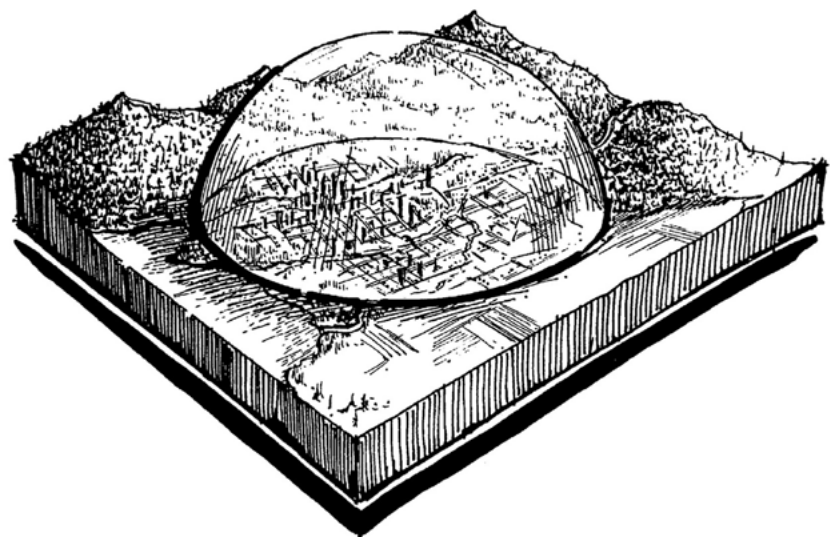
Contemporary cities and industrial regions depend on a vast and increasingly global hinterland of ecologically productive landscapes for survival and growth. Perhaps the most important insight from this is that no city or urban region can achieve sustainability on its own. Regardless of local land use and environmental policies, a prerequisite for sustainable cities is sustainable use of the global hinterland (Rees and Wackernagei, 1996).



As they are embedded within global supply chains, hinterlands lose their articulation to specific zones of direct consumption (Brenner and Katsikis, 2020). Therefore, sustainability needs to be understood in the context of the irreversible processes of urbanization and globalization.

Noteworthy, urbanization is not any more limited to a process that mostly transforms agricultural land, or natural landscapes into urban land by spreading out its dense built fabric. This is just one of the effects urbanization has upon the landscape. What is more important to unpack is how urbanization is transforming the landscapes of its broader hinterland, a transformation that in this way becomes part of the urbanization process (Katsikis, 2016).

My investigation delves in the contribution of cultural heritage preservation to the hinterlandscape articulation, as mean for a sustainable development, seeking to enhance the autonomy of these urban-supporting geographies.

The interaction between nature and culture is considered here as an essential characteristic of landscapes and their preservation fits in the framework of the protection of cultural and natural heritage. Although the concept of sustainable landscapes could be viewed as an utopian goal because the contradiction with their chronic instability (Antrop, 2006), the opportunities presented by a landscape based approach mark out the landscape as a possible new paradigm for new development models, with the aim of harmonious integration of social, economic and environmental factors in space and time (Agnoletti, 2014).



NAME	Allegra EUSEBIO		
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COURSE	XXXVI cycle - 2 nd year		
RESEARCH TITLE	A multi-hazard redefinition of the Limit Emergency Condition in Civil Protection Emergency plans. Introducing structural element in emergency planning		
TUTOR(S)	Piero BOCCARDO, Mario CERASOLI		

ACADEMIC CONTEXT

Alexander D., 2002. *Principles of emergency management and planning*, Edinburgh: Terra Publishing, Dunedin Academic Press Ltd.
 Atun F., 2014. Understanding effects of complexity in cities during disasters. In: C. Walloth, J.M. Gurr & J.A. Schmidt, eds, *Understanding Complex Urban Systems: Multidisciplinary Approaches to Modeling. Understanding Complex Systems*, Springer, pp. 51-65. https://doi.org/10.1007/978-3-319-02996-2_4.
 Ioannilli M., 2013. Pianificazione dell'emergenza e prevenzione strutturale del rischio: Il ruolo della CLE. *Urbanistica Dossier*, 130, pp. 31-34.

EXTERNAL COLLABORATIONS

- National Department of Italian Civil Protection – host for research period

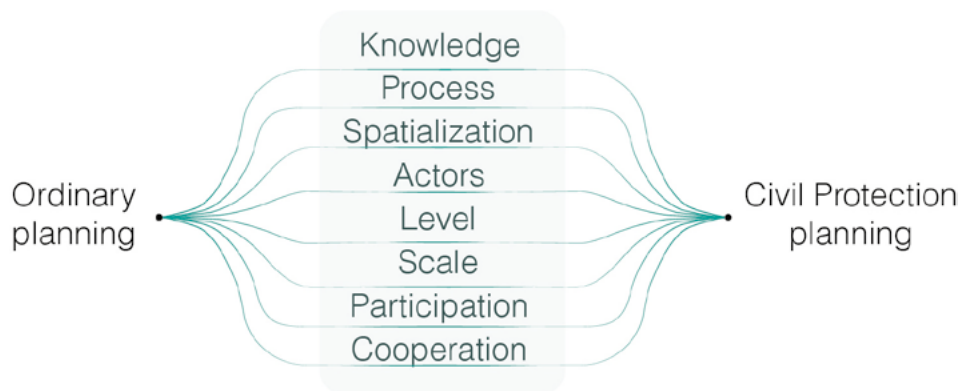
HIGHLIGHTS OF THE RESEARCH ACTIVITY

The research work here presented focus the attention on the Civil Protection Emergency plan and the instrument of the Limit Emergency Condition, framing the topic in the general discourse about the integration between ordinary planning, risk mitigation practices and emergency planning. Although being strictly related in fact, these three aspects of planning are seldom treated as integrated subject, even if their relevance when it comes to risk reduction is globally acknowledged.

As for the Italian situation, the issue of Disaster Risk Reduction is in charge of the Civil Protection, together with the other actor and stakeholder involved in ordinary territorial governance. In practice however, this relation is still unsolved, partly because of a complex definition of roles and competencies, but also because civil protection plans often struggle in going beyond the mere identification of emergency management procedure. They lack a dynamic and transformative vision of the territories and make difficult the identification of structural elements, able to create the connection with ordinary instruments of planning.

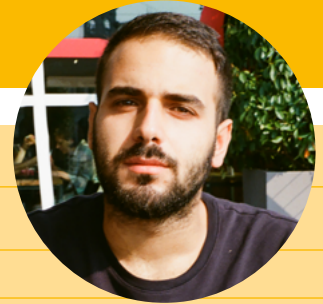
This need for structurality might be partially complied with the help of the Limit Emergency Condition (LEC), an instrument able to provide a systemic understanding of the risk resistant structure of an urban settlement. Therefore, recognizing pros and cons of the actual configuration of the LEC, the present work aims at deepening its strength, reinterpreting it with a multi-hazard perspective.

The project will be developed coupling theoretical and empirical work. It comprehends a period of collaboration with the National Department of the Civil Protection, in which it will be possible to follow a national training exercise on seismic and tsunami risk in the Straits of Messina. This occasion appears extremely interesting from several points of views. From an empirical one, it offers the possibility to



investigate on the risk-resistant structure of the coastal urbanization of the Calabria region, exploiting and exploring all the possibility offered by and optimized use of geographical information and spatial data. From the theoretical one, starting from a practical application, the research intends to re-define the concept of the Limit Emergency Condition, with a multi-hazard and structural characterization, in order to make possible the integration of emergency planning elements into territorial planning practices.

NAME **Mauro FONTANA**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE **Welfare and services accessibility in marginalised territories: issues, challenges, and perspectives. An investigation in the Province of Cuneo**
TUTOR(S) **Loris A. SERVILLO**

ACADEMIC CONTEXT

De Rossi A. and Barbera F., 2018. *Riabitare l'Italia le aree interne tra abbandoni e riconquiste*. Roma: Donzelli.
Fontana M. and Servillo L.A., 2022. Marginalised Territories, Local Development and Spatial Imaginaries: The Case of Terres Monviso. *Fuori Luogo Rivista di Sociologia del Territorio, Turismo, Tecnologia*, Under review.
Servillo L.A. and Fontana M., 2021. Il welfare in sezione: nuovi ambiti politici, funzionali e istituzionali. In A. De Rossi, F. Barbera, *Metromontagna. Un progetto per riabitare l'Italia*. Roma: Donzelli, pp. 101-125.

EXTERNAL COLLABORATIONS

- Municipality of Saluzzo (CN), February 2022 – July 2022.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

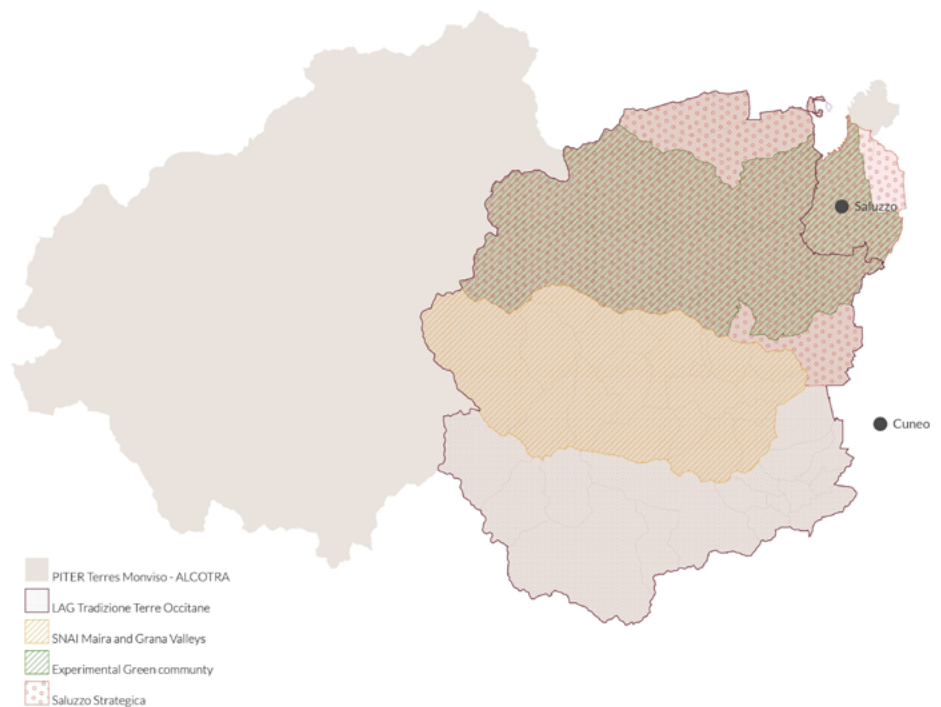
The research focuses on marginalised territories, within a larger cultural and political context that aims to flip the attention from an urban-centric vision to a vision that focuses on all territories kept on the margins of major transformation processes. Moreover, the recent pandemic has highlighted some structural problems in these territories: abandonment, marginalization, and socio-spatial inequalities, which undermine the welfare and services accessibility and the fundamental "citizenship rights".


The research investigates spatial disparities, how these have affected the right to citizenship and welfare and services accessibility, and the policy and governance responses to reduce spatial disparities.

The aim focuses on three aspects: firstly, the issue of spatial disparities in terms of spatial justice, and territorial welfare; secondly, the territorial governance, the hard and soft spaces and the experimental governance; finally, the role of spatial imaginaries in policy-making and vice versa.

The research is investigating a marginalised rural and mountain territory South-Western Alps of Piedmont as a case study to evaluate the experience of the National Strategy for Inner Areas (SNAI) 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 and strategic and policy dynamics affecting the territory, with the aim to support integrated strategies and policy implementation for a new form of welfare and services accessibility.



NAME	Marika GABALLO		
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COURSE	XXXVI cycle - 2 nd year		
RESEARCH TITLE	Localizing the 2030 Agenda: an analytical approach to operationalise SDG11 indicators		
TUTOR(S)	Isabella M. LAMI, Francesca ABASTANTE		

ACADEMIC CONTEXT

Abastante F., Lami I.M. and Gaballo M., 2021. Pursuing the SDG11 targets: The role of the sustainability protocols. *Sustainability*, 13(7). <https://doi.org/10.3390/su13073858>.

Abastante F. and Gaballo M., 2022. Assessing the SDG11 on a Neighborhood Scale Through the Integrated Use of GIS Tools. An Italian Case Study. In: F. Calabrò, L. Della Spina, M.J. Piñeira Mantiñán, ed. *New Metropolitan Perspectives*. Switzerland: Springer Cham, pp. 957-967. https://doi.org/10.1007/978-3-031-06825-6_91.

Bossel H., 1999. *Indicators for SD: theory, method, applications*. Winnipeg, Canada, Manitoba: International Institute for SD.

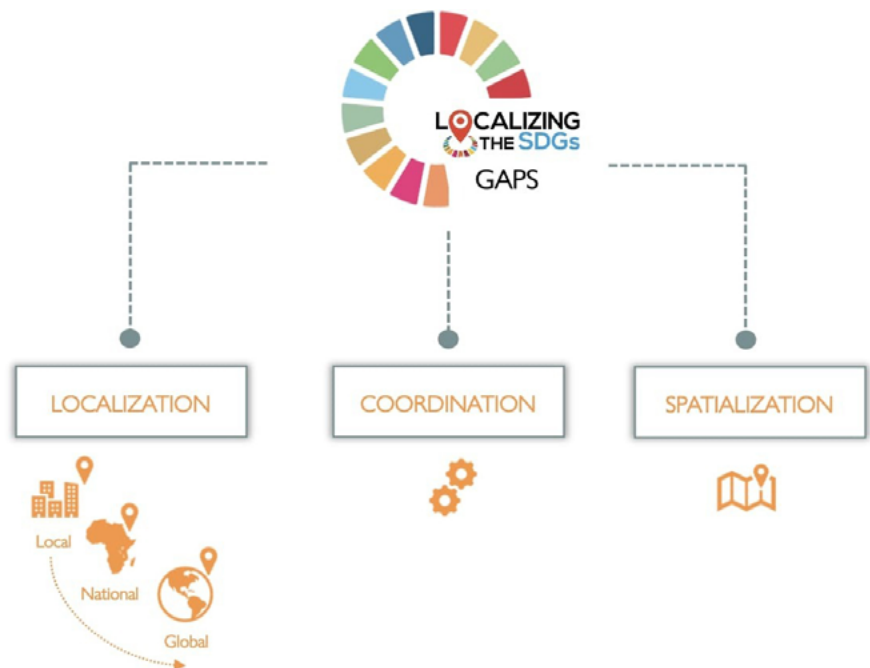
European Commission, Joint Research Centre, Coll Aliaga E., Irving A., Pacheco Oliveira M., et al., 2021. *Building urban datasets for the SDGs: six European cities monitoring the 2030 Agenda*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2760/510439>.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Achieving the Sustainable Development Goals (SDGs) of the 2030 Agenda can be done through spatial planning that considers complex processes involving indicators designed to measure progress (Cavalli, 2018). The importance of localizing the SDGs framework is emphasized in such processes, implying a current debate on subnational reporting in the pursuit of the 2030 Agenda in view of supporting spatial territorialization (Siragusa et al., 2021). Currently, territorial actions are based on prior assessments that do not sufficiently consider formal and spatial outcomes in terms of the sustainability of the evaluated interventions (Fusco Girard, 2000).

Considering the national context, the research focuses on 4 targets of SDG11 that address the most problematic issues in the last decade (UN-Habitat 2020; ISTAT 2021): i) housing and basic services (target 11.1); ii) public transport (target 11.2); iii) sustainable urbanization and civic participation (target 11.3); iv) public space (target 11.7). Considering the 4 targets and with respect to the broader context of localization of the 2030 Agenda, the research aims to develop a critical study and reasoning with respect to the operationalization of the SDG11 framework by considering the sustainability assessment of spatial outcomes of land-based interventions.

The research pursues the objective through: a theoretical phase by framing the state of the art of planning implementation tools and developing theoretical insight into the evaluative role of indicators and Geographic Information Tools (GIS) with respect to spatial planning; a second analytical phase delving from a theoretical and operational point of view into Neighborhood Sustainability Assessment Tools (NSATs) in the orientation of spatial planning, highlighting their correlations with SDG11; an ongoing empirical-exploratory phase, testing the integration of GIS tools into NSATs in the pursuit of SDG11, considering the city of Turin with respect to the Italian context. Future research developments include an experimental-operational phase based on the results obtained.



NAME **Ximena Rocio GARZON RUIZ**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE Data fusion for mobility pattern analysis and APC evaluation protocol definition: A case study
TUTOR(S) Cristina PRONELLO

ACADEMIC CONTEXT

Iliopoulou C. and Kepaptsoglou K., 2019. Combining ITS and optimization in public transportation planning: state of the art and future research paths. *European Transport Research Review*, 11(1), pp. 1-16. <https://doi.org/10.1186/S12544-019-0365-5>.
Lau B.P.L. et al., 2019. A survey of data fusion in smart city applications. *Information Fusion*, 52, pp. 357-374. doi: 10.1016/J.INFFUS.2019.05.004.
Mccarthy C. et al., 2021. A Field Study of Internet of Things-Based Solutions for Automatic Passenger Counting. *IEEE Open Journal of Intelligent Transportation Systems*, 2, pp. 384-401. doi: 10.1109/OJITS.2021.3111052.
Meng T. et al., 2020. A survey on machine learning for data fusion. *Information Fusion*, 57(2), pp. 115-129. doi: 10.1016/j.inffus.2019.12.001.

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.

For instance, 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.

Therefore, tools like automatic passenger counting (APC) systems have been developed based on the latest technologies and have been offered to transport companies as



a way to create indicators to measure their performance. However, there are no protocols or specifications that guide transport companies to choose the right system for them, leading to sub-optimal systems application.

For estimating mobility patterns, a large amount of data must be collected from different sources. 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. Additionally, the research also intends to comprehend and create guidelines to support transport companies in evaluate and choose better suited APC systems for them.

NAME **Alessio GENTILE**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE **Understanding catchments functioning using stable water isotopes:
a focus on young water fraction**
TUTOR(S) **Stefano FERRARIS**

ACADEMIC CONTEXT

Borga M., Penna D., Nasta P., Comiti F., 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., Stellato L. and Zuecco G., 2021. WATZON: the Italian network of ecohydrology and critical zone observatories. In: *EGU General Assembly 2021*, online, 19-30 Apr 2021, <https://doi.org/10.5194/egusphere-egu21-16287>.

Gentile A., Bevilacqua I., Canone D., Ceperley N., Gisolo D., N'Sassila M., Previati M., Zuecco G., Schaeffli B. and Ferraris S., 2022. Seasonal compartmentalisation of water in a grassland at 2600 m a.s.l. In: *EGU General Assembly 2022*, Vienna, Austria, 23-27 May 2022, <https://doi.org/10.5194/egusphere-egu22-9190>.

Kendall C. and McDonnell J.J., 1998. *Isotope tracers in catchment hydrology*. Amsterdam: Elsevier.

Kirchner J.W., 2016. Aggregation in environmental systems-Part 1: Seasonal tracer cycles quantify young water fractions, but not mean transit times, in spatially heterogeneous catchments. *Hydrology and Earth System Sciences*, 20, pp. 279-297, <https://doi.org/10.5194/hess-20-279-2016>.

EXTERNAL COLLABORATIONS

- Institute of Geography, University of Bern, Bern, Switzerland
- School of Architecture, Civil and Environmental Engineering, EPFL, Lausanne, Switzerland

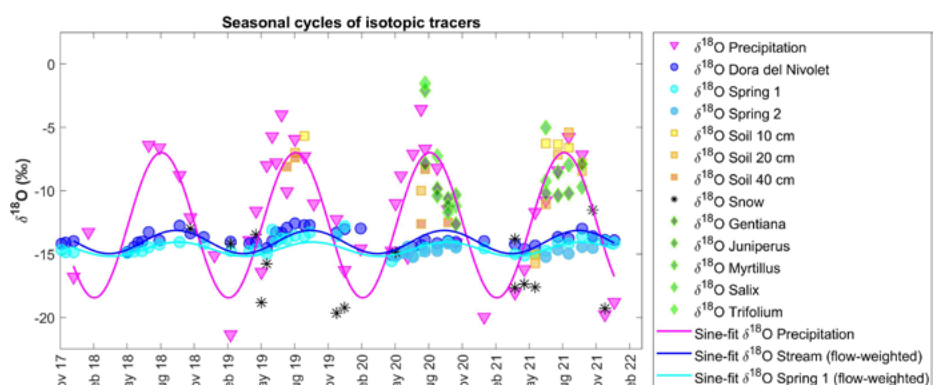
HIGHLIGHTS OF THE RESEARCH ACTIVITY

The use of tracers in hydrology and ecohydrology allowed giant steps forward for understanding the age, the origin, and pathways of water in natural catchments. Among conservative tracers, stable water isotopes have been used for these aims because they are natural constituent of water molecules. 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. 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.

The young water fraction, i.e., the fraction of water with transit times of less than roughly 2-3 months, has recently aroused great interest among the hydrology community. It can be easily estimated using isotope seasonal cycles in precipitation and streamwater and allows to study both floods and drought, with application also regarding drinking water.

In high and steep mountain environments isotope seasonal cycles generally revealed low young water fractions. This is a counterintuitive result since the presence of the exposed bedrock and steep landscapes are expected to promote high water velocity. Therefore, it remains basically unclear the hydrological processes hidden behind this result. Among different factors, we investigate the role of groundwater aquifers in streamflow generation processes of 27 study catchments clarifying this unexpected result.

Isotope seasonal cycles allow to simply estimate an average value of the young water fraction. However, it is important to investigate the non-stationary behavior of this quantity according to different catchments wetness conditions that are reflected in stream discharge. We couple the easily obtainable high-resolution electrical conductivity measurements with stable water isotopes developing a promising method, tested for three small Swiss catchments, for estimating time-variable young water fractions.



NAME **Lorenzo MAULONI**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE **Life in the street and the infrastructure of inhabitation. Assembling, governing, and reproducing migrants' encampments in Tiburtina Railway Station, Rome**
TUTOR(S) **Marco SANTANGELO, Silvia ARU**

ACADEMIC CONTEXT

Bourgeois P. and Schonberg J., 2009. *Righteous Dopefiend*. Berkeley: University of California Press.
Darling J., 2017. Forced migration and the city: Irregularity, informality, and the politics of presence. *Progress in Human Geography*, 41(2), pp. 178-198.
MEDU, 2022. *Margini: Rapporto sulle condizioni socio-sanitarie di migranti e rifugiati negli insediamenti informali della città di Roma*. Medici per i Diritti Umani.
Tazzioli M., 2020. *The Making of Migration*. London: Sage Publications.

EXTERNAL COLLABORATIONS

- Baobab Experience, Rome

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Since the beginning of the so-called refugee crisis of 2015, the general worsening of the migration policies and their related bordering practices led to the rise 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 two main railway stations, Termini and Tiburtina. The latter has represented a key site for both people on move and for those out from the receiving system, and where several forms of solidarity also appeared in sustaining migrants' needs.

As in other parts of Europe, migration is subjected to forms of government acting through processes of confinement and abandonment, and migrants' presence in the urban space is further affected by discourses of public security and decorum which often materializes into the eviction of these spatialities. As no alternatives to the street are provided, this act just leads to the reproduction of the encampment. Within these structural conditions governing certain subjects, how do migrants' build their own space of inhabitation when dealing with such inhospitable settings? After several years, to inhabit Tiburtina has become an endured practice for many, where migrants' life unfolds with its own codes, logics, and politics and the street transformed into a socio-material infrastructure sustaining inhabitation.



The research engages with a grounded approach in studying space, using ethnography as the main tool of investigation and as an epistemological tool for the development of the research. The fieldwork started in the aftermath of the last eviction of a major makeshift space named Baobab Experience, following the rearrangement of the new encampments and reconstructing migrants' urban inhabitation looking behind and after this event. The access to the field was negotiated joining the homonymous solidarity-based group, Baobab Experience, and establishing personal relationships of trust and empathy with the subjects/collaborators. That was necessary for the development of the research and the respect of people' subjectivities and politics of self-representation.

NAME	Beatrice MECCA		
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COURSE	XXXVI cycle - 2 nd year		
RESEARCH TITLE	The role of evaluation in architectural design: how to support the value creation in architecture		
TUTOR(S)	Isabella M. LAMI		

ACADEMIC CONTEXT

- Bouyssou D., Marchant T., Pirlo, M., Tsoukias A. and Vincke P., 2006. *Evaluation and Decision models with multiple criteria. Stepping stones for the analyst.* Springer New York, NY.
- Fattinanzi E., Acampa G., Forte F. and Rocca F., 2018. La valutazione complessiva della qualità nel Progetto di Architettura. *Journal Valori e Valutazioni*, 21, pp. 3-14.
- Lami I.M. and Mecca B., 2021. Assessing Social Sustainability for Achieving Sustainable Architecture. *Sustainability*, 13, pp. 1-21.
- Roberts F.S., ed., 1985. *Measurement Theory.* Cambridge University Press.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

In the perspective of a green and sustainable future, architectural choices, together with urban ones, should be made as clearly as possible in order to orient transformations towards environmental, economic and social sustainability. Indeed, 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.

Thus, an important issue is to understand how such choices can be supported and oriented to be in favour of an innovative and sustainable future. This point is related to the request of the European Commission (2020), that encourages the development of integrated tools for design and decision-making in the context of developing a sustainable and circular built environment with the aim of taking impacts into account.

This request, in the context of sustainable architecture could find answers in the development of models and evaluation tools to support the design of alternatives. The process of developing design alternatives is configured as a decision-making process in which choices must be made: evaluation can make these choices transparent, explicit and shareable by permeating the selection phases of the components of the scenarios.

In this context, the objective of the thesis 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 projects so that they can be considered as sustainable and value creating projects. In this sense, the research intends to analyse the features and peculiarities of the problem at hand and to reflect on techniques for the architectural project and sustainability appraisal, investigating which assessment method can support the development of sustainable architectural projects able to create value. Therefore, it is envisaged to investigate the logic of value creation of the architectural transformation projects that will be introduced into the market, identifying a possible methodological path able to support their structuring and evaluation. The potential usefulness of this path could be in the preliminary phase of the project, supporting public and private subjects in the identification and development of valuable and sustainable preliminary architectural scenarios.



NAME Michele **MONDANI**
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COURSE XXXVI cycle - 2nd 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. doi: 10.1007/s00477-020-01908-8.

EXTERNAL COLLABORATIONS

- Politecnico di Milano, Lecco (research support and projects collaboration)
- Flinders University, Adelaide (host for visiting research period)

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 because of 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.

The research topic will range from assessing hydrogeological input such as solid and liquid rainfall to analyzing aquifer characteristics and evolution starting from mountain spring hydrograph. Moreover a particular focus will be put on semi-permeant cryosphere evolution such as glacier and permafrost which are providing water to several hydrogeologic circuits.

This project wants highline the evolution of hydrogeological systems according to the difference of hydric input given by the climate warming up that cause less precipitation, less snowpack in winter and permanent cryosphere melting.

Hydro-Meteorological equipment will be necessary to build up consistent time-series of different atmospheric, hydrometric and snowpack variables. In fact, this research is focusing on Aosta Valley region, where multi-year weather stations and springs data will ensure the comprehension of and hydrogeological processes according to weather and cryosphere evolution.

The embedded analysis of hydric input and output with geological and chemical characteristics of aquifers are then exploited to build a spatial-statistical model of territorial groundwater evolution. This might help governance processes in territorial planning activities according to water resource management sustainability goal.



NAME **Richard Lee PERAGINE**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE Differential sovereignty. Emptiness, geopower and soils in the Bosnian krajina
TUTOR(S) Camillo BOANO, Angelo SAMPIERI

ACADEMIC CONTEXT

Ben-Dor Benite Z., Geroulanos S. and Jerr N., eds., 2017. *The Scaffolding of Sovereignty, Global and Aesthetic Perspectives on the History of a Concept*. New York: Columbia University Press.
Billé F., ed., 2020. *Voluminous States Sovereignty, Materiality, and the Territorial Imagination*. Durham and London: Duke University Press.
Mezzadra S. and Neilson B., 2019. *The Politics of Operations. Excavating Contemporary Capitalism*. Durham and London: Duke University Press.
Povinelli E.A., 2016. *Geontologies. A Requiem to Late Liberalism*. Durham and London: Duke University Press.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

I am investigating the struggle taking place in the final stretches of the Balkan Routes, on the north-western border of Bosnia and Herzegovina (BiH) with Croatia, in a borderland region contentiously known as the krajina. Borrowing the conceptual reference of geopower, I focus on how the geophysical environment is co-opted by authorities into acting violently against racialised migrant populations and how sovereign power spatialises through the production of this territory. How have state apparatuses been involved in this territorial formation and what practices have they relied on? More broadly, what is a fitting elaboration of sovereignty in times of ostensible state-decline and tangible environmental turmoil?

I posit the term differential sovereignty to describe Bosnian sovereignty and move beyond totalising visions of the state as a monolithic entity, while also arguing that sovereignty relies on a scaffolding of aesthetic and material practices of authority in order to enforce its claims. Emptiness, as a spatial and conceptual coordinate, is part of such scaffolding and apposite to examine how sovereign geopower spatialises. In fact, if sovereignty originates from difference constructed by Modernity's binary understandings of Nature, the Other and the Outside - and all such subordinate parts, I claim, are associated to emptiness - then emptiness too is constitutive of sovereignty and its violence, through the articulation of difference, i.e. geopower. Yet emptiness is also turned into a space of resistance by unwanted migrant people or an opportunity for nonhuman forms of life to thrive.

Methodologically, I dissect the krajina into a stratigraphy that blurs the binary divides through and on which sovereign geopower acts. All its layers (karst, water, forest, concrete and landmines) are underscored by a material and aesthetic relationship to emptiness and, therefore, to sovereignty - with this condition being exacerbated and diffracted in BiH by the presence of other-than-state actors, or differential sovereignty. Finally, this overlapping and mutually-influencing set of layers highlights the voluminous and material extent of sovereignty, while bringing up the political significance of soils: material evidence of Modernity which upset state-sovereignty's spatial axiom of land.

This research is a territorial study informed by multiple onto-epistemologies and literatures which aims to contribute to the fields of planning and architecture by focusing on an under-investigated peripheral geography, so as to discuss hegemonic processes in the production of territory and, hence, theorisations, as much as spatial extents, of sovereignty.



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COURSE	XXXVI cycle - 2 nd year		
RESEARCH TITLE	The role of local and global energy interconnections in the energy transition framework		
TUTOR(S)	Piero BOCCARDO, Stefano Paolo CORGNATI, Maria GAETA		

ACADEMIC CONTEXT

Caprioli C. and Bottero M., 2021. Addressing complex challenges in transformations and planning: A fuzzy spatial multicriteria analysis for identifying suitable locations for urban infrastructures. *Land Use Policy*, 102.

Pinto M.C., Boccardo P., Gaeta M. and Gelmini A., 2022. Achieving decarbonization: challenges and opportunities of green hydrogen. *REHVA Journal*, 01/2022, pp. 32-37.

Vakulchuk R., Overland I. and Scholten D., 2020. Renewable energy and geopolitics: a review. *Renewable and Sustainable Energy Reviews*, 122.

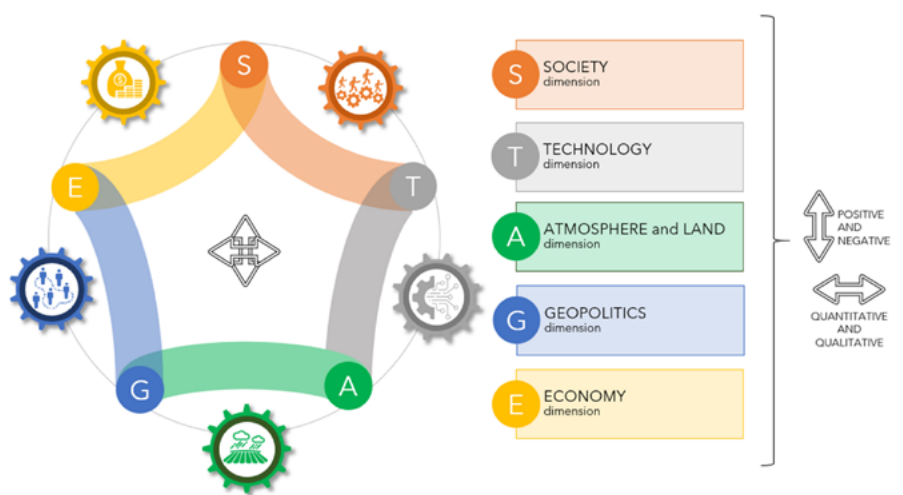
Zelt O., Kruger C., Blohm M., Bohm S. and Far S., 2019. Long-term electricity scenarios for the MENA region: assessing the preferences of local stakeholders using multi-criteria analysis. *Energies*, 12.

EXTERNAL COLLABORATIONS

- Sistema Energetico (RSE)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

To tackle climate change issues and to achieve climate-neutrality, effective pathways enabling the energy transition process must be developed. Even if energy-based, the transition represents a changeover involving the broader social, techno-economic, environmental, and geopolitical dimensions; it is an intrinsically multi-disciplinary process, which evolves over time and space and will reshape countries' identities and relations, through the crucial role of policymakers, whose actions must be supported by informed decisions. The focus of the research is on green hydrogen, which is produced through water electrolysis enabled by renewable energy and is identified as one of the key pillars of the transition. Specifically, the main goal is to study the technical aspects involved, together with the potential social benefits and barriers, the environmental issues and targets, and the economic and geopolitical standpoints, if green hydrogen is produced and transported from North Africa to Italy. In a world that will be completely reshaped by the transition, the development of a structured science-based decision-making process can represent a win-win option for all the dimensions and all the countries involved in strategic energy interconnections. To this end, it is necessary to investigate the role that specific countries can have in the process, especially if new strategic alliances are planned when new clean solutions are adopted. Georeferenced data, scenario analyses, qualitative and quantitative indicators, and multi-criteria decision methods are exploited, allowing to tackle the multi-disciplinarity of the transition. According to a preliminary assessment conducted through a multi-criteria analysis (PROMETHEE II), Morocco ranked as the most predisposed to green hydrogen production, followed by Tunisia, then Algeria, Egypt, and Libya. Secondly, a detailed mapping is developed for the areas of interest, making use of spatially-defined data, to exclude options that are not feasible at all. Then, in the context of the Multi-criteria Spatial Decision Support Systems (MC-SDSS), the Analytic Hierarchy Process (AHP) and the Geographic Information System (GIS) are exploited, to obtain a classification of different ranges of suitability, and also of stability and affordability, in terms of green hydrogen production and trade, for the areas under investigation, involving "Society, Technology, Atmosphere and land, Geopolitics, Economy".



NAME **Caterina POZZOBON**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE Bodies of water: an intersectional geography of waters in rural Tanzania
TUTOR(S) Elisa BIGNANTE, Emanuele FANTINI

ACADEMIC CONTEXT

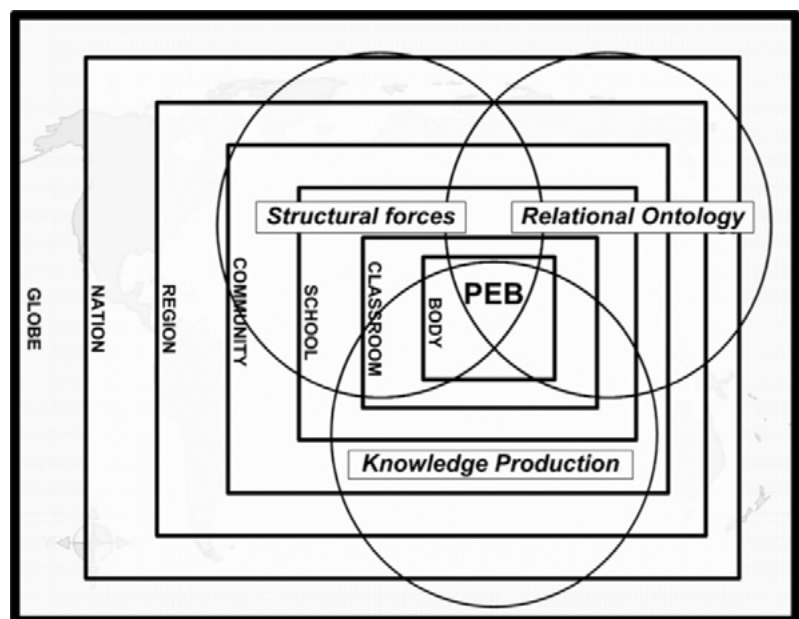
Hayes-Conroy J. and Hayes-Conroy A., 2013. Veggies and viscerality: A political ecology of food and feeling. *Emotion, Space and Society*, 6, pp. 81-90. doi:10.1016/j.emospa.2011.11.003.
Sultana F., 2011. Suffering for water, suffering from water: Emotional geographies of resource access, control and conflict. *Geoforum*, 42, pp. 163-172.
Thompson J. A., 2016. Intersectionality and water: how social relations intersect with ecological difference. *Gender, Place and Culture*, 23(9), pp. 1286-1301.
Zwartheven M. et al., 2017. Engaging with the politics of water governance. *WIREs Water*, 4, e1245. doi: 10.1002/wat2.1245.

EXTERNAL COLLABORATIONS

- Lay Volunteers International Association (LVIA)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

My research aims to reconstruct the complexity of the water geography of two villages located in central Tanzania by adopting a feminist approach that focuses on the micro scale of the body and how it interacts with other broader scales of community water management. The area under consideration is part of that strip of Sub-Saharan Africa that is facing increasing changes to the climate on whose predictability most of the lives of the farmers and herders living there are based. The pressure of human activity and the changing pattern between the dry and rainy seasons are challenging community water management institutions. These community entities have been institutionalised over time by the national government, but the number of villages using traditional forms of management is still significant and this creates uneven and fragmented waterscapes. The research is being carried out with the support of the NGO Lay Volunteers International Association that has been active in Water and Sanitation projects in the area for more than 25 years. This is the framework for this research, which, with an intersectional and feminist approach, deploys the theoretical framework of the Political Ecology of the Body (EPB) to study how the selected communities cope with the ongoing changes. The EPB framework allows the analysis to take into account not only the typical scales that deal with the way communities manage water such as household, village community, water scheme,... but also the more intimate scale of the body. In particular, the focus is on the gendered dimension within the everyday dynamics of water use and management and how this intertwines with other lines of social difference. The focus on the everydayness of water practices and how they shape people's lives also includes the materiality of water with its infrastructure, quality, and quantity. These dimensions emerge through an ethnographic approach and a participatory methodology (including visual methods). The co-production of knowledge, which aims to make the role of the participants in the research visible and recognised, is another main aspect of the research process.



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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE Framing the local resilience unit as a post pandemic planning paradigm
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. and Voghera A., 2019. Territorial Resilience: Toward a Proactive Meaning for Spatial Planning. *Sustainability*, 11(8), pp. 11-19.

Castro Rodriguez D.J., Beltramino S., Scalas M., Pilone E. and Demichela M., 2022. Territorial Representation of a Vulnerability Associated with the Seveso Installations in a Nord Italian Case Study. *ESREL 2022*.

Meerow, S., Newell, J.P. and Stults, M., 2016. Defining urban resilience: A review. *Landscape and Urban Planning*, 147, pp. 38-49

Moreno C., Allam Z., Chabaud D., Gall C. and Pratlong F., 2021. Introducing the "15-Minute City": Sustainability, Resilience and Place Identity in Future PostPandemic Cities. *Smart Cities*, 4(1), pp. 93-111.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

In my second year, I focused mainly on Post-UnLock activities, collaborating with researchers in the project that focuses on understanding resilience trajectories in the post-pandemic world. Awareness of the profound changes induced by the pandemic is also the focus of my thesis work, which is concerned with framing the concept of a Local Resilience Unit, to be understood as an urban portion characterised by the persistence of resilient features. The focus of the research is mainly on the local scale, in the wake of the renewed interest of academic research in the theme of proximity and quality of public space and ecosystem services. In this sense, the pandemic has reanimated the debate with the emergence (and re-emergence) of models of spatial organisation of cities, reinterpreted in a post-Covid key, such as Carlos Moreno's 15-minute City. The resilience unit, to be understood as variable geometry, is capable of providing indications on the state of the city and directing towards transformative interventions according to an understanding of transformative resilience and capable of improving the liveability of places by focusing on the community and its relationship with anthropic and natural elements. The identification of the Units, within the case study represented by the city of Turin, will be carried out through the selection and application of different quantitative and qualitative methodologies identified in the literature. The research activity was carried out alongside that of the R3C centre on the study of territorial vulnerability in the municipality of Moncalieri and the territorial representation of the vulnerability associated with an installation subject to Seveso regulations in a Piedmontese case study, presented at the European Conference on Safety and Reliability (ESREL). Other activities included participation in the Emilio Sereni landscape school, with a contribution on the inland areas of my home region - Sardinia - published in Quaderno 18 and focused on a case study of digital entrepreneurship, and collaboration with the activities of the National Institute of Urban Planning, youth section.



NAME **Agostino STRINA**
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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE Food logistics-led urbanization. Mass market retailers' distribution centers in Italy
TUTOR(S) Angelo SAMPIERI, Francesca GOVERNA

ACADEMIC CONTEXT

Bensi N.S. and Marullo F., 2019. The Architecture of Logistics: Trajectories Across the Dismembered Body of the Metropolis. *Foorprint*, 12(2), pp. 1-4.
LeCavalier J., 2016. *The Rule of Logistics. Walmart and the Architecture of Fulfillment*. Minneapolis and London: University of Minnesota Press.
Moritz A., 2022. *The Digital Factory. The Human Labour of Automation*. Chicago: The University of Chicago Press.
Young L., 2019. Neo-Machine: Architecture without People. *AD Architectural Design. Special Issue: Machine Landscape: Architecture of the Post-Anthropocene*, 89(1), pp. 6-13.

EXTERNAL COLLABORATIONS

- FULL – the Future Urban Legacy Lab (co-financer)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Over the past two decades the spaces for fresh food distribution in Italy have undergone major transformation processes, primarily aimed at increasing performance. These processes have taken place through logistical refinement, technological advancement, and increased automation throughout the supply chain. At the same time, the spaces for fresh food distribution have quickly expanded and increased their attractiveness compared to other logistics and production activities that are in their proximity, thus determining important repercussions on local and national economies. This research focuses on Distribution Centers (DCs), which are one of the key spaces where the main transformations are taking place. Over 450 DCs are currently open in Italy. They consist in large warehouses, usually located in large, equipped areas, which are considered strategic for distribution and used by Mass Market Retailers (MMRs) for hosting all stages of food reception, sorting, and delivery to the vast network of stores. This research investigates a dozen DCs of seven Italian MMRs in three selected case study areas: Santa Palomba (Roma), Pastorano and Carinaro (Caserta), Liscate and Biandrate (Milano).



The decision to focus on DCs stems from the fact that they represent the emergence of new spatial organizations, new territorial functioning, new architectures, which have become increasingly relevant in contemporary urban landscapes in terms of size, numbers, and impact. For these reasons, food distribution spaces have been selected as exemplary cases for investigating the relations between places, territories, people, and technologies. Two main issues are highlighted: a) the strong relations between fresh food logistic centers and the territory, on a local and national scale; b) the forms of urbanity that are gradually taking shape inside and outside DCs. I stress the importance of employing a detailed, relevant, and place-specific observation that can go beyond the strictly technical dimension of these spaces. In this way it is possible to identify the density and variety of practices involved, their articulated network of relationships and the forms of urbanity that are gaining ground. This framework is needed to relocate the logistical spaces within reflections that consider them as spaces in which to activate plans, policies, and projects at different scales, from that of territory, to national policies, to architectural design.

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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE **Blockchain tools for civic initiatives in the urban space**
TUTOR(S) **Marco SANTANGELO, Chiara CERTOMÀ, Guido BOELLA**

ACADEMIC CONTEXT

Ash J., Kitchin R. and Leszczynski A., 2018. Digital turn, digital geographies? *Progress in Human Geography*, 42, pp. 25-43.
Certomà C., 2021. *Digital Social Innovation: Spatial Imaginaries and Technological Resistances in Urban Governance*. Springer International Publishing, Cham.
Gloerich I., De Waal M., Ferri G., Cila N. and Karpinski T., 2020. The City as a License. Implications of Blockchain and Distributed Ledgers for Urban Governance. *Frontiers in Sustainable Cities*, 2, Dec. 2020.
Viano C., Avanzo S., Cerutti M., Cordero A., Schifanella C. and Boella G., 2022. Blockchain tools for socio-economic interactions in local communities. *Policy and Society*, 41(3), pp. 373-385.

EXTERNAL COLLABORATIONS

- University of Turin – Department of Computer Science

HIGHLIGHTS OF THE RESEARCH ACTIVITY

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. Many see its features as promising for supporting collaborative and decentralized socio-economic processes (Elsden et al, 2018); others consider it controversial in relation to the unpredictable nature of the social exchanges (Garrod, 2019). This research focuses on emerging Blockchain initiatives in the civic domain in urban contexts. It adopts a geography by the digital perspective (Ash, Kitchin, and Leszczynski, 2016) and considers the observed contexts as augmented urban spaces (Aurigi, De Cindio, 2008).

The objective of the research is to study how transactional technologies such as the Blockchain, in civic applications, reshape and are shaped by the local social and economic spatialities. The study investigates whether and to which extent the observed app is adapted and adaptable to different local socio-economic contexts, drawing on the concepts of embeddedness and adaptability (Chiappini 2020, Mello Rose 2021) and what are the expected and achieved effects in terms of spatial fluxes of resources and of economic and social benefits and costs, and for whom, referring to the processes of reproduction of spaces and spatialities through digital tools (Certomà, 2020, 2021).

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 is the main case study; it aims at making the Blockchain functionalities available to citizens, by supporting social and economic exchanges in local communities. Data will be collected from application of the tool in social innovation initiatives in Turin in the context of European and local projects, and from simulations and tests done with high school and graduate students.

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 Blockchain 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.



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COURSE XXXVI cycle - 2nd year
RESEARCH TITLE **Urban Green Infrastructure and spatial planning. A key driver for regenerating the contemporary city?**
TUTOR(S) **Carolina GIAIMO, Carlo GASPARRINI**

ACADEMIC CONTEXT

Barbieri C.A., Cialdea D. and Cotella G., 2021. I livelli e gli strumenti per la pianificazione integrata del territorio. *Polis, L'ingegnere italiano*, 380, monographic issue.

European Commission, 2013. *Building a green infrastructure for Europe*. Publications Office of the European Union, Luxembourg. <https://doi.org/10.2779/54125>.

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. Urbanistica Dossier on line*, 17, pp. 129-133.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

This research investigates the prospects for innovation of the national spatial planning system in addressing the ecological transition. In Italy urban planning at the municipal level has historically been concerned with regulating land use and the current scenario is characterised by a mosaic of different regional dispositions. What transversally distinguishes 'doing urban planning' is the intention to assign to the plan the role of a reference framework for the implementation of land-use and governance policies through actions and projects.

Spatial planning is an activity that is not only legally mandatory, but also it is recognised useful and necessary for many reason: it is included on the government's political agenda, is a subject of joint attention between the major associations of Italian urban planners, and particularly could support the landing of projects financed by the National Recovery and Resilience Plan (PNRR).

Nevertheless, the national planning system is still anchored to the law 1150 of 1942. It is necessary to work on new national fundamental principles and especially on the profile and nature of a new plan.

The perspective of radical rethinking of contemporary urban design and planning has to focus on the ecological-environmental dimension, central for the Green New Deal, where green and blue networks could be a new frame for the regeneration of the contemporary city and territory. The hypothesis to verify is that Green Infrastructure (GI) is a worthwhile content of the new urban plan because of its multifunctionality and multiscale characteristics.

While an extensive production of EU strategies and scientific literature about GI has been consolidated, urban planning practice still struggles to deal with it in a systemic manner. Integrating GI into the plan requires the shift from a conformative towards a configurative nature.

The research analyses experiences where the green space system is an explicit content of the urban plan. The choice has taken place on Italian and European cases study where to understand how the green component structures and qualifies the urban planning activity. Through the definition of comparison criteria to construct a focused analysis that could lead to a reasoned synthesis, the work is trying to understand how design and interpret GI in its different dimensions, particularly into the structural-strategic component of the urban plan, to potentially define a methodological proposal for spatial planning.





XXXVII CYCLE - 1st YEAR STUDENTS

NAME Farzaneh ALIAKBARI
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COURSE XXXVII cycle - 1st year
RESEARCH TITLE Cultural Natural Heritage-led urban and rural regeneration: A case study of Qeshm Island UNESCO Global Geopark, Iran
TUTOR(S) Rosa TAMBORRINO

ACADEMIC CONTEXT

Alcala L., Zouros N. and McKeever P.J., 2021. *Global Geoparks: Linking Geological Heritage and Local Development*. Elsevier Science & Technology Books.
Jones C., 2008. History of Geoparks. *Geological Society, London, Special Publications*, 300(1), pp. 273-277. doi: 10.1144/SP300.21.
Onley J., 2014. Indian Communities in the Persian Gulf, c. 1500-1947. In: Potter, L.G., ed. *The Persian Gulf in Modern Times*. New York: Palgrave Macmillan, pp. 231-266. https://doi.org/10.1057/9781137485779_10.
Torabi Farsani N., Celeste C. and Costa C., 2012. *Geoparks and Geotourism: New Approaches to Sustainability for the 21st Century*.

EXTERNAL COLLABORATIONS

- Qeshm Island UNESCO Global Geopark, Iran: Host for the research period

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The establishment of a digital hub (ecosystem) with linked instruments for historical and cultural analysis as well as disseminating knowledge about Cultural Natural Heritage (CNH) is the core theme of this thesis. The main goal is to investigate how to identify CNH, exploit it as a resource, and use it as a driver for sustainable regeneration in a geopark area. Into this, the research first addresses the importance of CNH in a non-European context using Qeshm Island UNESCO Global Geopark in Iran as a case study. Second, through creating collaborative procedures with local stakeholders, the tangible and intangible heritage assets are recognized. Finally, to strengthen the local identity based on the cultural and natural qualities of the area and to support heritage-led sustainable strategies, a digital network of CNH diversity in the geopark area is created. This research takes the advantage of Geographic Information System (GIS) to analyse and map the CNH Knowledge from a geographical and thematic perspective. The SDG 11, in particular, target 11.4 which stresses safeguarding and protecting the world's natural and cultural heritage is focused during this research. However, the digital hub prototype as a final product of the thesis contribute to achieving several SDGs at the local level (e.g., SDG3; wellbeing, SDG4; Sustainable education, SDG13; climate action). The outcome of this thesis will bridge the gap between the collective identities and forgotten local values linked to the CNH in the Qeshm Island UNESCO Global Geopark area.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE Composition design for load bearing hempcrete and measurement of the territorial impacts
TUTOR(S) Andrea BOCCO

ACADEMIC CONTEXT

Bohn A., Mazelli R. and Bocco A., 2022. Loadbearing Hempcrete? A preliminary research. In: NOCMAT, 18th International Conference on Non-conventional Materials and Technologies. Online, 7-28 June 2022.

Mazelli R., Bocci M., Bohn A., Zea Escamilla E., Habert G. and Bocco A., (in print). Fair Play: Why Reliable Data for Low-tech Construction and Non-conventional Materials Are Needed In: *Proceedings of the International Conference of Technological Imagination in the Green and Digital Transition*, Rome 30 June, 1-2 July 2022.

Stanwix W. and Sparrow A. 2014. *The Hempcrete Book: Designing and Building with Hemp-Lime*. Cambridge: Green Books.

EXTERNAL COLLABORATIONS

- ETH of Zurich, Chair of Sustainable Construction (host for visiting)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

This study investigates the potentials of an innovative bio-based material and products created from the latter. Today the conventional materials for construction field are represented by concrete, fired masonry and steel. However, their global warming potentials represent a real challenge and raise many issues. Finding alternatives in bio-based materials could decrease the emissions of GHG during the process of production by sinking into the plant the atmospheric carbon dioxide. This research aims to develop a suitable composition for composite and fibre reinforced hempcrete, seeking to increase its mechanical strength, while preserving its low thermal conductivity and density. The objective is to render hempcrete resistant enough to be considered as a load bearing material for some specific situations. The traditional local production of hemp and lime could generate a new local economy for regional companies, empowering the entrepreneurial realities and giving sovereignty back to the population.

The research of mechanical strength of hempcrete is quite young, and thus, it seems important to avoid too quickly that this product cannot be conceived as a load bearing material. Hempcrete can be used by hand, cast in formworks, sprayed out or even pre cast and transformed in blocks. However, even when changing technique, the issue of structural efficiency remains. The aggregate that are called shivs reduce the mechanical features of the hydraulic binder. Using cement inside, the setting time is faster, so it combines with the construction time, but its environmental impact rises as concentration concrete grows. The innovation of this research aims to find a suitable mix and composition design of elements that could lead hempcrete to be considered as a support for specific uses.

By processing a life cycle assessment of this new composition of a load bearing hempcrete, it will be the occasion to compare its performance to the conventional materials but also to non conventional materials like straw bale, and cob constructions.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE Innovation in the management of vineyard soils through the adoption of good practices and tools to support field activities
TUTOR(S) Stefano FERRARIS

ACADEMIC CONTEXT

Capello G., Biddoccu M., Ferraris S. and Cavallo E., 2019. Effects of tractor passes on hydrological and soil erosion processes in tilled and grassed vineyards. *Water*, 11(10), 2118. <https://doi.org/10.3390/w11102118>.

Capello G., Biddoccu M. and Cavallo E., 2020. Permanent cover for soil and water conservation in mechanized vineyards: A study case in Piedmont, NW Italy. *Italian Journal of Agronomy*, 15(4), pp. 323-331. <https://doi.org/10.4081/ija.2020.1763>.

Capello G., Biddoccu M. and Cavallo E., 2019. L'influenza della gestione del suolo e del traffico agricolo sulla conservazione dell'acqua e del suolo: un caso studio in Piemonte. In: F. Ventura, G. M. Poggi, eds., *Atti del XXII Convegno Nazionale di Agrometeorologia - Ricerca ed innovazione per la gestione del rischio meteo-climatico in agricoltura*, pp. 38-43. Bologna: Dipartimento di Scienze Agrarie - Università di Bologna.

Dorigo W., Himmelbauer I., Aberer D. et al., 2021. The International Soil Moisture Network: serving Earth system science for over a decade. *Hydrol. Earth Syst. Sci.*, 25, pp. 5749-5804. <https://doi.org/10.5194/hess-25-5749-2021>.

EXTERNAL COLLABORATIONS

- STEMS-CNR (Istituto di Scienze e Tecnologie per l'Energia e la Mobilità Sostenibili, Consiglio Nazionale delle Ricerche): financier of the research and host.

HIGHLIGHTS OF THE RESEARCH ACTIVITY



This research intends to study the problems related to soil erosion, a phenomenon to which the sloping areas of the Piedmont area, dedicated to the cultivation of vines, are particularly subjected. Other soil degradation phenomena are closely linked to erosion, such as the decline of organic matter and soil compaction, which are also among the major threats to the state of the soil in Europe. These phenomena have a significant impact on the ecosystem services of the vineyard, on the quality and fertility of the soil and on the availability of water resources, and therefore can negatively affect the quality and quantity of production.

The aim of the research is to introduce and promote optimal soil management techniques (good practices) in hilly wine-growing environments that allow to contain the typical phenomena of soil degradation such as erosion and compaction, improving soil and vine quality by means of the introduction of three main innovations: improved best soil management practices; agro-meteorological monitoring, to improve water and soil management; ICT tools for managing of monitored data and field observation to support farmers in vineyard management and water-soil conservation. The target is to understand how soil management with innovative practices in hilly vineyards can improve the response in terms of soil water content, runoff and erosion, increasing the availability of water and nutrients for the vine, and understand what is the effect of the repeated passage of vehicles on compaction and hydrological conditions of the soil.

The research activity started with the identification of the soil management practices to be implemented in 5 different vineyards: in each one, 2 theses chosen from good soil management practices are compared. In every vineyard specific systems are installed for continuous monitoring of: runoff and erosion; soil water content; meteorological parameters (temperature, air humidity and precipitation).

In-field periodical surveys are performed to measure soil parameters: bulk density; water content; penetration resistance; hydraulic conductivity. The use of a DSS has been introduced to the farmers. The data collected will be also used for the elaboration of indices based on parameters commonly measured in the agro-meteorological field and the relative thresholds in order to provide information on whether or not to intervene in the field with agricultural machinery.



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COURSE	XXXVII cycle - 1 st year		
RESEARCH TITLE	Preference Learning approach to evaluate the energy renovation of the building stock within Renewable Energy Communities framework		
TUTOR(S)	Marta BOTTERO		

ACADEMIC CONTEXT

Hüllermeier E. and Fürnkranz J., eds., 2011. *Preference learning*. Heidelberg: Springer Berlin.
 Löbbe S., Sioshansi F. and Robinson D., eds., 2022. *Energy Communities: Customer-Centered, Market-Driven, Welfare-Enhancing?*. Academic Press.
 Suppa A. R., Cavana G. and Binda T., 2022. Supporting the EU Mission "100 Climate-Neutral Cities by 2030": A Review of Tools to Support Decision-Making for the Built Environment at District or City Scale. In: *International Conference on Computational Science and Its Applications*. Malaga, Spain, 4-7 July 2022. Cham: Springer.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Being responsible of 40% of energy consumption and 36% of energy-related carbon dioxide (CO₂) emissions in Europe, the building sector has been seen as a strategic target by the European Green Deal and the subsequent "Fit for 55" package in the attempt to reduce its environmental impacts. The adoption of cooperative behaviour at different scales of the urban context in terms of technological adoption and energy sharing have been already demonstrated as capable of generating further benefits than considering each building independently. The evaluation of the combined effect of the energy consumption reduction due to energy efficiency measures and the implementation of Renewable Energy Communities (REC) at the urban level is still scarce and the behavioural rules of stakeholders engaging or not in such projects still have to be analysed. Aim of the research will be to evaluate the potential synergic benefits that could arise from citizens' participation in a Renewable Energy Community (REC) in combination with a deep retrofit of the urban fabric.

Methodologically, the energy consumption and distributed generation potentials at the urban scale will be calculated, and renovation strategies will be optimized within the REC framework. The Preference Learning approach will be used to analyse the trade-offs made by stakeholders and the parameters that guide their decision-making process toward the participation in such schemes.

The research will estimate the potential optimization of GHG emission reduction combining district scale retrofit solutions and RECs. In particular, the potential role of citizens in this process will be emphasised by identifying what are the discriminating socio-economic parameters between participating or not in such schemes. Furthermore, areas in which socio-economic barriers to the implementation of RECs could arise will be highlighted and such criticalities analysed. Finally, the parameters that could optimize the citizens' participation in the decarbonisation process of the built environment will be spatialized in the urban context in order to inform public decision-makers and stakeholders.

Research outline



Analysis of **synergies** between large scale **retrofit** and decentralized **energy generation**



Inclusion of the **complexity of the urban environment** in the analysis



Evaluation of citizens' attitude in the decision to participate or not to **merge the technical aspects** with the **socio-economic ones**

NAME **Marco DEL NIBLETTO**
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COURSE XXXVII cycle - 1st year
RESEARCH TITLE The distribution of retailers in Turin. Investigating the impact of real estate and urban flows
TUTOR(S) Giulio ZOTTERI, Luigi BUZZACCHI

ACADEMIC CONTEXT

Aguirregabiria V. and Suzuki J., 2015. Empirical games of market entry and spatial competition in retail industries. In *Handbook on the Economics of Retailing and Distribution*. Edward Elgar Publishing.
Duranton G. and Puga D., 2004. Micro-foundations of urban agglomeration economies. In: *Handbook of Regional and Urban Economics*. Elsevier, pp. 2063-2117.
Hidalgo C. A., Castañer E. and Sevtsuk A., 2020. The amenity mix of urban neighborhoods. In: *Habitat International*, 106. <https://doi.org/10.1016/j.habitatint.2020.102205>.
Stahl K., 1987. Theories of urban business location. In: *Handbook of Regional and Urban Economics*. Elsevier, pp. 759-820.

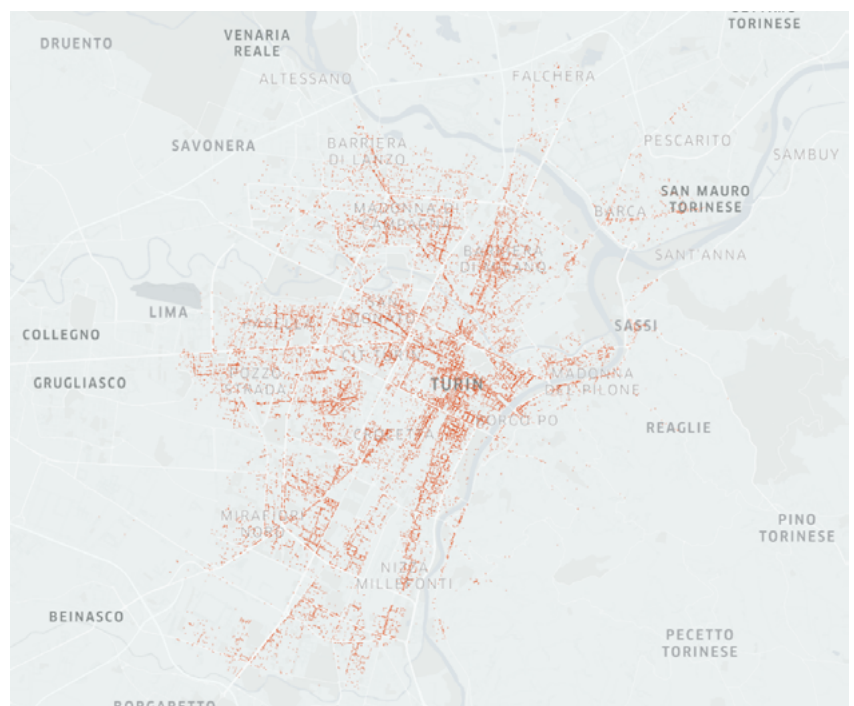
HIGHLIGHTS OF THE RESEARCH ACTIVITY

Retail businesses compete in an oligopolistic market providing specific goods or services to consumers at observable market prices (Betancourt and Gautschi, 1988). Retailers follow a two-stages process. First, they decide how similar their product may be with respect to competitors. Second, they decide their best location. Location in the retail sector is meant to be more than just a geographic position. It is the relative position that a retailer can occupy given the proximity to other stores, on one hand, and to potential consumers, on the other hand (Aguirregabiria and Suzuki, 2015). It is an evaluation of social, economic and even morphological aspects of urban life, such as centrality and accessibility, layout and design, visibility and popularity, cluster attraction and spill-over. Hence, commercial city patterns are the result of a long process in which retailers deal with urban morphology, given that space is a scarce resource to be allocated with competitors.

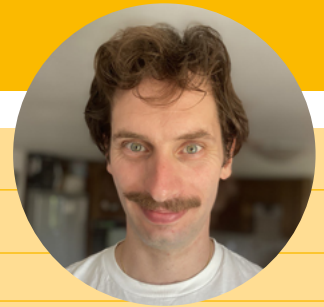
The most important reason for shop to cluster is the presence of shopping externalities, which are generated by consumers' trip-chaining behaviour (Koster and Pasidis, 2017) and which are increasing stores' attractiveness in the eyes on consumers. Customers who visit several shops indeed benefit from increasing return to scale. This externality is enhanced when multiple shops are located in close proximity (Eaton and Lipsey, 1979).

The main objective of the research is to investigate the position of retailers in the municipality of Turin and the drivers that influence this fundamental decision process. The work is focused on the real estate and urban flow of people to indagate how this factors impact the commercial city pattern. The purpose is to look for a possible link between the cost to pay for locating in a certain area, the type of activities that prefer to stay in high request spots, and if the housing market reflects the demand and observations offered by the literature regarding central business districts.

The other main driver that will be studied is the movement of citizens and will be explored how Turin reflects the main insight of literature regarding the flow of people in the urban area. The research will be addressed by comparing the position of retail activities with different types of traffic like pedestrian movement, vehicular traffic and travels by public transports.



NAME **Juri Igor FARDIN**
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COURSE XXXVII cycle - 1st year
RESEARCH TITLE **Play Aesthetics; Between the Figures of Skateboarding, Ugo La Pietra and *Play Time***
TUTOR(S) **Camillo BOANO**

ACADEMIC CONTEXT

Agamben G., 2005. *Profanazioni*. Roma: Nottetempo.
Borden I., 2019. *Skateboarding and the City: A Complete History*. London: Bloomsbury Visual Arts.
Rancière J., 2013. *The Politics of Aesthetics: The Distribution of the Sensible*. London: Bloomsbury.
Winnicott D. W., 2010. *Playing and Reality*. London: Routledge.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

On the 13th of December 1967, Jacques Tati's movie *Playtime* was premiered for the first time in a Parisian cinema. In this movie we see Monsieur Hulot, the fictional character created by Tati, engaging – or rather failing to engage – with a city that has become impossible to inhabit and to use. Ten years later (1977) Italian architect, artist and designer Ugo La Pietra started a series of works in which objects of exterior design such as bollards and chains were snatched from their non-use and converted into objects of interior design to stimulate “il gioco dell’uso dello spazio privato in pubblico”, a gesture that permeated many of La Pietra's works. About 20 years after this occurrence, skateboarders started to play with wooden toys (skateboards) in the newly built Piazza Duca d'Aosta, making an inappropriate use of the space in front of Milan central station, and are still there today.

These phenomena draw an arch that stretches between the end of the 1960s and today, a period that – following philosophers Giorgio Agamben and Guy Debord – is characterized by the impossibility of a use that exceeds both consumption and spectacular exhibition; an impossibility already emblemized

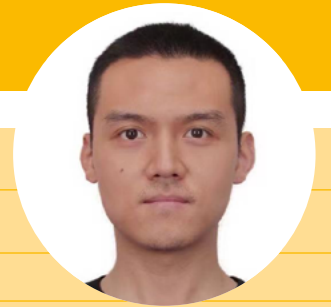
by Monsieur Hulot's bodily relations to space in the movie *Playtime*. Yet, these figures are not simple articulations of this impossibility of use, they also suggest that there is a specific way of using this (im)possibility; they show spaces and bodies as a field of polar tensions in which a specific type of use can happen – play. In this sense they become figures of uses and habits (an aesthetics) of play. My project asks: is it possible that these figures of play aesthetics allow us to glimpse at spatial and bodily uses and habits that cannot be reduced to consumption or spectacular exhibition?

In order to engage with this question my project will develop a historical analysis and theoretical reading of the figures of play aesthetics described above. In other words, my project asks: what are the historical conditions of possibility in which these figures are inscribed? But

also, what is their un-exhausted potential? What theory do they produce? While I will address the first question through an historical research, the following questions will be addressed by creating a dialogue between the studied figures and thinkers such as Giorgio Agamben, Walter Benjamin and Donald Winnicott; a dialogue guided by the concepts of *désœuvrement*, profanation and theatrical alienation.



NAME **Feiran HUANG**
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COURSE XXXVII cycle - 1st year
RESEARCH TITLE Rural landscape management in the digital era: examining the influence of smart village initiative on landscape management
TUTOR(S) Claudia CASSATELLA

ACADEMIC CONTEXT

Claval P., 2005. Reading the rural landscapes. *Landscape and urban planning*, 70(1-2), pp. 9-19.
Salemink K., Strijker D. and Bosworth G., 2017. Rural development in the digital age: A systematic literature review on unequal ICT availability, adoption, and use in rural areas. *Journal of Rural Studies*, 54, pp. 360-371.
Slee B., 2019. Delivering on the concept of smart villages – in search of an enabling theory. *European Countryside*, 11(4), pp. 634-650.
Stahlschmidt P., Swaffield S., Primdahl J. and Nellemann V., 2017. *Landscape Analysis: Investigating the potentials of space and place*. London: Routledge.

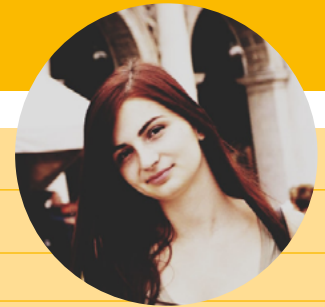
HIGHLIGHTS OF THE RESEARCH ACTIVITY

The advancement of the information and communication technology (ICT) and its increasingly widespread usage in different fields have brought our society to a new era, the Information Age where human societies perform their activities in a technological paradigm constituted around microelectronics-based information/communication technologies. This trend has also been brought to the countryside and we can see increasing numbers of practices integrating the use of ICT with the rural development agenda, such as the digitisation of agriculture and internet-based rural entrepreneurships. To keep up with this growing trend, different countries and regions have started to develop policies to facilitate this ICT-oriented rural development and those policies initiatives are known as “smart village”. However, as one of the most important issues in rural development, the rural landscape seemed to be somehow overlooked in the discussions around smart villages, while majority of the existing research has mainly focused on the socio-economic influences of smart village initiatives. In fact, it has been widely acknowledged that technological and policy factors are the two most important driving forces in landscape change. Therefore, reviewing smart villages initiatives from a landscape perspective seems a highly important and relevant topic, particularly in this information age.

On this account, this research will examine the smart village policies in different contexts and their applications at local level from a landscape perspective, trying to answer the questions on how the smart village initiatives have influenced the rural landscape, particularly on the way landscape is managed and used and if there are possible spatially implications. The very first task is to understand the key concept of this research, smart village, including its definition and the development of the smart village policy and its implementation at the local level. Besides that, different forms of landscape management and actors and stakeholders involved have also been examined. By comparing the practices of smart villages and landscape management, we can understand what are the potential influences of this policy initiative on the rural landscape.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE Non-conventional materials: opportunities for a paradigm shift in the construction sector
TUTOR(S) Andrea BOCCO

ACADEMIC CONTEXT

Bocco Guarneri A., 2020. *Vegetarian Architecture: Case Studies on Building and Nature*. Jovis Verlag GmbH.

Bohn A., Mazelli R. and Bocco A., 2022. Loadbearing Hempcrete? A preliminary research. In: *NOCMAT, 18th International Conference on Non-conventional Materials and Technologies*. Online, 7-28 June 2022.

Ghavami K., ed., 2014. Non-conventional materials and technologies for sustainable engineering. In: *Proceedings of 14th NOCMAT March 24-27, 2013, João Pessoa*. Trans Tech Publications.

Mazelli R., Bocci M., Bohn A., Zea Escamilla E., Habert G. and Bocco A., in print. Fair Play: Why Reliable Data for Low-tech Construction and Non-conventional Materials Are Needed. In: *Conference Proceedings of the International Conference of Technological Imagination in the Green and Digital Transition, Rome 30 June, 1-2 July 2022*.

EXTERNAL COLLABORATIONS

- ETHz (host for visiting or research period)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Non-conventional materials (NOCMAT) encapsulate sustainable use of novel technologies and innovative uses of more established materials; many of them have their roots in traditional vernacular construction, including bio-based materials, and other natural materials such as stone, earth, lime (Ghavami, 2014). While bio-based and other natural construction materials have been recognized as a way to reduce carbon emissions and build healthier environments, they are usually not backed by big industries promoting their scientific understanding, assessment methods and insertion in building codes. These materials were extensively used in vernacular architecture: they were locally available and widely found in nature or, in the case of bio-based materials, by-products of self-reliance agriculture. Today, the materials extensively available for construction are highly processed industrial ones. Eco-friendly materials have become hardly available; building with them expensive and challenging; and obtaining the permits effortful (Bocco Guarneri, 2020).

The study is mainly based on empirical research and real scale field prototypes (built through the research project Excellence_TEC) will serve as the main bed test. The principal building techniques studied are load bearing strawbale, lightearth and timber, and hemplime construction. The focus is on understanding the properties of the used materials and the detailed design of the related building techniques in order to maximise their performance and durability which to be tested and assessed through on spot and continuous monitoring.

Environmental impact assessments are to be performed in compliance with EU standards and by benefiting of primary sources to the greatest extend. This is to be coupled with laboratory samples and prototypes testing in accordance with the needs of the project and the parameters to be measured, and case studies analysis.

The final scope is to incorporate data on the performance and on the environmental impact of these materials with a holistic vision on the strategy for a paradigm shift towards the evolution of the use of non-conventional materials in construction to help meeting the targets of energy demand and carbon emissions reduction, an approach leading to building "inclusive, safe, resilient and sustainable human settlements".



NAME **Alessandra MOSSA**
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COURSE XXXVII cycle - 1st year
RESEARCH TITLE **Post-asylum geographies of madness. Finding space for getting mad**
TUTOR(S) **Michele LANCIONE**

ACADEMIC CONTEXT

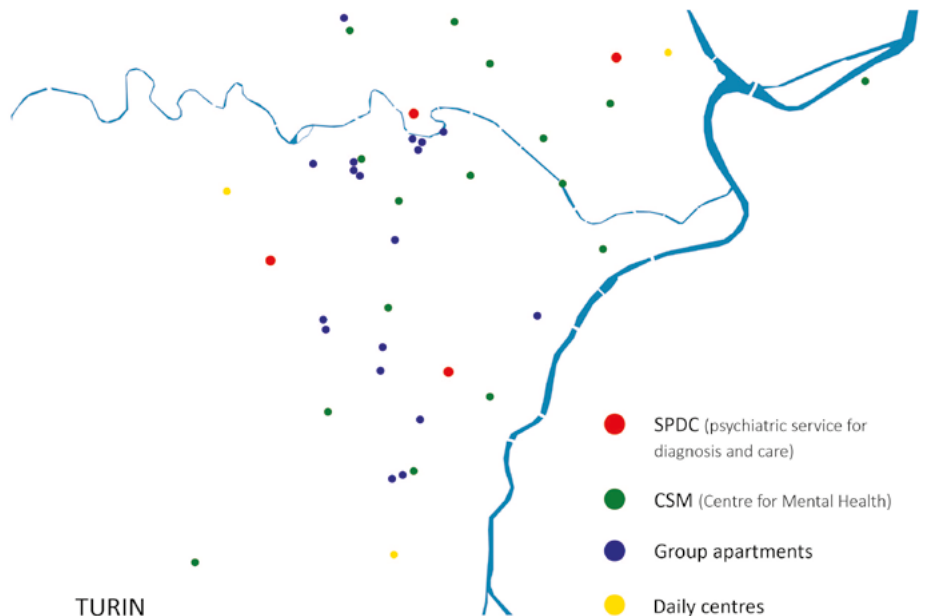
Basaglia F., Lovell A. and Scheper-Hughes N., 1987. *Psychiatry inside out : selected writings of Franco Basaglia*. New York; Guildford: Columbia University Press.
Butler R. and Parr H., 1999. *Mind and body spaces : geographies of illness, impairment and disability*. London: Routledge.
Crooks A., Andrews G. and Pearce J., 2018. *Routledge Handbook of Health Geography*. London and New York: Routledge.
Philo C., 2005. The geography of mental health: An established field? *Current Opinion in Psychiatry*, 18, pp. 585-591.


EXTERNAL COLLABORATIONS

- University of Glasgow - School of Geographical & Earth Sciences (host for visiting period).

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Over the last two decades, geographic disciplines have seen a growing interest on the role different spatial arrangements play in the everyday lives of people with mental disabilities. This new stream of research constitutes a welcomed “spatial turn” in critical mental health studies that, whether concerned with space, have mainly focused on total institutions (Goffman, 1968; Foucault, 1965;1977; Philo, 1997; 2004; Cohen, 2018). My research sits within the literature that looks at the process of deinstitutionalization of the mental health system through the lived geographies placed outside the “madhouse” (Butler & Parr, 1999; Parr & Philo; 2003; Conradson, 2003b; Imrie, 2004; Chouinard, 2012; Parr, 2000). By addressing how space is intertwined with process of care, or absence of it, from the perspective of its users, my study will address more general issues of urban marginality, collective agency and the role of the State as a mediator and enabler (Power, E. R., & Williams, 2020). To offer a fine-grained analysis of how these geographies act at the urban level, the site of analysis will be the city of Turin. The ethnographic analysis will be carried out, via participant observation and life-stories interviews, in a set of micro-geographies of mental health care constituted by drop-in centres and a group apartment run by the cooperative Blu Acqua. A focus on spatiality and embodied experiences will allow to explore to what extent space and its relational traits affect the psyche and how psychosis transform individuals’ perception and use of space and time (Parr & Davidson, 2015; Söderström et al., 2017; Söderström, 2019). Personal stories and spatial biographies will provide insight on where madness is created, how it is perceived, when it is instead a mere product of cultural or direct violence (Galtung 1990). This with the aim to build up a micro-geography of mental health care that, by putting the human and its everyday life at the centre of its inquiry, will make individuals’ “embodied and contested subjectivities to emerge more clearly” (Parr, 2000: 226). Through a life-history and a narrative approach enriched by an auto-ethnographic account (Moss, 1999 in Butler & Parr, 20; LeFrançois et al.; 2013; Fixsen, 2021) I will investigate individual everyday struggles, care trajectories and long-term expectations; this always in relation to wider power dynamics and intersectional forms of discrimination in which those lives are embedded.



NAME	Simone PERSICO		
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COURSE	XXXVII cycle - 1 st year		
RESEARCH TITLE	Disinformation and the “Nuclear” debate. The role of Bridges between Social Media platforms in the Trench Warfare Dynamic		
TUTOR(S)	Sara MONACI		

ACADEMIC CONTEXT

Bruns A., 2019. *It's not the technology, stupid: How the 'Echo Chamber' and 'Filter Bubble' metaphors have failed us*. International Association for Media and Communication Research.

Karlsen R., Steen-Johnsen K., Wollebæk D. and Enjolras B., 2017. Echo chamber and trench warfare dynamics in online debates. *European journal of communication*, 32(3), pp. 257-273.



Rogers R., 2021. Marginalizing the Mainstream: How Social Media Privilege Political Information. *Frontiers in big Data*, 4.

Wu L., Morstatter F., Carley K. M. and Liu H., 2019. Misinformation in social media: definition, manipulation, and detection. *ACM SIGKDD Explorations Newsletter*, 21(2), pp. 80-90.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The term “Nuclear” has recently raised the attention of the public opinion: at the end of 2021 in relation to the introduction of nuclear energy in the EU taxonomy for sustainable activities, and more recently, in the beginning of 2022, in relation to the Ukrainian-Russia war and the menace of a potential escalation of the conflict with the use of nuclear weapons. Both topics are of central importance for nowadays society because they embrace fundamental aspects such as international cooperation, environmental sustainability and economic policy. The topics have been largely discussed on the Social Media Networks that nowadays are used by people to get news and informations, having the power to potentially influence people’s mind. In this environment the constant check and monitoring for disinformation content is a fundamental task, in order to prevent cascades of fake news and disinformation that in the worst case scenario could lead people to adhere to conspiracy theories or extremely polarize their points of view on thematic of social primary importance. The discussion on the Social Media platforms is well described by the Trench Warfare Dynamics, a theory where people exchange information both with like-minded people than with people who hold different points of view, causing interactions in the Social Media environment. The exchange of information happens using the affordances of the platform: commenting, sharing, reacting, linking. A particular aspect not always taken into account is the synergic use of multiplatform connection in order to push information towards the public, in this attempt to move the discussion on favourable ground. This digital behavior can be described with a concept taken from Transmedia Theory that is called Bridge. The research wants to use Social Network Analysis and Digital Methods with a mixed quanti-qualitative approach to explore the use of the Bridges in order to understand its narrative role in the dissemination of information among different platforms regarding the debate that surrounds the term “Nuclear”.



NAME	Maurizia PIGNATELLI		
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COURSE	XXXVII cycle - 1 st year		
RESEARCH TITLE	An interactive Spatial Decision Support System to co-recovery sustainable villages and marginal areas		
TUTOR(S)	Patrizia LOMBARDI, Sara Torabi MOGHADAM		

ACADEMIC CONTEXT

Caselli B., Ventura P. and Zazzi M., 2020. Performance-based spatial monitoring. An interpretative model for long-term shrinking medium-small Italian towns. *Sustainable Cities and Society*, 53(February 2020), p. 101924. doi: 10.1016/j.scs.2019.101924.

Genta C. et al., 2019. Key Performance Indicators for Sustainable Urban Development: Case Study Approach. *IOP Conference Series: Earth and Environmental Science*, 296(1). doi: 10.1088/1755-1315/296/1/012009.

Klopp J.M. and Petretta D.L., 2017. The urban sustainable development goal: Indicators, complexity and the politics of measuring cities. *Cities*, 63, pp. 729-39.

Torabi Moghadam S., Genta C., Pignatelli M. and Lombardi P., 2020. Supporting sustainable urban planning process based on scenarios development. *IOP Conference Series: Earth and Environmental Science*, 588. doi: 10.1088/1755-1315/588/4/042022.

EXTERNAL COLLABORATIONS

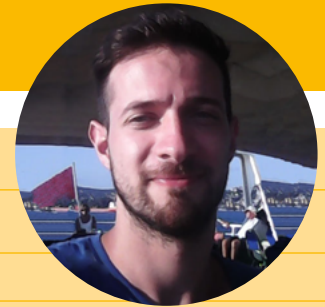
- Osservatorio per lo Sviluppo dei Territori (Istituto EURISPES e Ragioneria Generale dello Stato)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Territorial transformation processes and socio-economic dynamics that took place in Italy after World War II have brought about an inexorable change in the country's morphology. The increasing urbanization of the 1980s (Dematteis, 1986), has established trends that have led to the current situation in small urban areas (Bertolini and Pagliacci, 2017). As a result, there is now a clear disparity between major cities and villages located in marginal areas of Italy: progressive depopulation of inland areas and urban polarization such as consolidated territorial dynamics are difficult to dampen and adapt to the new paradigms of sustainable territorial development, although they have been abruptly redirected by the Covid 19 pandemic. The instability created by this pandemic offers the opportunity to redefine new parameters of intervention and new scenarios for the development of territories in relation to the new needs of decentralization and physical distancing. This research aims to create the conditions to repopulate and rebalance shrinking territories by establishing new centres of attractiveness. This study envisages the development of an interactive web GIS dashboard to be provided to municipalities and local authorities in order to create both a learning environment and a spatial decision support system for future local policy actions towards a sustainable participatory local development. In this way, it is proposed a functional method with a place-based approach to managing the existing territorial complexity through innovative models of territorial governance and policymaking, among them the effective implementation of participatory and multi-actor visions of territorial development. The selection of proper indicators in the decision-making processes is crucial for evaluation, measurement and reporting purposes (Hiremath et al., 2013). Therefore, the proposed doctoral research is closely linked to the contemporary Italian necessities and priorities set by the PNRR (Piano Nazionale di Ripresa e Resilienza). Its inclusion within a national research project as "Rinascita dei Borghi", approved by Eurispes observatory, enriches the methodological framework with many multidisciplinary aspects. The interdisciplinary approach of this research contributes to advancing the theoretical discourses to understand the dynamics of the new spatial participatory city planning, but also expands the empirical implementation to the urban context.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE Geocosystem tipping points and biogeomorphological assessment for “anthropocenic refugia”
TUTOR(S) Angelo BESANA

ACADEMIC CONTEXT

Barnosky A.D., Hadly E.A., Bascompt, J., Berlow E.L., Brown J.H., Fortelius M., Getz W.M., Harte J., Hastings A., Marquet P.A., Martinez N.D., Moers A., Roopnarine P., Vermeij G., Williams J.W., Gillespie R., Kitzes J., Marshall C., Matzke N., Mindell D.P., Revilla. E. and Smith A.B., 2012. Approaching a state shift in Earth's biosphere. *Nature*, 486, pp. 52-58.

Lambin E.F., Turner B.L. and Reenberg A., 2007. The emergence of land change science for global environmental change and sustainability. *Proceedings of the National Academy of Science of the United States of America (PNAS)*, 104(52), pp. 20666-20671.

Morelli T.L., Daly C., Dobrowski S.Z., Dulen D.M., Ebersole J.L., Jackson S.T., Lundquis, J.D., Millar C.I., Maher S.P., Monahan W.B., Nydick K.R., Redmond K.T., Sawyer S.C., Stock S. and Beissinger S.R., 2016. Managing Climate Change Refugia for Climate Adaptation. *PLoS ONE*, 11(8), p. e0159909.

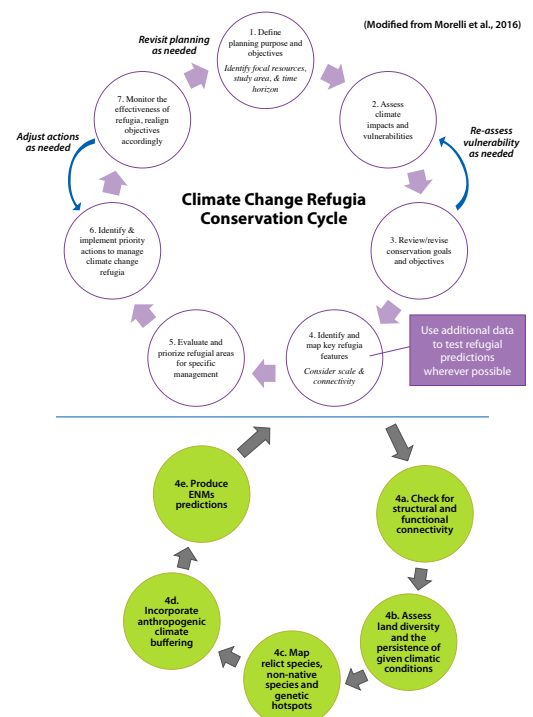
Steffen W., Richardson K., Rockström J., Cornell S.E., Fetzer I., Bennett E.M., Biggs R., Carpenter S.R., de Vries W., de Wit C.A., Folke C., Gerten D., Heinke J., Mace G.M., Persson L.M., Ramanathan V., Reyers B. and Sörlin S., 2015. Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223), p. 736.

EXTERNAL COLLABORATIONS

- University of Trento

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Anthropic disturbance on biogeomorphological systems manifests itself both directly (e.g., with deforestation) and indirectly (e.g., with climate change consequences), and its pressure is expected to keep on increasing exponentially in the next decades, eventually attaining unknown thresholds beyond which the entirety the Earth's surface can be considered virtually affected by human presence (Barnosky et al., 2012). The conflict between human settlements and biosphere seems to be unavoidable, however land change science can give a detailed and quantitative overview on the critical “boundary” along which they interact and can therefore represent one of the most precious instruments for a geographical analysis, assessment and management of the territorial resources to be preserved (Lambin et al., 2007). In this sense the basic principles founding the theory of ecological corridors and their operative setting, given by both structural and functional landscape connectivity, could mitigate the climate change impacts on species distribution, both in term of ensuring that thresholds of collapse of key ecosystems are not exceeded, thus concurring in planetary-wide cascade effects (Steffen et al., 2015), and that territorial contiguity is maintained to help mobile species in their forced upslope altitudinal and poleward latitudinal migration. Within this framework, the so-called climate change refugia (Morelli et al., 2016), i.e., those geographical areas exhibiting a delayed response to the global trends of climate change, may become a key factor to dampen the effects of anthropic disturbance on ecosystems, allowing a locally smoothed transition to higher temperature scenarios. Therefore, the aim of my PhD research activity is the individuation, definition and testing of a spatially based quantitative workflow, with possible exportable indicators, able to provide a comprehensive assessment of climate change refugia, through which the attainment of SDG 15 (protection of terrestrial ecosystems), and in particular SDG Target n. 15.5 (natural habitat integrity) could be more easily evaluated and fostered at the local level.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE 'Culture will fix that Place!': Philantro-policymaking, social innovation and the vision – power nexus at the urban level
TUTOR(S) Carlo SALONE

ACADEMIC CONTEXT

Bertacchini E.E., Pazzola G. and Puletti F., 2022. Urban alternative cultural production in Turin: An ecological community approach. *European Urban and Regional Studies*, 29(3), pp. 350-368.
Jessop B., Moulaert F., Hulgård L. and Hamdouch A., 2013. Social Innovation Research: A New Stage in Innovation Analysis. In: F. Moulaert, D. MacCallum, A. Mehmood, A. Hamdouch, eds. *The international handbook on social innovation: Collective action, social learning and transdisciplinary research*. Cheltenham: Edward Elgar Publishing Limited, pp. 110-30.
Rogers R., 2011. Why philanthro-policymaking matters. *Society*, 48(5), pp. 376-381.
Wacquant L., 2007. Territorial Stigmatization in the Age of Advanced Marginality. *Thesis Eleven*, 91(1), pp. 66-77.

EXTERNAL COLLABORATIONS

- Fondazione Santagata for the Economics of Culture

HIGHLIGHTS OF THE RESEARCH ACTIVITY

With the Post-Fordist collapse of the compromise between capital and labour we assist to a growing number of social problems that are exacerbated in peripheral or semi-peripheral urban areas marginalized from world's competition. In this context, the rise of public-private partnerships with social economy actors, such as philanthropic foundations, has tried to compensate for the State's withdrawal from public action, supporting contemporary views of social innovation (hereafter SI) that are coherent with the 'caring capitalism' paradigm. Accordingly, policy discourses on SI have become *powerful spatial-political imaginaries* through which State strategies and policies targeting marginalized urban areas are increasingly evaluated, drafted and put into practice around the western world.

In this research project, we focus on culture-driven SI processes in Turin's peripheral areas and interpret them as an outcome of an arena of deliberative decision making, whose transformative power depends upon the spatial negotiation of public spheres generated through the political power of the actors involved. We hypothesize that the imbalance of power towards philanthropic foundations within this arena, favours the emphasis on economic agency pushing other types of socially innovative agency into the background.

Consequently, the research focuses on *philantro-policymaking* actions aimed at funding SI projects promoted by cultural organisations, analysing call for funds as *State technologies* that, other than being designed to support creative production, try to reorient it to the *territorial fixation* of the problems attached to the symbolic defamation of space, to re-insert the marginalised urban areas into the capital's circulation circuit. At the same

time, the networks of cultural production will be analysed as complex and emerging social formations that exert their structuring effects as "alternative models of regulation" rather than only as "derivations" of the economic and social system or as mediators of the policies considered. Considering above, we will try to understand the effects of the negotiation of the SI imaginaries in terms of the Lefebvrian *production of space*, using Critical Discourse Analysis techniques to understand the connection between the *representations of space* attached to the philanthropic discourses on SI, the opening of *spaces of representation* for cultural organisations and the resulting *spatial practices*.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE **Assessment of coastal vulnerability in semi-enclosed sea basins: focus on a spatially explicit analysis of exposure**
TUTOR(S) **Alessandro PEZZOLI, Lorenzo MINOLA**

ACADEMIC CONTEXT

de Sherbinin A., Bukvic A., Rohat G., Gall M., McCusker B., Preston B., Aposos A., Fish C., Kienberger S., Muhonda P., Wilhelmi O., Macharia D., Shubert W., Sliuzas R., Tomaszewski B. and Zhang S., 2019. Climate vulnerability mapping: a systematic review and future prospects. *WIREs Climate Change*, 10.5, e600.
IPCC, 2019. Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities. In: Pörtner H.-O. et al., *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*.

Nguyen T.T.X., Bonetti J., Rogers K. and Woodroffe C.D., 2016. Indicator-based assessment of climate-change impacts on coasts: a review of concepts, methodological approaches and vulnerability indices. *Ocean and Coastal Management*, 123, pp. 18-43.

Vousdoukas M.I., Voukouvalas E., Mentaschi L., Dottori F., Giardino A., Bouziotas D., Bianchi A., Salamon P. and Feyen L., 2016. Developments in large-scale coastal flood hazard mapping. *Natural Hazards and Earth System Sciences*, 16, pp. 1841-1853.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

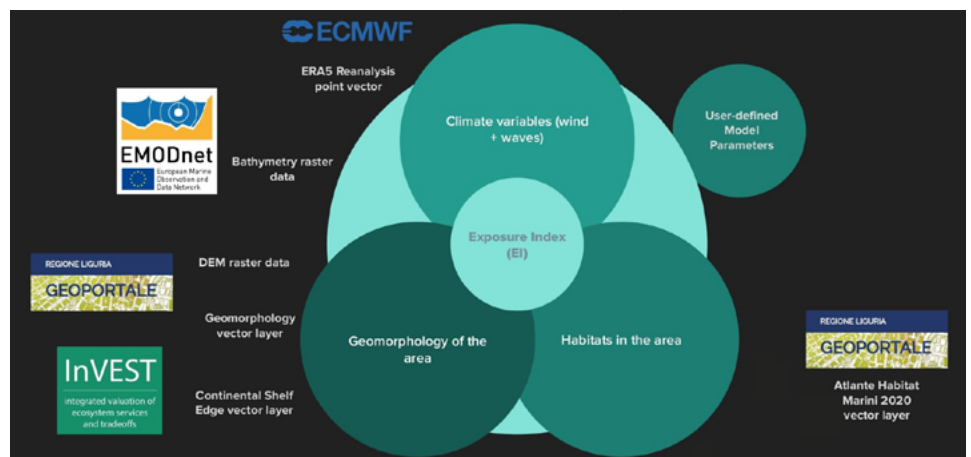
Assessing vulnerability to climate-related hazards is crucial for climate change adaptation. Coastal communities are among those who will likely be affected the most by relevant climate change-related outcomes such as sea level rise and floods. Projections of future urban population trends point towards coastal cities growing in the next years, and to more people being consequently exposed to such hazards. The aim of this PhD research is to advance the knowledge in this field, with a specific focus on assessing physical exposure to coastal inundation and wind-driven extreme sea level changes in semi-enclosed sea basins.

The first phases of the research have been devoted to developing a case study for the assessment of exposure to inundation and erosion for a large shoreline stretch in Liguria. This Italian region is renowned for extreme weather events having particularly dire consequences due to the region's geomorphology and relatively high population density. Liguria's location facing the Mediterranean Sea also allows to account for some peculiarities of sea level extremes in this sea basin.

The vulnerability of the area was analysed by computing a qualitative Coastal Vulnerability Index of relative exposure in a spatially explicit manner along the region's shoreline. The index is obtained as combination of several biogeophysical variables contributing in defining exposure to storm events. Such results can be used to identify which portions of the shoreline are of most concern, in order to orient further more in-depth studies. Though, the results of the analysis also highlight this index-based approach to have significant limitations in terms of conveying precise (i.e. easily interpretable in physical terms) information on the most relevant coastal hazards and their consequences. The shortcomings of the approach adopted in the first phases of the study are in the process of being used to inform the next phases of the PhD research.

The latter will entail: (i) further delimiting the scope of the research by focusing on a specific component of exposure (i.e. the flood hazard formation in its interaction with the territory); (ii) moving away from overly-aggregated and composite index-based approaches in favour of methods providing more easily interpretable outputs (e.g. the predicted flooded area extent).

Further research is projected to focus also on another semi-enclosed sea basin - the Baltic Sea - for comparison with previous results.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE **Scaling migration governance: insights on the role of intermediary organisation in small, medium-sized towns and rural areas**
TUTOR(S) Fabrizio DI MASCIIO, Tiziana CAPONIO

ACADEMIC CONTEXT

Ansell C. and Torfing J., 2015. How Does Collaborative Governance Scale? *Policy & Politics*, 43 (3), pp. 315-29. <https://dx.doi.org/10.1332/030557315X14353344872935>.
Caponio T., 2022. Scaling Migration Network Governance? City Network and Civil Society in Multilevel Policymaking Dynamics. *Global Networks*, 22(3), pp. 397-412. <https://dx.doi.org/10.1111/glob.12365>.
Lacroix T., 2022. Migration-Related City Networks: A Global Overview. *Local Government Studies*. <https://dx.doi.org/10.1080/03003930.2021.1938553>.
Oomen B., 2020. Decoupling and Teaming Up: The Rise and Proliferation of Transnational Municipal Networks in the Field of Migration. *International Migration Review*, 54 (3), pp. 913-39. <https://dx.doi.org/10.1177/0197918319881118>.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The migration crisis of 2014, together with the vast influx from Syria and Afghanistan in the following years, and recently the Ukrainian crisis, jeopardised the nation-states' capability to receive and integrate migrants. These arrivals have added further complexity to the reception management and inclusion of asylum seekers already on the territories. Municipalities struggle against the lack of funding and authority to cope with problems coming up from localities, both economically and socially. Notwithstanding, nation-states are recalcitrant in ceasing strands of sovereignty to the local level of governance for what concerns immigration. Cities have developed new ways of governing those phenomena.

On the one hand, the agency of political actors (i.e. mainly the mayors and civil society organisations) has provided new options for developing innovative ways of answering people's needs on the ground. On the other, cities have fought to create new opportunity structures expressing their longings and highlighting the national governments' shortcomings. Intermediary organisations (IO) provide them with a forum for collaboration and knowledge exchange and represent the need of municipalities and regions to upscale their conception of migration governance. The involvement in such networks implies broader interaction among jurisdictions and foreseeing strategic horizons for organising whole-encompassing reception and inclusion systems. There is the need to overcome the rigid and flat ontology of authority demarcation in territorial-defined and fixed layers of power. The actors interact with structures, sometimes constrained; otherwise can bend authority space creating new opportunity structures for political change.

Thus, it is fundamental to understand which impact the involvement of municipalities in IOs has on the upscaling of migration governance. This participation is expected to allow small and medium-sized towns to widen their opportunity structures for political change in three directions: city-to-city cooperation, EU-municipalities interaction, and territorial spillover. Thanks to a cross-country analytical comparison, this research will be able to shed new light on the ever-growing phenomenon of the upscaling of migration governance through IOs.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE **Beyond fear: an affective approach to urban violence from cuerpo-territorio and socio-spatial practices of healing**
TUTOR(S) Camillo BOANO

ACADEMIC CONTEXT

Anderson B., 2009. Affective atmospheres. *Emotion, space, and society*, 2(2), 77-81.
Hume M. and Wilding P., 2007. Beyond agency and passivity: Situating a gendered articulation of urban violence in Brazil and El Salvador. *Urban Studies*, 57(2), 249-266.
Pavoni A. and Tulumello S., 2020. What is urban violence? *Progress in Human Geography*, 44(1) 49–76.
Zaragocín S. and Carreta M., 2021. Cuerpo-territorio: A decolonial feminist geographical method for the study of embodiment. *Annals of the American Association of Geographers*, 111(5), 1503-1518.

EXTERNAL COLLABORATIONS

- Universidad Centroamericana José Simeón Cañas (UCA), El Salvador

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Urban violence has been one of the main struggles in Latin American (LA) cities in the past three decades. Despite there is not (and there never will be) a fixed definition of urban violence, it can be said to emerge from “the intersections between structures, processes, narratives, practices, and bodies that constitute the urban.” (Pavoni and Tulumello, 2020: 50) Among the significant contributions in the LA context, most studies on urban violence have overlooked two fundamental aspects: (1) the active role that the inhabitants of impoverished urban areas have in coping with the different manifestations of violence, and the socio-spatial practices that derive from this resistance (with a few exceptions such as Hume and Wilding, 2020), and (2) the active role that urban space has, in not only containing violence but also in receiving and exercising it, and how bodies and spaces affect each other as they are intersected by violence (spatial violence).

The aim of my research is to contribute to the understanding of these two aspects by looking at violence, spaces, bodies, and emotions from an affective, decolonial, and communitarian feminist approach, through the concept of affective atmospheres and the concept-method of Cuerpo-territorio, to unveil how coping with different kinds of violence affects bodies and space in low-income urban areas. From an affective approach, atmospheres emerge as an envelope, they are spatialized when bodies of multiple types affect one another (Anderson, 2009). Given the impossibility to record and capture affective atmospheres, Cuerpo-territorio, “as the inseparable ontological relationship between body and territory” (Zaragocín and Carreta, 2021: 2) might allow us to recall and share sensory spatial experiences. By doing so, it might help us to transgress the way in which urban violence has traditionally been approached, allowing us to build collectively a situated understanding of urban violence linked to knowledge and ways of being that are particular to this region.

This research is set in El Salvador, one of the countries with the highest rates of homicides and criminal violence in Latin America. In this context, I intend to pay attention not only to places associated with violent atmospheres, but also to practices, narratives, and spaces of healing, as a way of recognizing that inhabitants who deal with everyday violence are not passive victims but are actively resisting the onslaught of violence with and through their actions in space. To approach them, I will have to engage with different qualitative, affective, and feminist communitarian methods.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE Definition of a standard framework for ESG assessment of private companies: a focus in the manufacturing and construction sectors
TUTOR(S) Patrizia LOMBARDI, Sara TORABI MOGHADAM

ACADEMIC CONTEXT

Billio M., Costola M., Hristova I., Latino C. and Pelizzon L., 2021. Inside the ESG ratings: (Dis)agreement and performance. *Corporate Social Responsibility and Environmental Management*, 28(5), pp. 1426-1445. doi: 10.1002/csr.2177.

Gillan S.L., Koch A. and Starks L.T., 2021. Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance*. Elsevier B.V., 66(June 2020), p. 101889. doi: 10.1016/j.jcorpfin.2021.101889.

Pizzi S. et al., 2022. Voluntary disclosure of Sustainable Development Goals in mandatory non-financial reports: The moderating role of cultural dimension. *Journal of International Financial Management and Accounting*, 33(1), pp. 83-106. doi: 10.1111/jifm.12139.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Climate change is, without doubt, a problem that needs to be addressed by public and private actors. According to the secretary of the UN is a critical issue of our time. The private sector plays a key role in presenting concrete innovative solutions to evolving into a zero-carbon economy. Also, leading businesses in making climate change-driven decisions is the best way to improve and create healthier and equitable societies.

There is a global tendency towards mandatory sustainability disclosure, recognizing that it represents valuable business information for stakeholders and investors, yet there is doubt about the value companies give to reporting when sustainability criteria are not aligned with business objectives. The adoption of environmental, social and governance (ESG) criteria has become a mandatory regulation for European companies, consequently, several methodologies and rating agencies have emerged with individual proposals to evaluate sustainability contribution. To improve the quality and transparency of the reported information and in addition reduce the costs implied in ESG reporting, is necessary to coordinate and standardize the evaluations.

By aligning the values of companies with sustainability goals, the cost of sustainability reporting could be oriented towards the development of efficient measurements.

There is a need for a standard sustainability reporting tool that can compare sustainability report measurements between companies, to report progress in climate change mitigation and advancement in the achieving of the 2030 agenda, while also being of benefit to the companies' financial objectives.

This review aims to consolidate the current situation regarding sustainability reporting in private companies at the European level, including mandatory and optional reports, indices and frameworks to provide a general overview and critical analysis to elaborate future reporting protocols that contribute to better achievement of sustainability goals and climate change mitigation while complying business objectives.

Economies are reshaping into sustainable practices, conducting businesses into the consideration of ESG issues in decision-making, and using reporting as a key initiative to achieve the value creation of the sector with the SDGs. Also the potential is such that the Global Sustainable Investment Review (2018) stated that the global sustainable investing assets accounts for 30 million dollars and is continuing to increase.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE Gender, caste & planning: women street vendors and the politics of space in Mumbai
TUTOR(S) Michele LANCIONE

ACADEMIC CONTEXT

Anjaria J.S., 2006. Street Hawkers and Public Space in Mumbai. *Economic and Political Weekly*, 41(8).
Bandyopadhyay R., 2009. Archiving from Below: The Case of the Mobilised Hawkers in Calcutta. *Sociological Research Online*, 14(5), pp. 27-37.
Chakravarti U., 2018. *Gendering caste through a feminist lens*. New Delhi: SAGE Publications Stree.
Sundaresan J., 2019. Urban planning in vernacular governance: Land use planning and violations in Bangalore, India. *Progress in Planning*, 127, pp. 1-23.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Street vendors in Mumbai are targeted on various fronts: by the forces of neoliberalism that term vendors as ‘encroachments’ over property; a state that views them as an obstacle to an ordered urban life; “bourgeois environmentalists” that consider street vendors as ‘eyesores’ and sources of ‘filth’; as well as xenophobic, regionalist political parties that protest against the ‘influx’ of migrant workers in the city. How does the intersection of gender and caste influence these multiple axes of oppression faced by street vendors?

For Indian women, the decision to work outside the home involves crossing boundaries – both social and material – that are based on the traditional perception of where a woman’s domain should lie. It is this very tension between the workplace and home, the public and private that gives birth to a spatiality shaped by the intersections of gender, caste, and class. Women street vendors in Mumbai are, thus, uniquely vulnerable to urban policies that encourage segregation of the commercial from the residential, create rigid “no-hawking” zones, rely on technocratic solutions, and focus on formalising rather than supporting street vendors. Knowledge produced about and with women street vendors will be key to addressing this gap.



Thus, an ethnographic approach that is grounded in the social and historical geography of the city is required to understand the experiences of women street vendors in Mumbai. I argue that doing so opens up a portal that allows us to critique the current urban planning paradigm in India, interrogate how the intersection of gender, caste, and class has produced urban space, and shift attention to the policy-based, political, and epistemological exclusion of women and caste minorities in India. To do this, I build upon three main conceptual frameworks in my research – decolonial Southern urbanism, feminist geography, and anti-caste geography.

Therefore, the broad research aim of my project is expanding our understanding of the intersection of caste, gender, and space in Indian cities, and how this relation has produced urban space, through the experiences of women street vendors in Mumbai. This would include understanding the everyday experiences of women street vendors through an ethnographic approach, focusing on the impact of contemporary urban planning policies on them, and finally, analysing, through a historical lens, how street vending has been viewed by the colonial and postcolonial state.

NAME **Elia SILVESTRO**
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COURSE XXXVII cycle - 1st year
RESEARCH TITLE The geography of italian logistics' renaissance: private rationalities and public prophecies between sprawl and special economic zones
TUTOR(S) Carlo SALONE

ACADEMIC CONTEXT

Agenzia per la coesione territoriale, 2017. *ZES – Zone Economiche Speciali*. <https://www.agenziacoesione.gov.it/zes-zone-economiche-speciali/> [Accessed 31 Aug 2022]
Dablanc L. and Browne M., 2020. Introduction to special section on logistics sprawl. *Journal of Transport Geography*, 88, p. 102390. <https://doi.org/10.1016/j.jtrangeo.2019.01.010>.
UNCTAD, 2019. Special Economic Zones, in: UNCTAD, ed. *World Investment Report*. Geneva: United Nations Conference on Trade and Development, pp. 128-206. <https://unctad.org/webflyer/world-investment-report-2019> [Accessed 31 Aug 2022]
Yeung H., 2005. Rethinking relational economic geography. *Transactions of the Institute of British Geographers*, 30, pp. 37-51. <https://doi.org/10.1111/j.1475-5661.2005.00150.x>.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

As supply chains stretch along ever-longer globalized corridors, Western economies are jumping on the bandwagon of logistics, and Italy is no exception. After decades of non-existent national industrial policies, in 2017 the government introduced the bold legislative frameworks of Special Economic Zones (SEZs) for disadvantaged Southern Italian regions and Simplified Logistics Zones (SLZs) for richer Northern-Central Italy. SEZs and SLZs delimit areas linked to Mediterranean seaports, reconfiguring them as nuclei of extensive development policies (Agenzia per la coesione territoriale 2017). Foreign investors are lured with tax breaks as well as grandiose narratives of economic opportunities.

Italy's singular move has several uninvestigated geographical dimensions. The SEZ/SLZ policy is unique both for its location in a high-income country under strict EU state aid regulation (UNCTAD 2019) and the sheer amount of potentially competing free zones. It also introduces public intervention in a chiefly private-led sector, where distant rationalities come to operate in common spaces. I explore these tensions and contradictions in the case of heavily urbanised and industrialised Po Valley, in Northern Italy.

My first hypothesis is that logistics sprawl in Northern Italy results from unplanned private initiative, as argued in much literature (Dablanc and Browne 2020). Second, I posit that SLZs overlies the existing sprawl with a planned geography where public and private interests balance out

into a new rationality, resulting in disconnected spatial outcomes. I quantitatively test whether this may reorder the existing logistics landscape, while using qualitative methods such as semi-structured interviews and desktop research to clarify the rationalities of the actors producing logistics spaces. Third, I question the competing strategies of individual SLZs against global logistics hubs. The regional scope of SLZs clashes against the (supra-)national range of competitors. While Northern Italy's main ports, Genoa and Trieste, aim at catching up with European competitors, the self-prophesying 'global hubs' of ZLSs only cover the immediate hinterland of hub-ports. I shall explore this contradiction with qualitative methods again. I ultimately aim at producing a relational geography of logistics development in Northern Italy (Yeung 2005) unveiling the socio-spatial determinants of logistics spaces development.



Ph Michele Borzoni

NAME **Anthony SUPPA**
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COURSE XXXVII cycle - 1st year
RESEARCH TITLE Towards a climate-neutral Turin: evaluating district-scale retrofit scenarios for the built environment using design expert input and urban building energy modelling (UBEM)
TUTOR(S) Marta Carla BOTTERO

ACADEMIC CONTEXT

Becchio C., Bottero M.C., Corgnati S.P. and Dell'Anna F., 2018. Decision making for sustainable urban energy planning: an integrated evaluation framework of alternative solutions for a NZED (Net Zero-Energy District) in Turin. *Land Use Policy*, 78, pp. 803-817.

Davila C.C., Reinhart C.F. and Bemis J.L., 2016. Modeling Boston: A workflow for the efficient generation and maintenance of urban building energy models from existing geospatial datasets. *Energy*, 117, pp. 237-250.

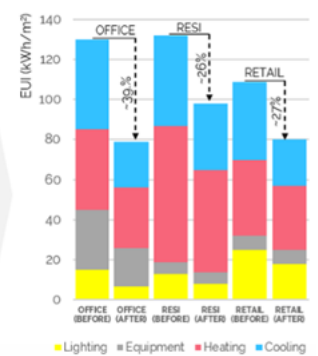
Huovila A., Siikavirta H., Rozado C.A., Rökman J., Tuominen P., Paiho S., Hedman Å. and Ylén P., 2022. Carbon-neutral cities: Critical review of theory and practice. *Journal of Cleaner Production*, p. 130912.

Suppa A.R., Cavana G. and Binda T., 2022. Supporting the EU Mission "100 Climate-Neutral Cities by 2030": A Review of Tools to Support Decision-Making for the Built Environment at District or City Scale. In *International Conference on Computational Science and Its Applications*. Springer, Cham. pp. 151-168.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Turin was recently selected as one of 100 cities for the EU mission, "100 climate-neutral cities by 2030". To achieve this mission, cities must eliminate or offset all direct emissions created in their boundaries as well as all grid-supplied electricity supplied to the area. Whether Turin's participation will include the entire city or a district of minimum 50,000 population is not yet clear. In either case, a key to Turin's decarbonization must include retrofit strategies to reduce energy demand in the built environment, which accounts for 40% of energy consumption and 36% of energy-related carbon dioxide (CO₂) emissions in the EU.

In the first-ever review on the climate-neutral cities concept, Huovila et al. (2022) note how the transition to neutrality involves decisions laden with co-benefits and trade-offs. They detail tools to estimate impact of climate actions and describe the need for clear indicators to monitor progress, concluding that research in these fields can support cities to develop and evaluate action plans. One support and evaluation tool for decision and policy makers dealing with urban transitions, as suggested by recent research, is urban building energy modeling (UBEM). UBEM creates models at the district or city scale, ranging from dozens to thousands of buildings at a time, and providing both the baseline case and energy and CO₂ savings arising in retrofit scenarios. A small number of UBEM studies demonstrates the potential for district-level retrofits to meet net-zero energy or CO₂ standards, and others reach the European Green Deal target of reducing 55% of emissions below 1990 levels by the year 2030.



Source: Ang et al. (2020)

the transition to neutrality involves decisions laden with co-benefits and trade-offs. They detail tools to estimate impact of climate actions and describe the need for clear indicators to monitor progress, concluding that research in these fields can support cities to develop and evaluate action plans.

One support and evaluation tool for decision and policy makers dealing with urban transitions, as suggested by recent research, is urban building energy modeling (UBEM). UBEM creates models at the district or city scale, ranging from dozens to thousands of buildings at a time, and providing both the baseline case and energy and CO₂ savings arising in retrofit scenarios. A small number of UBEM studies demonstrates the potential for district-level retrofits to meet net-zero energy or CO₂ standards, and others reach the European Green Deal target of reducing 55% of emissions below 1990 levels by the year 2030.

The PhD candidate's proposed research shall unfold over three academic journal articles: (1) a literature review on district- or city-scale intervention scenarios using UBEM, focusing on retrofit interventions, the decision-making behind their selection, as well as the performance and cost of the interventions; (2) guided by precedents in Article #1, determine climate-neutral retrofits for a Turin district using UBEM; and (3) guided by precedents in Article #2 as well as design expert input, determine climate-neutral retrofits for the Turin district(s) participating in the EU mission using UBEM. This last article further adds to the decision support and evaluation value of the work, using design experts to select and rank climate-neutral retrofits for the Turin district(s), using focus groups and multi-criteria analysis (MCA) tools.

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COURSE XXXVII cycle - 1st year
RESEARCH TITLE Urban development through Complex Networks and Mathematical Dynamic Modelling
TUTOR(S) Marta Carla BOTTERO

ACADEMIC CONTEXT

Assumma V., Bottero M., De Angelis E., Lourenço J.L., Monaco R. and Soares A.J., 2021. A decision support system for territorial resilience assessment and planning: an application to the Douro Valley (Portugal). *Science of the Total Environment*, 756, p. 143806.

Bettencourt L.M.A., 2021. *Introduction to Urban Science*, Cambridge: MIT Press.

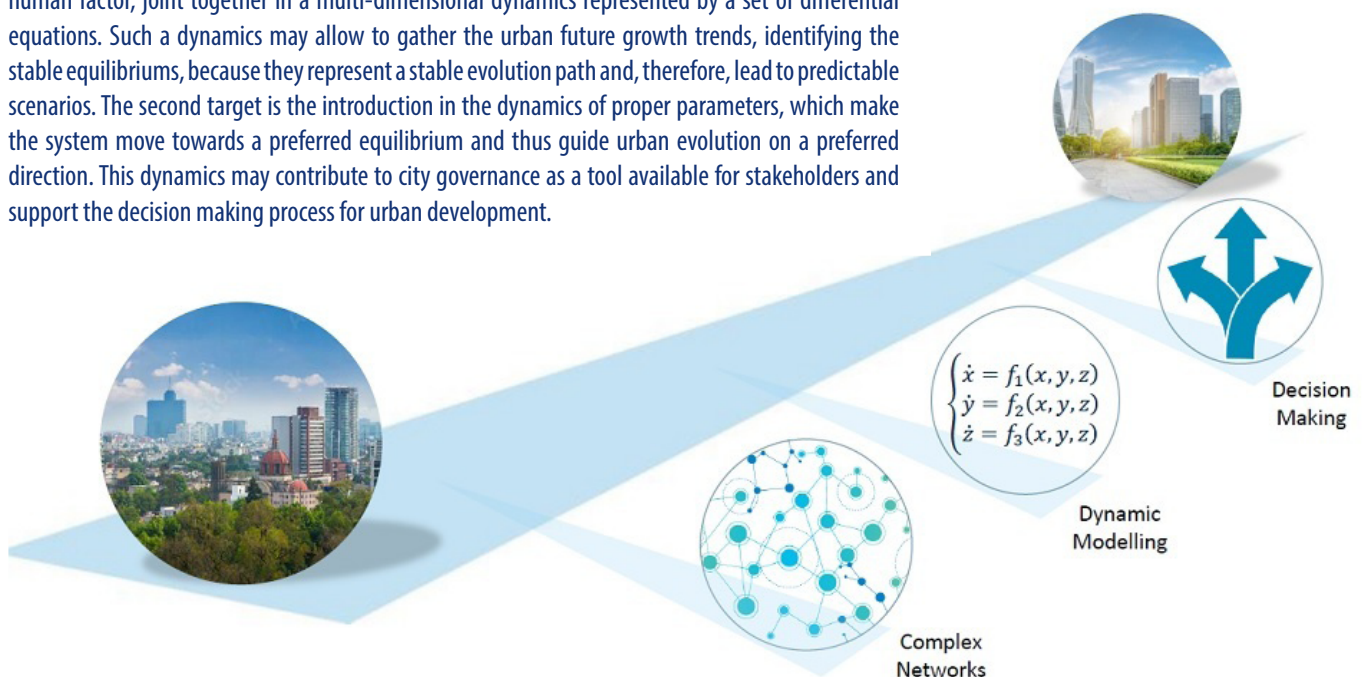
Finotto F., Monaco R. and Servente G., 2010. Un modello per la valutazione della produzione e della diffusività di energia biologica in un sistema ambientale. *Scienze Regionali (Italian Journal of Regional Sciences)*, 9(3), pp. 61-84.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Since the middle of the XX century, the world's population has experienced a sharp increase due to a general improvement in living conditions and in the last 35 years urban population had a jump of 2.3 billion people and the analyses show a consolidated trend of this phenomenon, which will bring 68% of people to live in cities by 2050. The control of urban processes and what tools are to be used to achieve this result have, thus, become a central issue for managing such complex realities, in constant economic, social and building development, not to mention the environmental fall-outs.

Starting from the awareness that contemporary cities are complex systems, as every problem dealing with complexity it is necessary to use tools and methods suitable for the urban governance and future development. The research aims to address the specific topic of urban evolution using Science of Complex Networks and Mathematical Dynamic Modelling to predict possible scenarios in the growth of metropolitan areas and to provide further elements to support decision makers, in order to guide cities' future development.

From this background, the research aims to the analysis of cities' topology, examining the steps taken to get to the current configuration (from central to polycentric city and recently to city of cities) and the basic features of a network reading and modelling. This path will lead to the ultimate research aim, the development of a mathematical model of urban evolution accounting for several components: urban growth, environmental sustainability and the human factor, joint together in a multi-dimensional dynamics represented by a set of differential equations. Such a dynamics may allow to gather the urban future growth trends, identifying the stable equilibriums, because they represent a stable evolution path and, therefore, lead to predictable scenarios. The second target is the introduction in the dynamics of proper parameters, which make the system move towards a preferred equilibrium and thus guide urban evolution on a preferred direction. This dynamics may contribute to city governance as a tool available for stakeholders and support the decision making process for urban development.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE **Achieving the United Nations' Sustainable Development Goals.
Developing a toolbox for localizing Agenda 2030 in cities**
TUTOR(S) **Patrizia LOMBARDI, Riccardo POLLO, Luisa MARELLI, Alice SIRAGUSA**

ACADEMIC CONTEXT

Brandon P.S. and Lombardi P., 2011. *Evaluating Sustainable Development in the Built Environment*. 2nd ed. Oxford: Wiley-Blackwell.
European Commission, Joint Research Centre, Siragusa A., Stamos I., Bertozzi C. and Proietti P., 2022. *European Handbook for SDG voluntary local reviews: 2022 edition*. Publications Office of the European Union. <https://doi.org/10.2760/355330>.
Pollo R., Trane M. and Giovanardi M., 2021. Urban Metabolism, Interdisciplinary models, and design at micro-urban scale. *Techne*, 21, pp. 154-164.
Sala S., Farioli F. and Zamagni A., 2013. Progress in sustainability science: Lessons learnt from current methodologies for sustainability assessment: Part 1. *International Journal of Life Cycle Assessment*, 18(9), pp. 1653-1672. <https://doi.org/10.1007/s11367-012-0508-6>.

EXTERNAL COLLABORATIONS

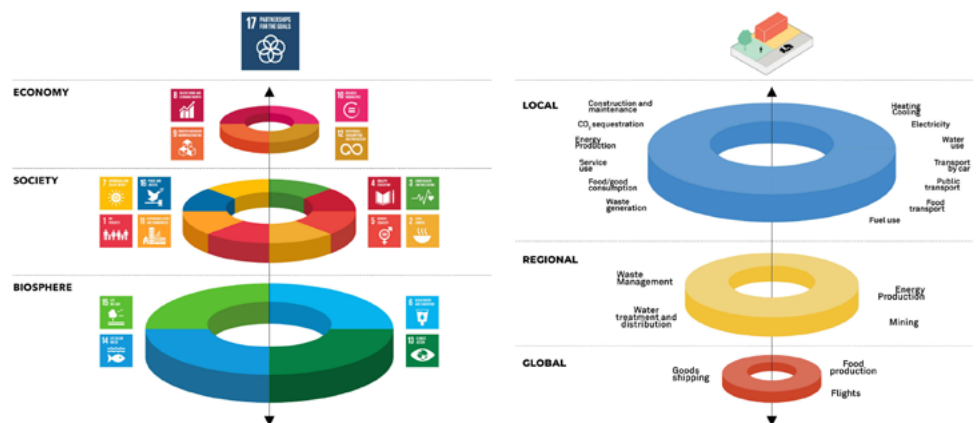
- European Commission's Joint Research Centre (JRC), Ispra (VA), Italy (co-financer of the PhD grant)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Approved on 25 September 2015, the Sustainable Development Goals (SDGs) came up with 17 Goals, 169 Targets and 231 Indicators. Agenda 2030 was conceived with a comprehensive review protocol, as the United Nations recognized that a robust, voluntary, and integrated progress tracking at global, regional, and national level vitally contributes to SDG implementation.

This joint Doctoral Research between Polito and the JRC focuses on the development of methods to monitor progress, design transformations, and identify solutions to achieve the Agenda 2030. As for the first research year, the collaborative programme aims at performing a critical and systematic survey on existing approaches for identifying solutions to achieve the SDGs at European, national, and sub-national levels. As an output of this, a Systematic Literature Review (SLR) has been performed. Indeed, many approaches are now available for sustainability assessment in all domains. Research is now putting efforts into adapting consolidated methodologies, and related methods, in operationalizing Agenda 2030, as well as establishing new approaches for conceptualizing the SDGs and measuring phenomena or progress against them.

Therefore, the SLR aims at reiterating the centrality of SDGs for sustainable policy-making by systematizing knowledge on the "Means of Implementation" of the Agenda 2030. From this perspective, the SLR highlights major gaps and paves the way for future investigations. A paper database has been set after establishing a review protocol. The papers have been presented by descriptive analysis (historical series, scale of investigation, and SDG correspondence mapping); bibliometric analysis on key-word co-occurrence; content analysis, both quantitative and qualitative, according to the approach adopted and recurrent research domains. In light of major trends and gaps highlighted, a three-step strategy across scales have been proposed, to frame and advance the research in upcoming years. The strategy will imply: performing priority setting and interlinkage assessment among SDG Targets at the city level, identified as major hotspot for sustainability and the scale where the localization of Agenda 2030 should be definitely pursued; boosting policy coherence across national and urban development strategies; identifying a toolbox for assessing the response of cities in SDG mainstreaming, i.e., reviewing progress and promote urban sustainability transformations in light of established priorities.



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COURSE XXXVII cycle - 1st year
RESEARCH TITLE **A spatial dynamic integrated approach for beavers management as Nature-based Solution for freshwater ecosystem restoration**
TUTOR(S) **Elena COMINO**

ACADEMIC CONTEXT

Austin M.P., 2007. Species distribution models and ecological theory: a critical assessment and some possible new approaches. *Ecol. Model.*, 200, pp. 1-19.
Nyhus P.J., 2016. Human-Wildlife Conflict and Coexistence. *Annu. Rev. Environ. Resour.*, 41, pp. 71.
Siemer W.F., Hall B., Jonker S.A., Decher D.J. and Organ J.F., 2013. Toward an understanding of beaver management as human and beaver densities increase. *Human-Wildlife Interactions*, 7(1), pp.114-131.
Treves A., Bottero M., Caprioli C. and Comino E., 2020. The reintroduction of Castor fiber in Piedmont (Italy): An integrated SWOT-spatial multicriteria based approach for the analysis of suitability scenarios. *Ecol. Indic.*, 118.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Human activities directly and indirectly affect the environment by changing land uses, breaking off river continuity, altering flow regime, polluting environmental matrices and affecting biodiversity. Freshwater ecosystem are one of the most threatened ecosystems at global scale.

In this context, beavers represent a Nature-based solution to increase the resilience of freshwater ecosystem to drivers of change. These animals are known as ecosystem engineers because they deeply modify the environment acting on species richness, landscape, climate, flow regime. Moreover, beavers offer several ecosystem services. However, although beavers represent a sustainable solution, they as other species (wolf, bear, deer, etc) are often identified as a problem or they are seen as intruder where the proximity to human is strong. Human-wildlife relation, interactions and the extent of related conflicts are strictly linked to human vision of World. Currently, the management of species and related conflict is a hotly debated topic given the involvement of social community and the different interpretation of the concepts of acceptance, tolerance and coexistence. The challenge is to find a balance between needs and behaviour of species involved implementing management strategies that consider ecosystem approach and socio-economic theories.

To response to this challenge, the proposed approach aims to structure a planned multi-species management approach which considers beavers and biodiversity as a resource, evaluating socio-ecological dynamics linked to human-wildlife interactions. This approach is innovative in the field of human-wildlife conflicts because it combines Species Distribution Models



(SDMs) and Causal Loop Diagrams (CLDs). SDMs are often applied for conservation purposes, while CLDs are used for modelling complex systems in engineering and management. The analysis will be applied in a participatory perspective to two different study areas suitably chosen. The expected results will consist of a cartographic support and a discussion tool that permit to define several guidelines for the management of human-wildlife relationship and a social debate management approach that considers the beaver as a resource and not a problem to be solved.



PAST CYCLES



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Velia BIGI

Vulnerability to Natural Resilience and the Landscape Identity

Francesca BLANC

Testing Comparative Spatial Planning Studies in Latin America. Case Studies from Ecuador and Bolivia

Francesca Caterina BRAGAGLIA

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

Alessandra BUFFA

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

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Elena BELCORE

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

Giacomo CAZZOLA

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