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2019 - Number 3
ISSN 2533-2139

Urban and Regional Development Ph.D. Programme
ANNUAL REPORT 2019

POLITECNICO DI TORINO
UNIVERSITÀ DEGLI STUDI DI TORINO

Dipartimento Interateneo di Scienze, Progetto e Politiche del Territorio

Urban and Regional Development Ph.D. Programme - ANNUAL REPORT

Editorial coordination: Umberto JANIN RIVOLIN and Luca STARICCO
Graphic design: Cinzia PAGANO

Viale Mattioli, 39 - 10125 Torino, Italy

2019 - Number 3
ISSN 2533-2139

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INTRODUCTION

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

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

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

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

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

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

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

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

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19. Renewable energy and energy transition
20. Water management

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XXXII CYCLE - 3rd YEAR STUDENTS

NAME **László CSEKE**
E-MAIL laszlo.cseke@polito.it

COURSE	XXXII cycle - 3rd year
RESEARCH TITLE	The landscape of separation. Non-human value production in the 'mozzarella landscape' of Campania
TUTOR(S)	Ugo ROSSI, Laura LIETO (Università di Napoli Federico II)

ACADEMIC CONTEXT

Boyd W., Prudham W. S., Schurman R. A., 2001. Industrial Dynamics and the Problem of Nature. *Society and Natural Resources*, 14, pp. 555-570.
Braverman I., 2016. *Animals, Biopolitics, Law: Lively Legalities*. Abingdon and New York: Routledge.
Esposito R., 2011. *Immunitas: The Protection and Negation of Life*. Cambridge: Polity Press.
Gillespie K., Collard R.C., 2015. *Critical Animal Geographies*. Abingdon: Routledge.

EXTERNAL COLLABORATIONS

- Department of Geography, Simon Fraser University, Vancouver, Canada
- Department of Architecture (DIARC), Università di Napoli Federico II
- Fattoria Didattica Biologica Ponteré, Cancello ed Arnone - Caserta

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Research interests

- 'More-than-human' geographies
- Lively capital
- Immunological politics
- The real subsumption of nature
- The 'mozzarella landscape' in Campania

My research investigates the relationships between humans, buffaloes and the landscape in Terra dei Mazzoni (Province of Caserta, Italy). More specifically, I am interested in the various ways in which laws/regulations, cultural-historical mechanisms, and the physical characteristics, as well as limitations of the landscape, contribute to the transformation of animal lives and bodies through capital and science.

In order to analyze the changing relationships between humans, animals and the landscape, and the various mechanisms that seek to transform and improve animal lives and bodies to conform the market demand for mozzarella cheese, I have used a variety of research methods.

These methods have included detailed textual analyses of newspapers, magazines and government and industry reports, in-depth and expert interviews and photography. I have also conducted participant and direct observation in a multispecies 'contact zone' during my work experience in a buffalo farm.

One of the first outcomes of this research – recently presented at the Annual Meeting of the American Association of Geographers in Washington DC – is that securitization of nonhuman economies results not only in stronger control over the product and the whole production chain, including nonhuman value producers, but it also contributes to the transformation of nonhuman/animal life cycles in radical ways.

NAME **Federico DELL'ANNA**
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COURSE XXXII cycle - 3rd year

RESEARCH TITLE Energy and Economic Evaluations to Design Urban Transformation and Requalification Programs

TUTOR(S) Marta C. BOTTERO, Stefano P. CORGNATI (Politecnico di Torino)

ACADEMIC CONTEXT

Becchio C., Bottero M., Corgnati S., 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.
Bottero M., Bravi M., Dell'Anna F., Mondini G., 2018. Valuing buildings energy efficiency through Hedonic Prices Method: are spatial effects relevant? *Valori e Valutazioni*, 21, pp. 27-39.
Buso T., Dell'Anna F., Becchio C., Bottero M., Corgnati S., 2017. Of comfort and cost: Examining indoor comfort conditions and guests' valuations in Italian hotel rooms. *Energy Research & Social Science*, 32, pp. 94-111.

EXTERNAL COLLABORATIONS

- National University of Singapore, Singapore
- Universitat Politècnica de Catalunya, Spain
- Aalborg University, Denmark

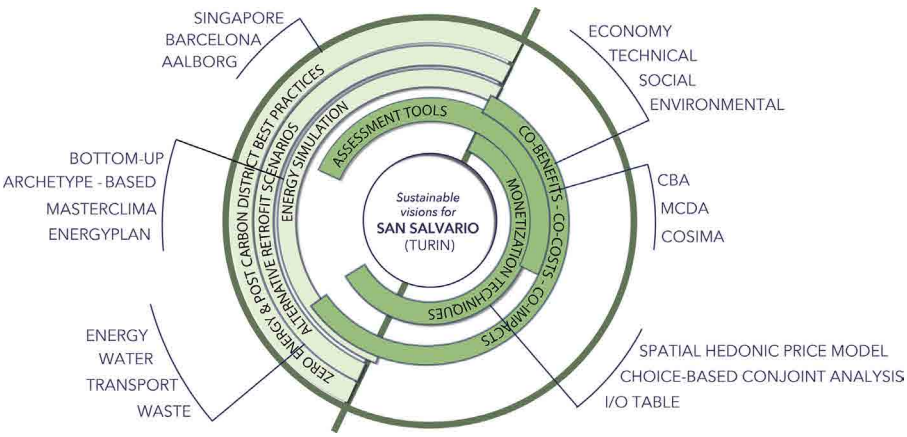
HIGHLIGHTS OF THE RESEARCH ACTIVITY

According to the European Roadmap 2050, the government should employ significant financial resources to develop innovative technologies in energy efficiency which are more expensive compared to conventional ones. Against these expenses, it is necessary to consider the full range of positive impacts generated in the feasibility evaluation. My thesis aims to create a standardized decision support system to guide the evaluation of retrofit processes in the context of the post-carbon cities. The valuation process incorporates the co-benefits coming from energy-efficient urban solutions considering economic, social and environmental aspects bearing in mind all stakeholders involved.

The first part of the research provides a detailed analysis of virtuous existing cases around the world where innovative sustainable measures in energy, mobility, waste and water sectors were tested. An on-site exploration were performed in Singapore, Barcelona (Spain), and Aalborg (Denmark).

The second section deals with the exploration of the co-benefits generated by the retrofit projects. In particular, a space hedonic prices model has been applied to the Singapore's real estate market, to understand the green premium provided by green buildings. As second application, a choice-based conjoint analysis was developed for the cities of Barcelona and Turin to identify the attitude of young families towards energy efficiency. The goal of the third research is to measure the new green jobs connected to renovation projects through an input-output analysis model.

Finally, I investigated possible future scenarios for the San Salvario district located in Turin. The scenarios definition covered all the sectors of the urban system that come into play. The results of the energy analysis were integrated into the COSIMA (COmpoSIte Modelling Assessment) evaluation model in order to identify the best solutions for the district including both economic/monetary aspects and extra-economic aspects, and deliver sustainable guidelines to Municipality.



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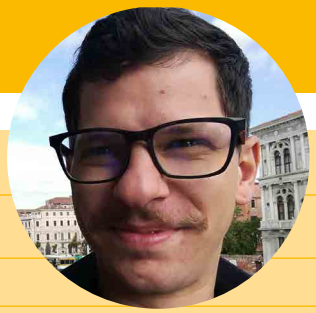

COURSE XXXII cycle - 3rd year

RESEARCH TITLE Does Climate Change Adaptation Planning need the Plan?
Evidence and insights through the Mainstreaming lens in south Europe

TUTOR(S) Maurizio TIEPOLO, Claudia CASSATELLA, Lorenzo CHELLERI (Universitat Internacional de Catalunya)

ACADEMIC CONTEXT

Granceri M., 2018, Mainstreaming climate resilience into local planning frameworks: the case of Barcelona's innovative climate plan. *Urbanistica Informazioni* - XI Giornata Studio INU, pp. 174-176.
Runhaar H., Wink B., Persson A., Uittenbroek C.J., Wamsler C., 2018. Mainstreaming Climate Adaptation: Taking Stock about 'What Works' from Empirical Research Worldwide. *Regional Environmental Change*, 18(4), pp. 1201-1210.
Tiepolo M., Pezzoli A., Tarchiani V., 2017. *Renewing Local Planning to Face Climate Change in the Tropics*. Cham: Springer.
Wamsler C., 2017. Stakeholder Involvement in Strategic Adaptation Planning: Transdisciplinarity and Co-Production at Stake?. *Environmental Science & Policy*, 75, pp. 148-157.

EXTERNAL COLLABORATIONS

- UIC - Universitat Internacional de Catalunya, Barcelona, Spain
- Comune di Torino – Assessorato Ambiente

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Climate Change Adaptation, CCA henceforth, is a topical research field made of appealing challenges and clear-cut gaps that still need to be fulfilled. Due to the broadness of this research field and the related risks in getting lost into this universe, this Ph.D. Thesis focuses on specific: i) spatial scale, i.e. the local; ii) typology, i.e. public organizations; iii) administrative level, i.e. the municipal; iv) purpose, i.e. planned; v) context: i.e. urban. It aims to understand how to create the basis for a long-lasting and performative CCA planning, questioning that whether CCA can take pace and be integrated into the local planning frameworks. In order to investigate on these issues, the lens through which this research will be conducted is the "mainstreaming", which is a concept that involves the cross-sectoral integration, both horizontal and vertical, of policies and measures, into ongoing spatial development processes and existing plans, portfolios or programmes. Starting from the evidences that municipalities tackle CCA through dedicated plans and in the last two decades the degree of CCA implementation has been low, this research revolves around three questions: i) Does CCA local planning need a new dedicated sectorial plan? ii) Can local governments integrate CCA into their planning frameworks? iii) How does climate-related information enter and last into local planning frameworks?

This research frames its geographic focus on a specific context, namely the south Europe, and the cities that were selected for this study are Barcelona (Spain) and Turin (Italy); both are tackling CCA through ad-hoc policies and plans. The agents that play a significant role in the urban governance of CCA are actors and networks. In the climate policy framework, there are also the funded project to be considered (e.g. EU-LIFE+ and Horizon2020). In the case of Barcelona, the city is part of several networks: international (i.e. C40, R100C, Covenant of Mayors) and local (e.g. Xarxa BCN +sostenible); and it is also partner in an EU-funded project, called RESCCUE. Turin has started its CCA planning due to the EU-funded project "DERRIS", which boosted the CCA policy-making process. It is also part of a trans-national municipal network, i.e. GMF's Transatlantic Cities Lab, and the Covenant of Mayor.

The concept of knowledge "co-production" appeared along the research development and opened for an unexpected discussion on the theoretical alignment with the "mainstreaming" notion.

NAME **Fabio IAPAOLO**
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COURSE XXXII cycle - 3rd year

RESEARCH TITLE De-Individuation of the Modern Subject in the Age of Artificial Intelligence: The Case of Self-Driving Cars & Algorithms for Decisionmaking

TUTOR(S) Marco SANTANGELO

ACADEMIC CONTEXT

Braidotti R., 2013. *The Posthuman*. Cambridge: Polity Press.
Hayles K., 2017. *Unthought: The Power of the Cognitive Unconscious*. Chicago and London: University of Chicago Press.

EXTERNAL COLLABORATIONS

- Research Group on Critical Machine Intelligence (KIM), University of Arts and Design, Karlsruhe, Germany

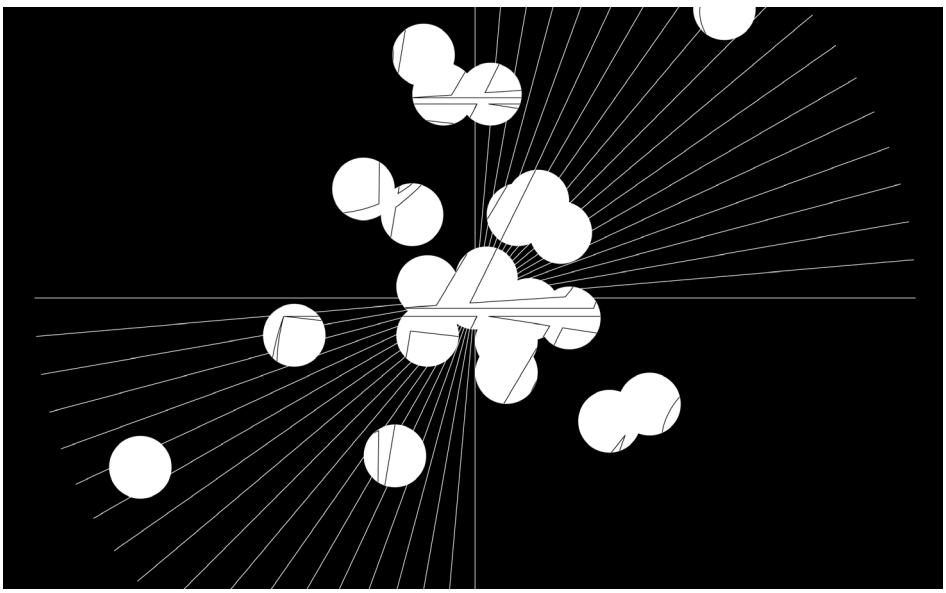
HIGHLIGHTS OF THE RESEARCH ACTIVITY

In recent years, the widespread proliferation of machine learning-based techniques of knowledge production and decision-making has introduced an ambiguous conceptual overlap between automation and autonomy. This is because machine learning algorithms do not simply execute rule-based instructions.

Rather, they can adaptively operate within dynamic environments, taking decisions with no human input and beyond predictability. In other words, they automate cognitive tasks within the framework of ethical decisions previously reserved for humans.

As a result, in the field of geography attention has been increasingly drawn to world-making capacities of algorithms, whose embodied actions and decisions produce tangible socio-spatial effects. By adopting a cognitive assemblage approach, this work investigates the agency of algorithms as expressed in the context of automated driving systems.

The empirically-grounded discussion of self-driving is aimed at showing that neither humans nor machines can be said to operate within fully autonomous realms. Rather, driving decisions result from complex human-machine interactions taking place at multiple spatiotemporalities. Ultimately, the project contest the liberal conception of the human subject as the sole locus of sovereign decision-making.



NAME **Lucia LUPI**
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COURSE XXXII cycle - 3rd year

RESEARCH TITLE Mirroring the City. Toward Web-Based Technologies to Support City Stakeholders in Local Development Actions

TUTOR(S) Marta C. BOTTERO, Giancarlo COTELLA, Anna DE LIDDO (The Open University)

ACADEMIC CONTEXT

Lupi L., 2019. City Data Plan: The Conceptualisation of a Policy Instrument for Data Governance in Smart Cities. *Urban Science*, 3(3), p. 91.

Lupi L., 2019. Building City Mirrors: structuring design-driven explorations of future web-based technologies for local development, *IASDR 2019*.

EXTERNAL COLLABORATIONS

- KMi - Knowledge Media Institute, The Open University, Milton Keynes, United Kingdom

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The limited impact of smart city technologies and the under-exploitation of the potentialities of web-based technologies in local actions are rooted in a disconnection between these technologies and city dynamics. This disconnection concerns a) the model of the users of such technologies and the social structures, norms, relationships regulating city life, b) the model of the city as physical background of local activities instead than system of systems working ecologically, c) the roles and forms of support provided by technology as media, instrument, intermediary, or enabler.

This work addresses the problem of realigning the models of users, city and technology to city dynamics for exploring how to design web-based technologies to support city stakeholders in the orchestration of local development actions. This work investigates:

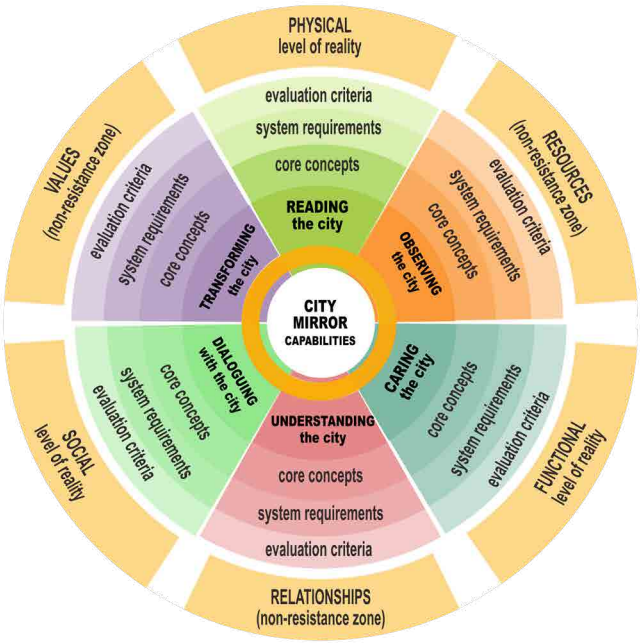
- the factors that could facilitate the coexistence of different local stakeholders with divergent or conflicting goals, practices, constraints, discourses in a shared virtual environment;
- how local stakeholders could interact with/in/through this digital shared environment, overcoming part of the current limitations of standard web-based technologies to infrastructure reliable and resilient multi-actor actions in local processes;
- the implications of design choices and solutions for web-based technologies intended to support these processes in a multi-purpose, multi-stakeholder, and multi-scalar environment mirroring the interdependence among city systems, users' identities and local actions.

The thesis had been developed within a transdisciplinary research framework bridging Urban Planning, Urban Design, and Urban Studies on one side, Computer-Supported Cooperative Work, Human-Computer Interaction Design, and Information Systems on the other side.

Three case studies covered the development of three prototypes of web-platforms intended to be multi-stakeholder, multi-purpose, and multi-scale to reflect how cities work: a civic social network, a collaborative urban governance platform, and an open city data portal.

The main outputs of the research are:

1) a preliminary theoretical framework of the capabilities of web-based technologies mirroring the city;
2) an operational framework to assess the correspondence between the capabilities of city technologies and their expected applications for implementing people-centred smart city visions.



NAME **Andrea MORA**
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COURSE XXXII cycle - 3rd year

RESEARCH TITLE Collective labor in practice. Infrastructures, power and normativity in Lima neoliberal stage of popular urbanizations

TUTOR(S) Francesca GOVERNA, Pablo VEGA CENTENO (Pontificia Universidad Católica del Perú)

ACADEMIC CONTEXT

Amin A., 2013. Telescopic urbanism and the poor. *City*, 17(4), pp. 476-492.
Jones A., Murphy J.T., 2011. Theorizing practice in economic geography: Foundations, challenges, and possibilities. Progress in *Human Geography*, 35(3), pp. 366-392.
Schatzki T.R., 2012. A Primer on Practices. In J. Higgs, R. Barnett, S. Billett, M. Hutchings, F. Trede, *Practice-Based Education*. Rotterdam: SensePublishers, pp. 13-26.

EXTERNAL COLLABORATIONS

- Grupo Interdisciplinario de Investigación en Ciudades y Territorios Urbanos (INCITU), Centro de Investigación de la Arquitectura y la Ciudad (CIAC), Pontificia Universidad Católica del Perú (PUCP), Lima, Peru
- Urban Research Group, Centre for Latin American Research and Documentation (CEDLA), University of Amsterdam, The Netherlands

HIGHLIGHTS OF THE RESEARCH ACTIVITY

In the field of the urban studies with a focus in social and spatial justice, a recent entrant approach has attempted to examine informal urban conditions from a different prospective. The reflections on 'telescopic urbanism', started by Amin (2013) and fueled by other scholars have the purpose to claim for different analytical lens enquiring cities. It refers to the opportunity to see the urban condition as an integral whole rather than separated pieces, each one self-referential. Following this debate, my research project address Peruvian urbanization issues, questioning how institutionalized actors deal with low income and marginalized settlements at the urban fringe and how people which are settled in those places struggle to achieve better living conditions. Specifically, I analysed the strengths and weaknesses of the process of urban consolidation occurring in those areas, with a focus in infrastructures, services and a collective labor practice called Faenas Comunale in Spanish.

My guess is that the practice of Faena Comunal is subjected to an ideological and political struggle over meaning, influenced by a neoliberal idea of development in popular urbanization, different from those which emerged in the previous years and in different areas.

I tested such premise assuming a practice-based approach (Schatzki, 2012). An approach chosen due to its capacity to "examine and interpret socioeconomic processes through a focus on the actions and meanings through which and wherein the everyday world is constituted" (Jones & Murphy, 2011:371). Following its assumption, a specific qualitative multi-methods toolbox has been composed, including interviews, quasi-participant observation and focus groups. With the help of TECHO, an international NGO, case-study areas were located in La Nueva Rinconada, in San Juna de Miraflores district, were grassroot organizations had been selected as reference communities.

NAME **Qi MU**
E-MAIL qi.mu@polito.it

COURSE XXXII cycle - 3rd year

RESEARCH TITLE Spatial Morphology of Traditional Settlements in Mountainous Rural Area in China. Taking Tongren area as case study

TUTOR(S) Giuseppe CINÀ

ACADEMIC CONTEXT

Bray D., 2013. Urban Planning Goes Rural Conceptualizing New Villages. *China Perspectives*, 3, pp. 53-62.
Oakes T., 2016. Villagizing the city: turning rural ethnic heritage into urban modernity in southwest China. *International Journal of Heritage Studies*, 22(10), pp. 751-765.
Stojević I., 2019. Village and Heritage in China: A Discussion on the Influence and Future of Heritage Work in Rural Areas. *Heritage*, 2(1), pp. 666-680.
Mu Q., 2019. Chinese Traditional village preservation, practices and policies underway Taking Tongren prefecture as a case study. *XXI Conferenza Nazionale SIU Confini, movimenti, luoghi. politiche e progetti per città e territori in transizione*, Firenze.

EXTERNAL COLLABORATIONS

- South China University of Technology (SCUT)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

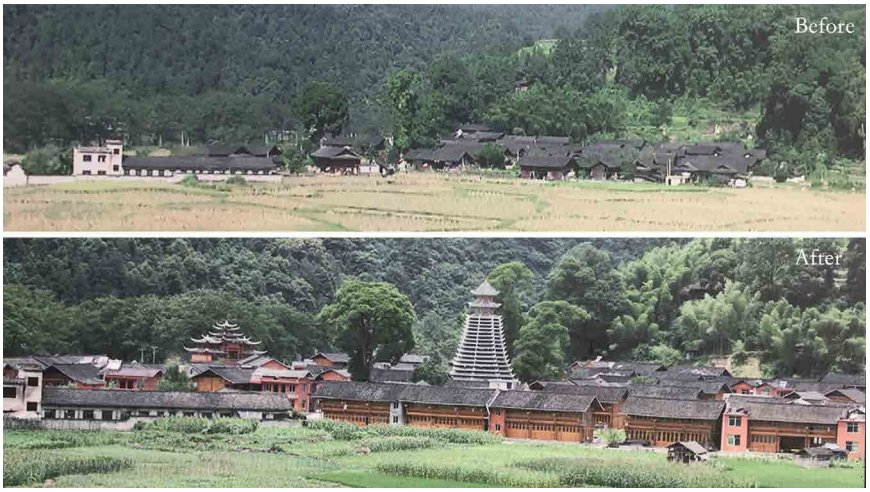
This dissertation focuses on the role of heritage planning activities in Chinese rural context, taking into account both preservation and valorization perspectives. The empirical research is supported by case studies, aiming at understand and analyze the preservation policies and practices in Chinese rural contexts through which the heritage value of the traditional rural settlements have been exploited to address spatial and societal changes, especially in underdeveloped areas.

The research first problematized the topic by focusing on the main conceptions composed in the title, discussing the implications of heritage value in today's traditional rural settlements, how these understandings have been integrated and interpreted into planning policies in rural context, which have been affected on the spatial modifications occurred in three groups of case study villages.

The dissertation adopts a qualitative research methodology, in which the data collection relies on a systematic analysis of the literature review about the rural heritage preservation in China. Moreover, the readings of planning documents released in different periods and by different authorities is also important in understanding when/who/how have interpreted the conceptions of rural heritage into the spatial policies.

To analysis the physical and spatial changes impacted by rural heritage planning policies, an analytical framework has been created. The framework is composed of three levels: i. land use as the macro scale analysis ii. morphological analysis as the median scale refers to physical features modified by the spatial policies iii. building typology and living space evolution as the micro scale.

Moreover, in order to understand the complexity and the reality of each case study, a set of semi-structured interviews with stakeholders involved in planning processes have been carried out.



NAME **Maurizio PIOLETTI**
E-MAIL maurizio.pioletti@polito.it

COURSE XXXII cycle - 3rd year

RESEARCH TITLE Spatial governance in Latin American and Carribean countries: a survey framed by metropolitan regions in Bolivia, Brasil and Cuba

TUTOR(S) Umberto JANIN RIVOLIN, Luciana DE OLIVEIRA ROYER (FAU USP, Brazil)

ACADEMIC CONTEXT

Janin Rivolin U., 2012. Planning systems as institutional technologies: a proposed conceptualization and the implications for comparison. *Planning Practice and Research*, 27(1), pp. 63-85.
Maddalena P., 2014. *Il territorio, bene comune degli italiani: proprietà collettiva, proprietà privata e interesse pubblico*. Roma: Donzelli.
Mazza L., 2015. *Spazio e cittadinanza: Politica e governo del territorio*. Roma: Donzelli.
Pioletti M., de Oliveira Royer L., Urquieta Crespo P., 2019. La articulación de los derechos espaciales en las ocupaciones ilegales para vivienda en el centro de San Pablo (Brasil) y en El Alto (Bolivia). *Uso del derecho y acciones colectivas en areas urbanas segregadas de America Latina y El Caribe.* Quito: FLACSO.

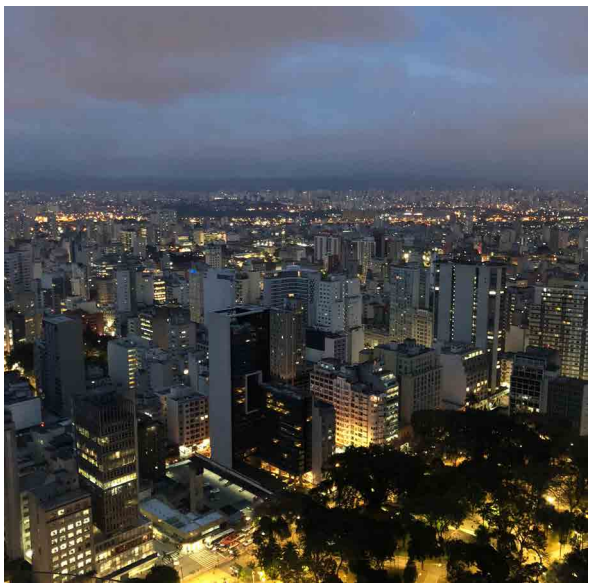
EXTERNAL COLLABORATIONS

- FAU USP, University of São Paulo - FUNDO FICA, Fundo Imobiliário Comunitário para Aluguel, São Paulo, Brazil
- CIDES UMSA, Universidad Mayor de San Andres, La Paz - GAMLP, Municipality of La Laz - GADLP, Departamento de La Paz- RED-HÁBITAT, El Taller de Proyectos e Investigación del Hábitat Urbano y Rural, El Alto, Bolivia
- Associazione di Amicizia Italia-Cuba, Torino

HIGHLIGHTS OF THE RESEARCH ACTIVITY

This research studies the spatial governance in three different Latin American and Caribbean countries: Brazil, Bolivia and Cuba, with a specific focus on the metropolitan regions. The objective is to analyze the spatial governance, according to an analytical conceptualization that considers the spatial governance as the result of the reciprocal influences of 4 different domains: the Structure of the national planning and governance system, the planning Tools, the Discourses influencing the system, and the spatial Practices.

Brazil is a federative republic and an emerging economy. It has formal urban and metropolitan policies and the largest metropolitan regions. Bolivia is a centralized republic and a developing country. The urban development is mostly informal and is currently a more urban country; Cuba is a socialist republic, excluding any sort of metropolitan recognition and policy, even if La Habana is a "de facto" metropolitan region. The main results show a series of problematic issues: (1) the Napoleonic, prescriptive and conformative tradition is present as a post-colonial heritage, but it is not at all the unique model, neither the unique praxis; (2) the implementation of institutional planning is rival and complementary to the social practices that often produce urban space faster; (3) the land and housing tenure is a territorial and social problem: in theoretical and legal terms, the property regime is dominant, in practice, the insufficient land redistribution, the lack of adequate housing, the sum of idle lands lead to illegal occupations, that are legitimized by the social need, ensured by the constitutional and international right to decent housing; (4) territorial cooperation processes are not just an issue of performance of horizontal and vertical relationships. They imply an effort of scaling-up in ensuring citizenship rights from the municipal to the metropolitan/regional scale.



In conclusion, the research shows that the used analytical conceptualization deriving from considering a planning system as an institutional technology is effective also in the analyzed context, but the results are substantially different.

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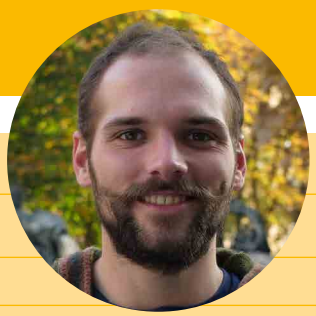


COURSE	XXXII cycle - 3rd year
RESEARCH TITLE	Digital tools and participatory management of urban spaces: an action-centered approach
TUTOR(S)	Giancarlo COTELLA, Grazia BRUNETTA

ACADEMIC CONTEXT

Hess C., Ostrom E., eds., 2007. *Understanding knowledge as a commons: from theory to practice*. Cambridge, Mass: MIT Press.
Kelty C.M., 2016. Too Much Democracy in All the Wrong Places: Toward a Grammar of Participation. *Current Anthropology*, 58(S15), pp. S77-S90.
Latour, B. 2005. *Reassembling the social: an introduction to actor-network-theory*. Oxford, New York: Oxford University Press.
Reason P., Bradbury H., eds., 2011. *The Sage handbook of action research: participative inquiry and practice.* 2 ed., reprinted, London: SAGE.

EXTERNAL COLLABORATIONS

- Avanzi, Sostenibilià per Azioni, Milan
- Comune di Chieri
- CivicWise
- Colector Valencia

HIGHLIGHTS OF THE RESEARCH ACTIVITY

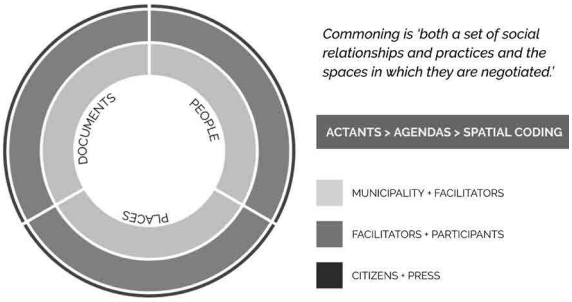
This work makes abstract conceptualizations of urban commons dialogue with empirical experiences of participatory management of urban spaces. Urban commons are made of three inseparable components: built spaces (commons); the communities who define how to access and use them (commoners); and the process that supports their social reproduction (commoning). In addition, since urban commons exist within urban centers they (1) have porous boundaries, both in terms of what the commons is and who commoners are; and (2) are in dialectic with the other forms of organization in their surroundings, often dominated by the public-private dichotomy.

I conceptualize urban commons as spaces with a material and immaterial dimension. The first relates to the commons' situated attributes (like position, architectural characteristics and spatial organization) while the second captures the actions, arrangements and behaviors that support its social reproduction. The two are in constant dialectic, which produces the commons' spatial coding: the set of scripts and repertoires appropriate to that place. If spatial coding captures the link between the material and immaterial dimension of places, we can reinterpret commoning as the process to consolidate a type of spatial coding that corresponds to the arrangements self-designed by commoners.

I test this understanding with an approach that mixes actor-network theory and action research to trace associations between human and non-human entities who support competing agendas aimed at affecting the spatial coding of a commons.

The empirical part of this work is mainly based on a year-long case-study in Chieri, where the municipality hired external facilitators to manage to participatory processes. The first process revolved around the regeneration of a former textile factory, while the second was about the management of three public buildings who had been assigned to local associations. I analyze each process as the intersection of different actor-networks: one where the municipality and facilitators defined a shared strategy; another where facilitators interacted with participants; and a third where the rest of the citizens interact with the process.

Since the municipality and facilitators explicitly referred to urban commons and commoning tn official documents and communication materials, could this be considered as a case of top-down commoning? By tracing the making and unmaking of associations that supported competing agendas, I reflect on the roles played by human actants (people, groups, institutions) and non-humans ones (built spaces, text documents and digital tools). This ANT-drive approach combined with moments of engagement helped me appreciate the influence and interdependence of different entities while avoiding presumptions about their internal stability and bonds.



NAME **Leonardo RAMONDETTI**
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COURSE XXXII cycle - 3rd year

RESEARCH TITLE Spaces of Accumulation in the central plains of China. The case of Zhengzhou, Henan

TUTOR(S) Angelo SAMPIERI, Francesca GOVERNA

ACADEMIC CONTEXT

Ramondetti L., 2019. Zhengdong. Empowering the Inland Metropolis. In M. Bonino et al., eds. *The City after Chinese New Towns. Spaces and imaginaries from contemporary urban China*. Basel: Birkhäuser, pp. 115-122.
Ramondetti L., 2018. Zhengzhou. Il potenziamento della metropoli interna. *Territorio,* 85, pp. 51-56.
Ramondetti L., Safina A., Carota F., 2017. Yanzhou Island, a well-being reserve inside the Zhaoqing New Area. *Urban Design*, 13(5), pp. 54-61.

EXTERNAL COLLABORATIONS

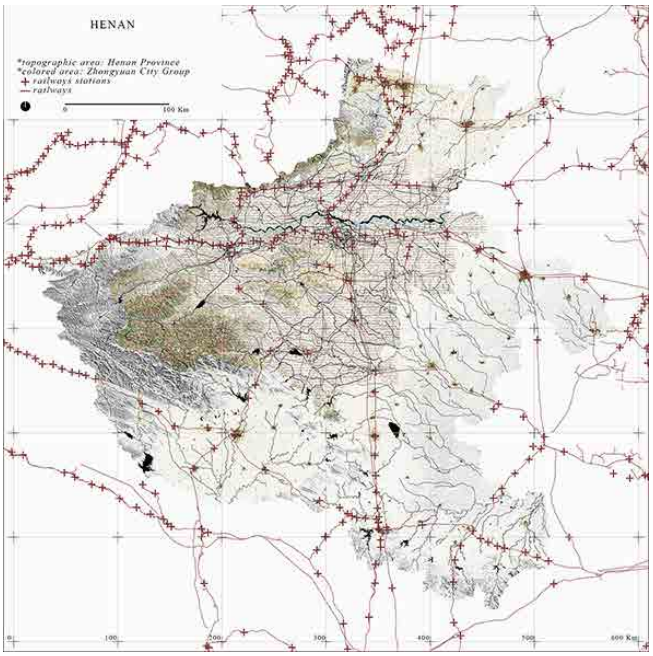
- Tsinghua University of Beijing, China
- South China University of Technology of Guangzhou, China

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The research provides an interpretation of the landscape transformations occurring in the Central Plains of China, Henan province. The research hypothesis is that the Central Plains are a specific site to inquire global transformations, as Chinese urbanism is one of multiple materializations of globalization. Hence, by investigating the spatial features of this place, its morphological elements and their relations, the study attempts to set up some considerations on how this phenomenon is grounded and its implications.

The research is organized in three part. The first one investigates three urbanization processes occurred during the last fifty years: the formation of the 'middle-landscapes', the urban diffusions, and the construction of logistic and infrastructural spaces resulting from the globalization process. By inquiring these different landscapes and how they have been interpreted by several scholars, the first part provides a methodological framework, while highlighting some spatial features to be challenged by the ones emerging from the case-study.

The second part focuses on the urban transformations occurring in the Central Plains since the last century by investigating planning activities, demographic trends, and economic and urban policies. By considering this area as an experimental site for several urban practices, this part is organized according to three periods: the planning activities of the pre-reform era, the urban entrepreneurialism that characterized Chinese cities from the economic reform to the mid-2000s, and the urbanization trends of the last decade resulting from several policies that are acting in order to spread globalization effects all over the country.



Finally, the third part inquires the ongoing spatial transformations in the Central Plains through an empirical analysis based on the critical use of visual materials such as satellite views, maps and photographs which have been collected and elaborated during fieldwork activities. These materials are used in order to set up a landscape interpretation based on three phenomena: the overlapping of infrastructural networks, the juxtaposition of different types of settlement, and the reassembly of fields and land-uses.

The study offers a contribution to the debate on Chinese urbanization process by inquiring how globalization is grounded and how the emerging landscape is questioning patterns of urbanization that characterized other areas of the world.

NAME **Niccolò RAPETTI**
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COURSE XXXII cycle - 3rd year

RESEARCH TITLE BIM implementation for infrastructure projects. Methods and tools for information modelling and management

TUTOR(S) Anna OSELLO

ACADEMIC CONTEXT

Ciribini A.L.C., 2013. Level of Detail e Level of Development: i processi di committenza e l'Information Modelling. *Techne*, 6, pp. 90-99.
Clevenger C., Ozbek M., Mahmoud H., Fanning B., 2014. Impacts and Benefits of Implementing Building Information Modeling on Bridge Infrastructure Projects. *Mt. Consort*.
Succar B., Sher W., Williams A., 2012. Measuring BIM performance: Five metrics. *Architectural Engineering and Design Management*, 8(2), pp. 120-142.

EXTERNAL COLLABORATIONS

- ANAS S.p.a, Rome

HIGHLIGHTS OF THE RESEARCH ACTIVITY

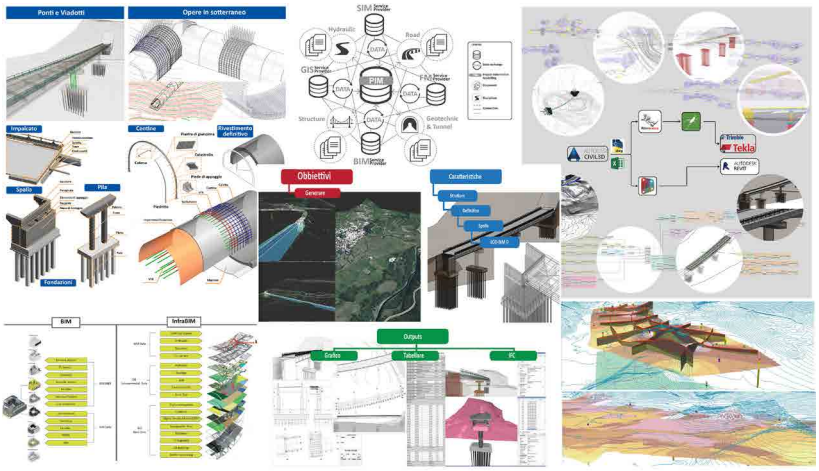
The research aims to test the implementation process of BIM methodology into a public company, like Anas S.p.a. . Currently, according to D.M. 1st of December 2017,n.560, starting from 2019 the Italian Governement has mandatory the use of BIM methodology for public works. In this panorama ANAS, as the first Italian contract authoring, plays a key role to provide a new framework for the information management into AECO sector. Indeed, in the last year ANAS begun the first contract authoring in Italy adopting BIM methodology, publishing contracts for €240 million of architecture and engineering service, requiring the use of BIM methodology.

Moving from a consistent multi-disciplinary literature research, the research objectives mainly focus about the real capacity of BIM methodology adoption for horizontal project. Testing different BIM modelling tools, the main exchange data format for interoperability process (e.g. open format like IFC, LandXML, CityGML), creation of standard like BIM libraries and codification for the data information to manage contract and support service, in order to optimize a best control on the project and a real collaboration among the entire supply chain.

Moreover, exploiting the contracts starts into 2017 it will be possible to implement a conceptual framework to determine the right level of information (LOD) for each project stages, starting from a definition of main BIM Uses. In this way, it should be possible to define in a better way the contract obligations during the tender phase and facilitate the verification and validation phase.

The final findings will be best practices dedicated to manage BIM information for civil project until the procurement and contract of works and provide a bench mark analysis of BIM tools presents on the market.

In this way it should be possible to produce a re-modelling of internal workflow, especially form authoritative point of view, in order to facilitate a better introduction of new roles and reasonability for compliance with the Italian regulation, the D.M. 1st of December 2017,n.560.



NAME **Pablo Angel RUFFINO**
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COURSE	XXXII cycle - 3rd year
RESEARCH TITLE	Digital cultural heritage: information modelling approach for historical buildings and sites
TUTOR(S)	Anna OSELLO

ACADEMIC CONTEXT

Dore C., Murphy M., 2012. Integration of Historic Building Information Modeling (HBIM) and 3D GIS for recording and managing cultural heritage sites. In *Virtual Systems and Multimedia (VSMM)*, 18th International Conference, pp. 369-376.
MacDonald J. A., 2012. A framework for collaborative BIM education across the AEC disciplines. In *AUBEA (University Building Educators Association)*, 37th Annual Conference of Australasian.
Ruffino P.A., Del Giudice M., 2018. From geospatial data to information modeling. In *Dn Building Information Modeling, Data & Semantics*. Roma, pp. 35-44.
Ruffino P.A., Permadi D., Gandino E., Haron A., Osello A., Wong C.O., 2019. Digital Technologies For Inclusive Cultural Heritage: The Case Study Of Serralunga D'alba Castle, *ISPRS Ann. Photogramm. Remote Sens. Spatial Inf. Sci.*, IV-2/W6, pp. 141-147.

EXTERNAL COLLABORATIONS

- MMU, Multimedia University of Malaysia
- IIS Sella Aalto Lagrange
- Associazione per il patrimonio dei paesaggi vitivinicoli di Langhe-Roero e Monferrato

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The research topic focus on the digitalization of the built environment as important contribution for Smart Cities goals. The thesis is going to give attention to the main advanced technologies aiming to facilitate the conservation and dissemination of historical buildings and sites. For each innovative technology or methodology applied to case studies chosen, the research is committed to summarize their potentialities and limitations. More specifically, the research considers photogrammetry and geomatic technologies about surveying stages, BIM-base software for data restitution stage and AR/VR/MR (Augmented/Virtual/Mixed Reality) for dissemination issues.

One of the main research value, it is to prove that virtual models of existing buildings can be useful for many goals belonging to different field. The basic hypothesis is that 3D models of buildings and cities, besides the digitalization of the built environment, allow to get new kind of innovative solutions during the construction life cycle in order to store, manage and visualize building data, but it is not limited to this. Taking advantages of 3D models and innovative visualization tools, it is possible to develop interesting solutions, especially concerning the dissemination of cultural heritage. About that, the research aims to apply this approach to get make easier the fruition and the accessibility to person who are unable to visit cultural sites. This methodology concerns relevant places such as museums, UNESCO sites, historical buildings and so on. Main users could be represented by far tourists, seniors, occupational therapy patients and so on.

In the end, thesis faces training aspects to educate future professionals of medium level at digital skills addressed to the built environment.

In conclusion, thesis goals can be summarized in the following research questions:

- Can the digitalization approach contribute to achieve Smart Cities objectives?
- Which are current and innovative technologies and methodologies to get digital cultural heritage?
- What are achievable goals starting from historic building information models?
- How to prepare future professional to govern digital environment applied to cultural heritage?

NAME **Astrid Coromoto SAFINA ALMEIDA**
E-MAIL astrid.safina@polito.it

COURSE	XXXII cycle - 3rd year
RESEARCH TITLE	Beyond globalized vision of urban regions. Spatial readings from the Greater Bay Area
TUTOR(S)	Francesca GOVERNA, Angelo SAMPIERI

ACADEMIC CONTEXT

Ramondetti L., Safina A., Carota F., 2017. Yanzhou Island, a well being reserve inside the Zhaoqing New Area. *Urban Design*, 13(5), pp. 54-61.
Safina A., 2018. Zhaoqing New Area. La saturazione del Pearl River Delta. *Territorio*, 85, pp. 45-50.

EXTERNAL COLLABORATIONS

- CenTo Research on Chinese New Town, South China, Torino Collaboration Lab
- Yanzhou Island Concept Planning, South China, Torino Collaboration Lab
- South China University of Technology

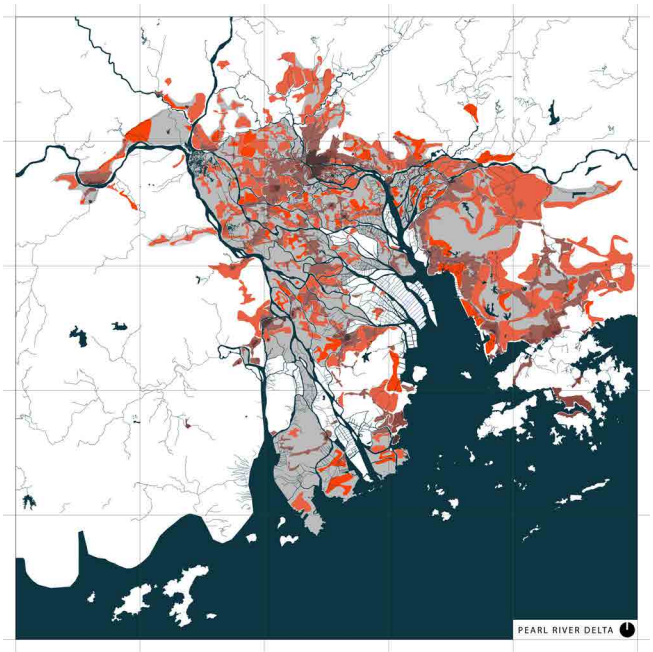
HIGHLIGHTS OF THE RESEARCH ACTIVITY

The Pearl River Delta, one the densest, most populated and most extended urban agglomerations in the world has often been described as an abstract object made my global networks, commercial paths and international fluxes, indicators that emerge from looking at the territory with a distant look and under the perspectives of globalized terms such as global city-region, global city, world city, among others. However, when observing this territory from up close and with a particular attention to the spatial characteristics it offers, the networks and flows become continuous spatial events full of particularities and identity.

Based on these two valid, but partial approaches to the study of the territory, one from a distant look and one from up close, this research aims at following a third approach that combines both looking from the distance and looking from up close. This mean regulating the observation point to the right scale, in order to go beyond globalized visions and to set bridges between the way spaces get describe in literature and the way it is actually built. This is a way of testing the categories we have inherited and that limit and hide the potential behind the study of a place.

In order to do so, this research combines two types of actions: i. Using the space and the traces that it offers to highlight and describe in a critical way the spatial translations of the non-spatial characteristics of global city region; ii. Confronting the observations with the traditional lecture that literature has given to the category in order to identify gaps and differences between the theory and the spatial dimension of those theories. The confrontation argues how the literature behind "global city region" concentrates in a non-spatial dimension mostly dominated by economic studies; how tends to concentrate into the creation of hierarchical orders that leave some cities out of the urban studies maps, instead of understanding the spatial organization of the spaces, and acknowledging the particularities of each place; how simplifies its lecture by looking at particular global variables; and how remains at a distant level of observation than tends to produce generalized assumptions that commonly poorly fit.

Using the Pearl River Delta as a case study where to put in to test the categories related to the "global" city and city-regions is driven by a necessity of refining, reinventing, re-elaborating and even discarding inherited concepts so that new directions to research can be opened.



NAME **Francesco SEMERARO**
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COURSE XXXII cycle - 3rd year

RESEARCH TITLE The BIM and Management approach for infrastructure works. Possible solution of procurement contracts and maintenance management in the public sector

TUTOR(S) Anna OSELLO

ACADEMIC CONTEXT

Eastman C., Teicholz P., Sacks R., Liston K., 2011. *BIM Handbook A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors* (2nd ed.). Hoboken, New Jersey: Jhon Wiley & Sons, Inc.
He Q., Wang G., Luo L., Shi Q., Xie J., Meng X., 2017. Mapping the managerial areas of Building Information Modeling (BIM) using scientometric analysis. *International Journal of Project Management*, 35(4), pp. 670-685.
Holzer D., 2015. BIM for procurement - procuring for BIM. In *Living and Learning: Research for a Better Built Environment: 49th International Conference of the Architectural Science Association*, pp. 237-246.
Succar B., 2009. Building information modelling framework: A research and delivery foundation for industry stakeholders. *Automation in construction*, 18(3), pp. 357-375.

EXTERNAL COLLABORATIONS

- ANAS S.p.A., Rome

HIGHLIGHTS OF THE RESEARCH ACTIVITY

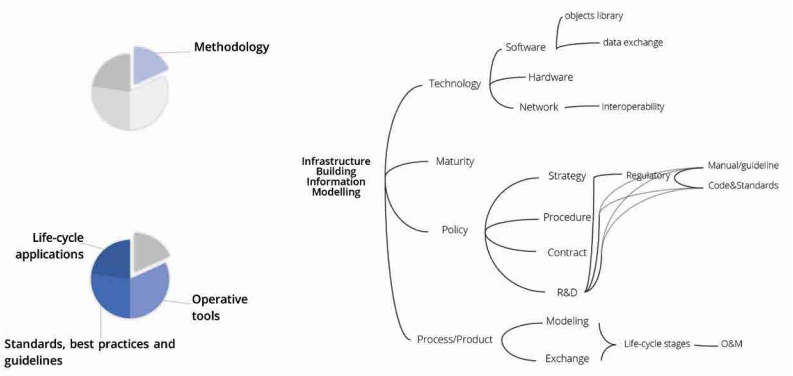
The EU strategy for the medium to long-term period in order to enhance performances of the Construction sector is related to research and innovation activities mainly focused on technology-oriented activities. These activities cover a broad range, such as ICTs. The Directive 2014/24/EU on public procurement states that for public work contracts and design contests, Member States may require the use of specific electronic tools, such as of building information electronic modelling tools (BIM). D.Lgs. 50/2016 implemented the EU directive for the Italian context and the D.M. 560/2017 set the plan for the mandatory adoption of BIM in public contracts, starting from 1st January 2019. The general objective of the research is focused on the BIM methodology application to transportation infrastructure projects. The framework of the research is focused on three main areas: a) technology; b) policy; and c) process/product.

In order to develop these topics, ANAS company - a public industrial company, leader into the Italian market of design, construction and maintenance of transportation infrastructures - has been selected as the main case study for the research. The main goal is to define tools and methods to implement BIM in a traditional-oriented design company, such as ANAS.

Contract procurement methods and tender management tools have been developed and tested during two years. In particular: i) three types of Employer's Information Requirements (EIRs) have been developed, in order to allow ANAS to subcontract BIM-oriented design services and works; ii) a BIM criterion for public tenders has been developed, in order to allow ANAS to evaluate tenderers' offers; iii) a strategical support has been provided to ANAS for the definition of standards for infrastructure object libraries and the realization of the Common Data Environment (CDE). Those requirements have been translated in an open format text language, in order to control and validate information related to contracts and models.

Furthermore, were investigated "Operations & Maintenance (O&M) parameters" related to the Design stage, in order to define a standard set of requirements to be introduced in contracts for the production of BIM models.

CONCEPTUAL FRAMEWORK OF THE RESEARCH



XXXIII CYCLE - 2nd YEAR STUDENTS

NAME **Vanessa ASSUMMA**
E-MAIL vanessa.assumma@polito.it

COURSE	XXXIII cycle - 2nd year
RESEARCH TITLE	Assessing the resilience of environmental systems for Shaping Territorial Transformation Scenarios
TUTOR(S)	Marta BOTTERO, Roberto MONACO

ACADEMIC CONTEXT

Assumma V., Bottero M., Monaco R., Mondini G., 2019. Assessing the Landscape Value: An Integrated Approach to Measure the Attractiveness and Pressures of the Vineyard Landscape of Piedmont (Italy). *New Metropolitan Perspectives*, pp. 251-259.
Assumma V., Bottero M., Monaco R., Soares A.J., 2019. An Integrated evaluation model for shaping future resilient scenarios in multipole territorial systems. *TeMa Journal of Land Use, Mobility and Environment*, pp. 17-24.
Monaco R., Soares A.J., 2017. A new mathematical model for environmental monitoring and assessment. From Particle Systems to Partial Differential Equations IV. *Springer Proceedings in Mathematics and Statistics*, pp. 263-283.
Elmqvist T., Andersson E., Frantzeskaki N. et.al., 2019. Sustainability and resilience for transformation in the urban century, *Nature Sustainability*, 2, pp. 267-273.

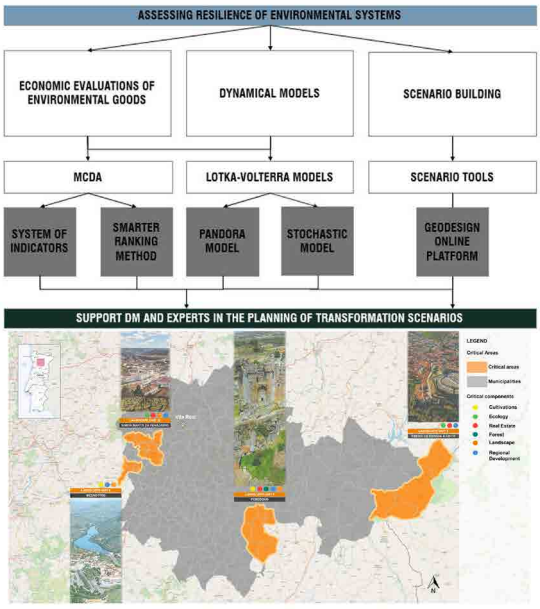
EXTERNAL COLLABORATIONS

- Centro de Matematica (CMAT) & Centro de Território, Ambiente e Construção (C-TAC), Universidade do Minho
- Regione Piemonte & IRES Piemonte
- NEOMA Business School, France
- ResCult project, Increasing Resilience of Cultural heritage: a supporting decision tool for the safeguarding of cultural assets

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Resilience is at the center of debate of scientists and governments for understanding the relations with sustainability and aligning territorial policies and future transformations to the global agendas at all scale dimensions (UNISDR 2015; Cutter 2016). Despite the great attention, an incorrect and overuse of resilience generated overlays and misunderstandings: sustainable choices do not guarantee the increase of resilience and resilient choices do not guarantee sustainable transformations. The adoption of a multidisciplinary and interdisciplinary approach to analyse the state of art of territories and explore how to design sustainable interventions without compromising resilience is the main challenge (Elmqvist et a., 2019). There is an evident need to analyse, organize and monitor a lot of data in integrated spatial frameworks for urban transformation purposes (Atzori et al. 2010; Kraneburg 2008; Campagna, 2014). The proposed methodology is a combo between the evaluation of environmental goods, the mathematical modelling and the scenario building.

The first step of the research defines a system of resilience indicators for calculating a synthetic index of territorial resilience, according to the Multicriteria Decision Analysis (MCDA). The second step consists in coupling MCDA with Lotka-Volterra cooperative models (LV). Specifically, the considered LV models predict possible future ecological scenarios and population dynamics over time. The third step consists in employing scenario building tools for aiding actors and stakeholders to shape territorial transformation scenarios. The considered cases study are ordinary and extraordinary landscapes: the vineyard landscape of Langhe, Roero and Monferrato, the Monferrato Ovadese, the Douro Valley, the landscape of Cuneo and the landscape of Turin metropolitan area.



NAME **Maurizio BACCI**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Mainstreaming climate change adaptation in Tropical and sub-tropical region

TUTOR(S) Alessandro PEZZOLI, Maurizio TIEPOLO

ACADEMIC CONTEXT

Niang I., Ruppel O.C., Abdrobo M.A., Essel A., Lennard C., Padgam J., Urguhart P., Africa, 2014. In Climate change 2014: Impacts, adaptation, and vulnerability. Part B: regional aspects. *WG II to the Fifth assessment report of the IPCC*. Cambridge: Cambridge University Press, pp. 1199-1265.
Nicholson S.E., 2001. Climatic and environmental change in Africa during the last two centuries. *Climate research*, 17, pp. 123-144.
Tiepolo M., 2014. Flood risk reduction and climate change in large cities south of the Sahara. In Macchi S., Tiepolo M., *Climate change vulnerability in Southern African cities. Building knowledge for adaptation*, pp. 19-36. Cham: Springer.
Tiepolo M., Bacci M., Braccio S., 2018. Multihazard Risk Assessment for Planning with Climate in the Dosso Region, Niger. *Climate 2018*, 6, pp. 67.

EXTERNAL COLLABORATIONS

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

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Developing countries are increasingly challenged to respond to increased exposure to risk and vulnerability under climate change (desertification, floods, climate related hazards, mass migration, etc.). However, responsive local governance for climate adaptation is constrained by weak technical and managerial capacity, poor linkages with other institutions at different levels, weak systems for gathering and disseminating information, and unclear mandates and conflicting priorities between levels and agencies of government. This has particularly serious implications for the poorest and most vulnerable groups that are frequently the most adversely impacted by climate stress.

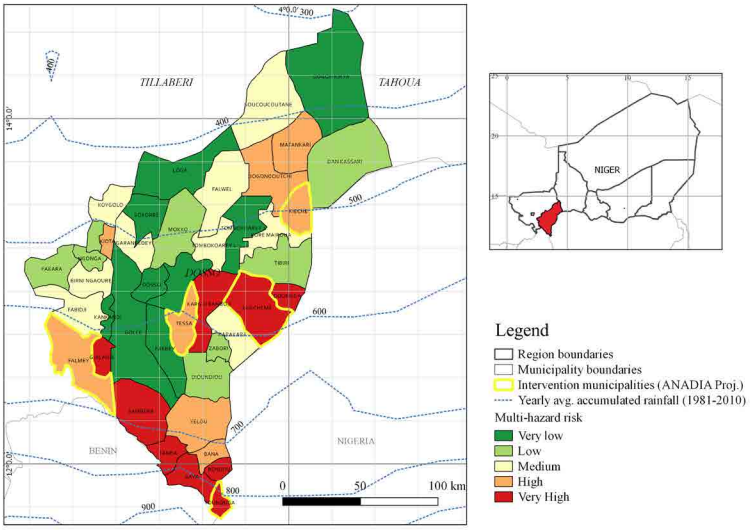
The Sendai Framework for disaster risk reduction and the Sustainable Development Goals recommend that more efforts should be made to carry out risk analysis with a holistic vision. This should orient new-generation plans and projects towards communities that are most at risk, towards the main hydro-climatic threats and should help monitoring, evaluation, communication and awareness-raising activities.

The goal of the research activity is to propose a multi-hazard risk assessment on a regional scale identifying a methodology able to characterize natural risks that impact the studied area and producing the future evolution of these risks. The identification of significant changes in risk distribution provides the key to understand natural disaster evolution and guide regional and urban planning and development.

The study will draw conclusions on the applicability of the method to different case studies in Sub-Saharan Africa characterized by a systematic lack of field data and by a low capability of local authorities to produce a medium-long term planning of interventions in the territory due to lack of human and financial resources.

The proposed case studies are:

- Tillaberi and Dosso Regions, Niger (ANADIA Project)
- Hodh Chargui Region, Mauritania
- Province of Huila, Angola (FAO-IRCEA Project)



NAME **Andrea BARBERO**
E-MAIL andrea.barbero@polito.it

COURSE XXXIII cycle - 2nd year

RESEARCH TITLE BIM for data management for new concept of stadium: collaboration, interoperability and data visualization

TUTOR(S) Anna OSELLO, Fabio MANZONE (Politecnico di Torino)

ACADEMIC CONTEXT

Barbero A., Ugliotti F.M., Del Giudice M., 2019. BIM-based collaborative process for Facility Management / Impostazione di un processo collaborativo BIM per il Facility Management. *Dienne - Building Information Modeling, Data & Semantics*, 4, pp. 6-14.
Barbero A., Del Giudice M., Manzone F., 2018. BIM model methods for suppliers in the building process. eWork and eBusiness in Architecture, *Engineering and Construction, proceedings of ECPPM 2018*, pp. 291-296.
Osello A., Ugliotti F.M., 2017. *BIM verso il catasto del futuro – Conoscere, Digitalizzare, Condividere – Il caso studio della città di Torino*. Roma: Gamgemi.

EXTERNAL COLLABORATIONS

- JUVENTUS F.C. S.p.A., Facility and Maintenance department

HIGHLIGHTS OF THE RESEARCH ACTIVITY

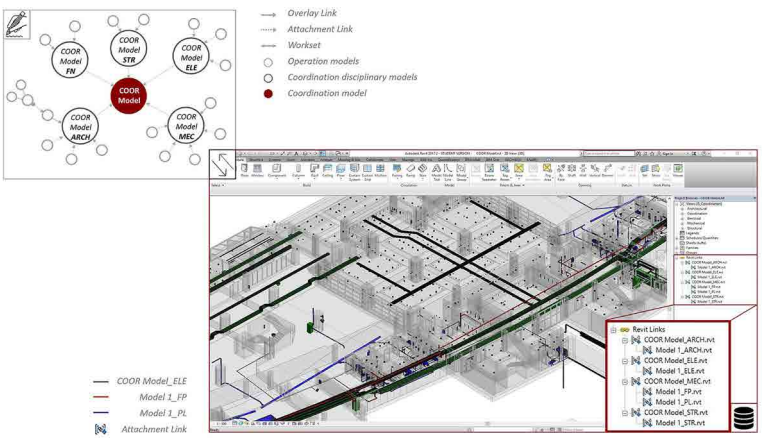
The research topic focus on the potentialities provided by the Building Information Modelling (BIM) methodology, applied to a complex building that evolves constantly like the Allianz Stadium, starting from the definition of guidelines for the the operational step of the building lifecycle. These aspects will be closely linked to Virtual Reality (VR) and Augmented Reality (AR) activities that will be employed to achieve the owner's maintenance needs.

The achievement of these objectives will lead to the full development of the integrated building management concept during its lifecycle, allowing it to constantly update, overcoming the actual methodology not based on an integrated alphanumeric model.

So, the main general keywords of the research topic will be:

- Collaboration, based on Data Sharing and Worksharing between all the actors involved in the process.
- Interoperability, related to the employment of the BIM model with a Integrated Workplace Management (IWMS) software. It is based on standard definition which require the identification of a procedure workflow for Code Checking and Model Checking of each BIM model through Visual Programming Language (VPL) tool, defined inside specific guidelines.
- Data Visualization, based on AR and VR tools that will be useful for the improvement of maintenance activities performance and for a new concept of stadium.

Starting from these concepts and from the consultation of international literature, the main activity of these first two years has been: (i) the definition of the project structure, starting from the needs for which BIM models are created; (ii) the BIM modeling workflow for each actor involved in the process, in function of the relative discipline (as visible in the figure below); (iii) the structure of the operational guidelines aimed to identify all the features that each BIM model should have in order to reach its specific use; (iv) the development of interoperability tests between the modelling software and the IWMS one; (v) the identification and definition of the validation activity, based on Data Checking and Model Checking trough the employment of Visual Programming Language (VPL) and Clash Detection.



Future research activities will be focused on data visualization. It will be developed using AR and VR tool for the creation of a virtual tour and with several tests related to Internet of Things (IoT) assessment (p.e. stewards geolocalization).

NAME **Elena BELCORE**
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COURSE	XXXIII cycle - 2nd year
RESEARCH TITLE	Generation of LC and LCC Atlas using unconventional tools for climate planning
TUTOR(S)	Marco PIRAS, Alessandro PEZZOLI

ACADEMIC CONTEXT

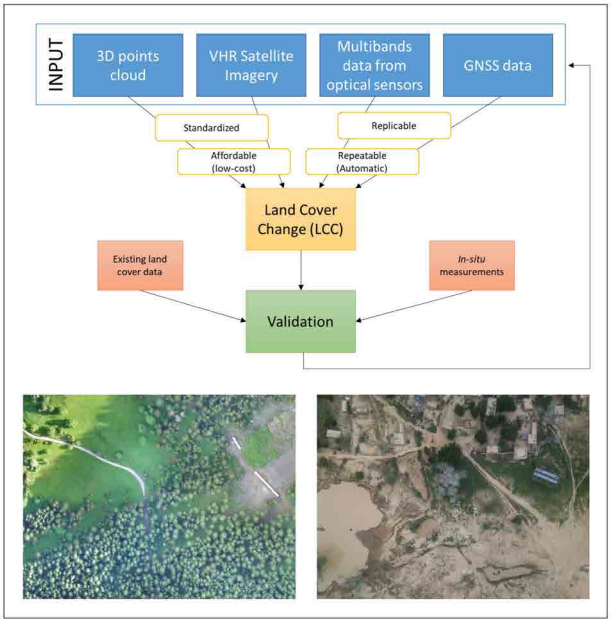
Aicardi I., Dabove P., Lingua A.M., Piras M., 2016. Integration between TLS and UAV photogrammetry techniques for forestry applications. *iForest,* 10, pp. 41-47.
Lewiński, S., Aleksandrowicz, S., Banaszkiewicz, M., 2015. Testing Texture of VHR Panchromatic Data as a Feature of Land Cover Classification. *Acta Geophysica.*, 63, pp. 547-567.
Turner B.L., Lambin Eric F., Reenberg A., 2007. The emergence of land change science for global environmental change and sustainability. *Proceedings of the National Academy of Sciences*, 104(52), pp. 20666-20671.

EXTERNAL COLLABORATIONS

- Istituto di Biometeorologia, Sede di Firenze, Consiglio Nazionale delle Ricerche (IBIMET-CNR)
- Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture (IRSTEA), France
- Dipartimento di Scienze Agrarie, Forestali e Alimentari, Università degli studi di Torino (UNITO-DISAFA)
- Space Research Centre, Polish Academy of Science, Warsaw, Poland

HIGHLIGHTS OF THE RESEARCH ACTIVITY

In the framework of planning for natural risk reduction and prevention, monitoring the most vulnerable areas of the world has become crucial. Nevertheless, monitoring activities can be resources consuming. This is particularly true in those areas characterized by a lack of infrastructure, peculiar land morphology, extreme climate conditions, and homogeneous land cover. In these critical areas, the emerging geomatics technologies can be powerful tools to monitor the processes taking place in areas affected – and potentially affected – by natural hazards and for the detection of Land Cover Change (LCC). This research aims to investigate new and emerging technologies to create a high-resolution Land Cover Change (LCC) Atlas for risk management and climate planning. Floods, rockfalls, and wildfires are the natural hazards considered in this study. The Atlas considers the relation between spatial and thematic detail, with a specific focus on the effort needed to collect data. The Atlas is built upon the data collected through the combination of different geomatics techniques. Particularly, it has been used UAV (Unmanned Aerial Vehicles) multispectral imagery, Satellite Imagery, and Terrestrial and Aerial Laser scanning. The UAV data are collected with low-costing and high-resolution optical sensors (spatial resolution ≤10cm) that are sensitive to Near InfraRed light. Radiometric and geometric calibrations were carried out for each sensor. A handheld terrestrial laser scanner was used for the points cloud data collection. The UAV imagery and the 3D point clouds were co-registered and later classified using different supervised algorithms. The result is multi-layered land cover information. For the multi-temporal analysis, Google Earth Engine has been tested for the elaboration of large amount of data. The classifications will be inter- and an intra- validated. Convolutional neural network systems may be included in the research to automatize the classification process. The areas selected for testing the Atlas-generation methodology are the Tillabery region in sub-Saharan Niger and the protection forests of subalpine areas of Alpine Arch.



NAME **Giacomo CAZZOLA**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Back to the roots of socially constructed risk: envisioning disaster planning

TUTOR(S) Maurizio TIEPOLO

ACADEMIC CONTEXT

Thomalla F., Boyland M., Johnson K., Ensor J., Tuhkanen H., Gerger Swartling Å., et al. (2018). Transforming Development and Disaster Risk. *Sustainability*, 10(5), p. 1458.
Oliver-Smith A., Alcántara-Ayala I., Burton I., Lavell A., 2017. The social construction of disaster risk: Seeking root causes. *International Journal of Disaster Risk Reduction*, 22, pp. 469-474.
Lavell A., Maskrey A., (2014). The future of disaster risk management. *Environmental Hazards*, 13(4), 267–280.
Blaikie P., Wisner B., Blaikie P.M., Cannon T., Davis I., 2004. *At Risk: Natural Hazards, People's Vulnerability and Disasters*. Psychology Press.

EXTERNAL COLLABORATIONS

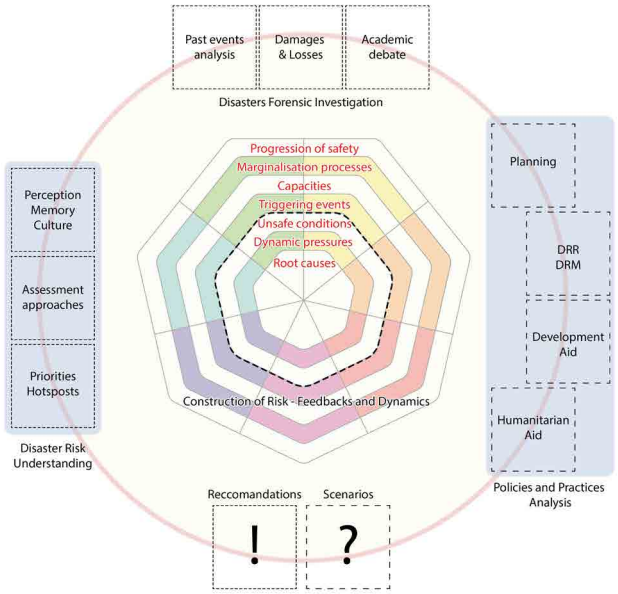
- Cooperazione Internazionale (COOPI), Haiti

HIGHLIGHTS OF THE RESEARCH ACTIVITY

My dissertation frames in the Political Ecological Perspective grown up within disaster studies in the past forty years and thrive to meet the challenges arisen with the Vulnerability Paradigm: disaster risk and vulnerability can be explained, and should, therefore, be addressed, as socially constructed, as a puzzle of intertwined underlying historical, cultural, economic and political factors.

The main object of this investigation has been the unmet challenge of reducing and dealing with vulnerability enhancing urban attributes and human behaviors, components that brought David Alexander to classify vulnerability as: (1) newly generated, e.g. as a result of new urban development in hazard areas and unprepared and incapable to cope new residents, as (2) residual and un-ameliorated pre-existing sources of risk, and vulnerability as (3) delinquent, as the outcome of violated norms, codes and regulations.

The analytical process has been framed thinking of disaster-prone countries with dependent economies where, also due to multiple subsequent catastrophes, crises are creeping and/or forgotten, emergencies permanent and recovery processes everlasting. The case study of the research relates to those Arenas of Intervention resulting from the permanent establishment of International Organizations taking part to the disaster governance: this actor-based approach involved stakeholders belonging to UN agencies, NGOs, Governmental bodies and civil society organizations both in Haiti and Guatemala. Within these contexts, I recollected and related to each other (1) academic articles and reports regarding past events, (2) stakeholder's perceptions, explanations and approaches to the problem and (3) existing policies, projects and plans facing such complexity.



Recomposing aid workers' understandings, the resulting scenarios portrays an alarming warning for future planning strategies: in addition to the persistence and reinforcement of root causes and risk drivers, the succession of several catastrophic events added failed disaster recoveries (e.g. temporary and hazard-prone shelters turning into long-term informal settlements) and counterproductive effects (e.g. rural-to-urban migration as a result of the aid-related opportunities). This set of unintended dynamics call for a revision of short- term achievement-based projects towards a more coordinated Resistance to Disaster Risk Creation.

NAME **Sara CRAVERO**
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COURSE	XXXIII cycle - 2nd year
RESEARCH TITLE	The Serious Games: an analysis towards the learning tools as an application for community engagement in smart cities context
TUTOR(S)	Patrizia LOMBARDI, Isabella LAMI, Edwin CHAN (The Hong Kong Polytechnic University)

ACADEMIC CONTEXT

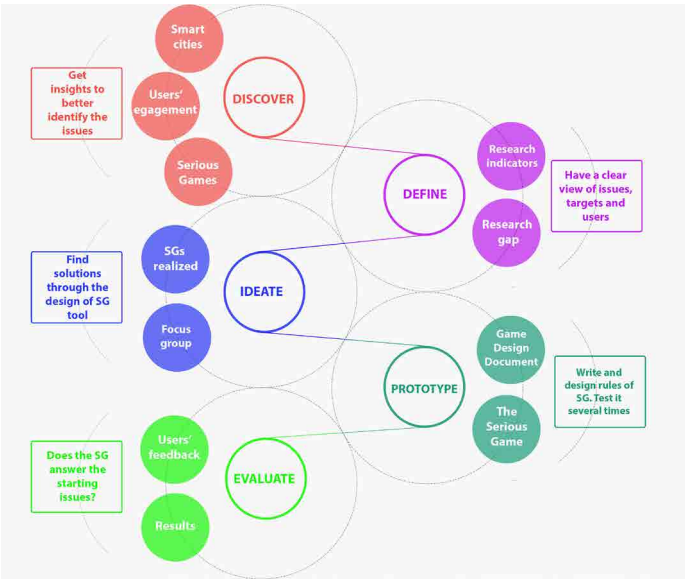
Abt C.C., 1987. *Serious games*. University press of America.
Deterding S., Dixon D., Khaled R., Nacke L., 2011. From game design elements to gamefulness: defining gamification. In *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments*. ACM, pp. 9-15.
Schell J., 2014. *The Art of Game Design: A book of lenses*. AK Peters/CRC Press.
Werbach K., Hunter D., 2012. *For the win: How game thinking can revolutionize your business*. Wharton Digital Press.

EXTERNAL COLLABORATIONS

- The Hong Kong Polytechnic University, BRE Department
- ETH Zurich, Department of Computer Science- Game Technology Center, Switzerland

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Nowadays smart cities are tackling urban and social challenges in terms of sustainability perspective. Although a shared definition is still missing, the smart cities involve several aspects and therefore they can be analyzed through different sustainable perspectives as social, technological, economic and environmental. This interdisciplinary intersection makes the proper understanding and design of the smart cities and communities a very difficult task (Albino et al., 2015; Dewalska-Opitek, 2014). Concerning these issues, the 2030 Agenda for Sustainable Development provides strategic directions to support the future development of cities and communities, identifying 17 Sustainable Development Goals (SDGs), as an urgent call for actions by developed and underdevelopment countries, in a global partnership (sustainabledevelopment.un.org). Notably, the SDG 11, "Make cities and human settlements inclusive, safe, resilient and sustainable", concerns urban growth and safety development empowering the citizens' involvement. Every projects, decisions, and actions done in cities have an impact on the citizen's quality of life. Allowing citizens to take part in urban projects and initiatives, and becoming them active stakeholders in the urban environment, it could improve the achievement of specific goals for cities development. Accordingly, the Citizen Design Science is recognized as being an interesting approach to involve citizens in urban design from a sustainable perspective, through an easily accessible design (Mueller et al., 2018). Here the citizens have the chance to transform their ideas into tangible outcomes such as proposals, comments, plans, and sketches. It can be recognized some activities to support the citizens' involvement in smart cities, such as questionnaires, focus groups, and workshops. However, according to the literature (Leydesdorff and Deakin, 2011; Nalbandian et al., 2013; Joshi S. et al., 2016), the need for new participatory methods emerges. With this respect, the objective of the thesis is to analyze, study and evaluate the application of Serious Game (SG) tool towards sustainable issues in smart cities contexts. SGs are able to get fun and achieve purposes at the same time. SGs are teaching tools with multiple learning aims, a means of entertainment and they can be applied in many areas and targets all age groups (Mouaheb, et al., 2012). The final aim of this thesis is to design an SG demo, for one of the university campuses of Politecnico di Torino, involving associations, students, researcher, and professors, in order to build a sustainable university community.



NAME **Maria Valentina DI NICOLI**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE The role of the build environment and the human dimension towards a sustainable energy transition

TUTOR(S) Patrizia LOMBARDI, Stefano P. CORGNATI (Politecnico di Torino)

ACADEMIC CONTEXT

Torabi Moghadam S., Lombardi P., Mutani G., 2017. A Mixed Methodology for Defining a New Spatial Decision Analysis towards Low Carbon Cities. *Procedia Engineering,* 198, pp. 375-385.
Kalkbrenner B. J., Roosen J., 2016. Citizens' willingness to participate in local renewable energy projects: The role of community and trust in Germany. *Energy Research and Social Science*, 13, pp. 60-70.
Becchio C., Corgnati S., Delmastro C., Fabi V., Lombardi P., 2015. The Role of Nearly-zero Energy Buildings in the Definition of Post-Carbon Cities. *Energy Procedia*, 78, pp. 687-692.
Trotta G., 2018. Factors affecting energy saving behaviours and energy efficiency investments in British household. *Energy Policy,* 114, pp. 529-539.

EXTERNAL COLLABORATIONS

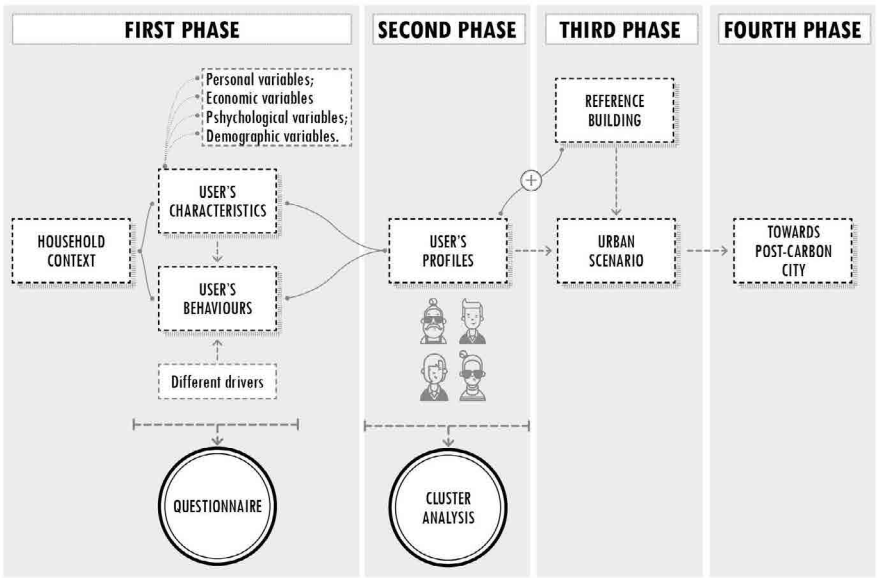
- H2020 SCORE project: Supporting CO-ownership in REnewable energies (2018-2021)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Nowadays, considering the several environmental issues, a "decarbonization process" should be applied through the revision of current energy mix and the reflection on the role of city system (including citizens) in the "energy transition".

Since the goal is to avoid the use of energy from fossil sources and to define a more conscious energy consumption, this research analyses how the citizens' characteristic plays an active role in defining energy consumption at urban scale. The actual energy scenarios are defined considering only the buildings and the users' behaviour, excluding the users' acceptance related to their demographic, social, economic and psychological features. In order to fill this gap, a survey was drawn up in order to collect user information; to understand obstacles in engaging and implementing certain actions (since various difficulties are hidden when decisions are to be made); and to define user's clusters (that share the same features).

This will be supported through an application in real context in 10 municipalities in Val di Susa (thanks to on-going Horizon 2020 project, named "SCORE") in which particular attention will be given to the dynamics that allow (or not allow) the birth of the energy communities, shifting the focus from the consumer to prosumer, from the individual to the community.



NAME **Agata ELIA**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Geospatial data and information in emergency settings. Information for displacement settings

TUTOR(S) Piero BOCCARDO

ACADEMIC CONTEXT

Voigt S., Schoepfer E., Fourie C., Mager A., 2014. Towards semi-automated satellite mapping for humanitarian situational awareness. *Global Humanitarian Technology Conference (GHTC)*, 2014 IEEE, pp. 412-416.
Füreder P., Lang S., Hagenlocher M., Tiede D., Wendt L., Rogenhofer E., 2015. Earth observation and GIS to support humanitarian operations in refugee/IDP camps. *Geospatial Data and Geographical Information Science Proceedings of the ISCRAM 2015 Conference*.
Goldblatt R., You W., Hanson G., Khandelwal A., 2016. Detecting the Boundaries of Urban Areas in India: A Dataset for Pixel-Based Image Classification in Google Earth Engine. *Remote Sensing*, 8(8), p. 634.
Oloruntoba R., Banomyong R., 2018. Humanitarian logistics research for the care of refugees and internally displaced persons: A new area of research and a research agenda. *Journal of Humanitarian Logistics and Supply Chain Management*, 8(3), pp.282-294.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

Geoinformation systems and remote sensing proved the extent to which they can significantly contribute to emergency response. In the context of decision making in emergency situations, high-quality and timely information, accessibility, defined standards, user-friendly interfaces and appropriate visualizations are all factors of great significance and help.

Displacement settings represent a particularly complex case of emergency. The magnitude of displacement is rising, and nowadays it represents a global theme, involving both developed and developing countries. Displacement settings are getting more numerous and more crowded and the tendency of a high fraction of them is to lose their temporary nature to become permanent and extensive. Displacement is lately becoming topic of research (Oloruntoba et al., 2018) and it keeps growing as an operational and technical concern of humanitarian agencies and organizations.

At the same time, the geospatial world is expanding. The availability of open source data is vast, and the capacities made freely available to extract information from it are growing. The starting point of the proposed research is the perception of an existing gap between available data and the operational use of it. The amount of data generated is impressive and its quality has proven to be good or high, embedding characteristics such as timeliness and accessibility.

From field experience it has emerged that the information extraction task for operational use is generally left to the end user, who sometimes might not have the ability or the resources to use or make best use out of the available data. Is it possible to apply in the context of humanitarian operations in displacement settings a standardized, operationally focused and simple (relatively to the end user) method to take advantage of the large quantity of data and of the most recent processing capacities available?

The main objective of the research is in first place to investigate applications of geospatial tools and methods in support of emergency settings, specifically in the context of humanitarian operations in displacement settings. After exploring current best-practices, the aim is to identify potential gaps, needs and solutions, possibly bridging the large amount of available free and open source data and processing capacities with existing standardized operational needs.

The Rohingya exodus in Bangladesh – Paula Bronstein Photojournalist 2017

Kutupalong Rohingya refugee camp - Sentinel-2 image 2017

NAME **Davide GISOLO**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Carbon, water and energy fluxes in an Alpine region

TUTOR(S) Stefano FERRARIS, Davide CANONE

ACADEMIC CONTEXT

Lee X., Massman W., Law B. (Eds), 2005. *Handbook of micrometeorology - a guide for surface flux measurement and analysis*. Springer Science + Business media.
Aubinet M., Vesala T., Papale D., eds., 2010. *Eddy Covariance, a practical guide to measurement and data analysis*, Springer.
Mortarini L., Anfossi D., 2015. Proposal of an empirical velocity spectrum formula in low-wind speed conditions. *Quarterly Journal of the Royal Meteorological Society*, 141, pp. 85-97.
Gisolo D., Canone D., Previati M., Bechis S., Ferrari S., Bevilacqua I., Heery B. and Ferraris S., 2019. Quality control on eddy covariance daytime fluxes of energy and carbon dioxide on a mountain slope, *Agricultural and Forest Meteorology*. (submitted).

EXTERNAL COLLABORATIONS

- Arpa Valle d'Aosta
- CNR
- University of Bayreuth, Department of Micrometeorology, Germany

HIGHLIGHTS OF THE RESEARCH ACTIVITY

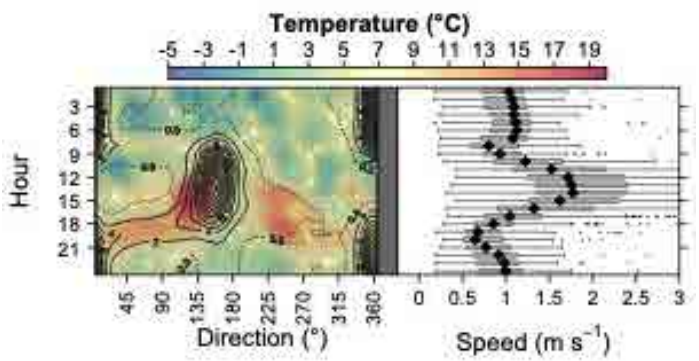
The main goal of the research is to evaluate the mass and energy exchanges between the soil and the atmosphere, and to obtain reliable water, carbon and energy balances in an Alpine region. This is done by means of modelling tools considering important phenomena occurring in the soil and the surface boundary layer.

Mountain ecosystems are important because they provide services supporting downstream human life and activities, thus their preservation is fundamental. Their monitoring is one of the more challenging research fields in the Earth sciences, because of terrain complexity and sensitivity to anthropogenic phenomena: climate change including dramatic carbon dioxide and temperature increases, and land-use alterations e.g. vegetation expansion towards higher altitudes (Gehrig-Fasel, 2007). In Italy, hilly and mountainous regions are a significant part of the territory. Improved knowledge about those regions is important scientifically, because of several open challenges: the correct computation of mass and energy fluxes using the eddy-covariance technique (Lee et al., 2005; Aubinet et al., 2012), the related imbalance between incoming and outgoing energy from the system comprising the first meters of atmosphere and the upper soil layers, data quality assessment (Aubinet et al. 2012, Gisolo et al., 2019) and understanding of local scale phenomena, such as wind flow and temperature oscillations (Mortarini and Anfossi, 2015).

Furthermore, mountainous areas play a key role in the sequestration of carbon (in forests and grasslands) and water availability and distribution. In mountain meteorology, studies of wind flow regimes are important for understanding the transport of pollutants, water vapour and carbon dioxide. Soil properties are investigated due to the coupling (i.e. exchange of heat, liquid and gases) between land and atmosphere.

Long-term studies will provide a better evaluation of the interactions between the soil and the atmosphere. To perform the analyses, data are collected from ARPA Valle d'Aosta and stations installed and maintained by the LABFLUX Team in the Gran Paradiso National Park (Cogne and Colle del Nivolet sites).

These activities will be useful for policymakers and land planning. The research framework is also carried out by the CNR Project NEXTDATA and by Ecopotential, an H-2020 funded European Project.



NAME **Chiara IACOVONE**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Airbnb in the real estate financial chain

TUTOR(S) Francesca GOVERNA

ACADEMIC CONTEXT

Aalbers M., 2016. *The financialization of housing: A political economy approach*, London: Routledge.
Frenken K., Schor J., 2017. Putting the sharing economy into perspective, *Environmental Innovation and Societal Transitions*, 23, pp. 3-10.
Hadjimichalis C., 2017. *Crisis spaces: Structures, struggles and solidarity in Southern Europe*. London: Routledge.
Fields D., 2019. Automated landlord: Digital technologies and post-crisis financial accumulation. *Environment and Planning A: Economy and Space*, 0(0), pp. 1-22.

EXTERNAL COLLABORATIONS

- Global Metropolitan Studies center, University of California, Berkeley

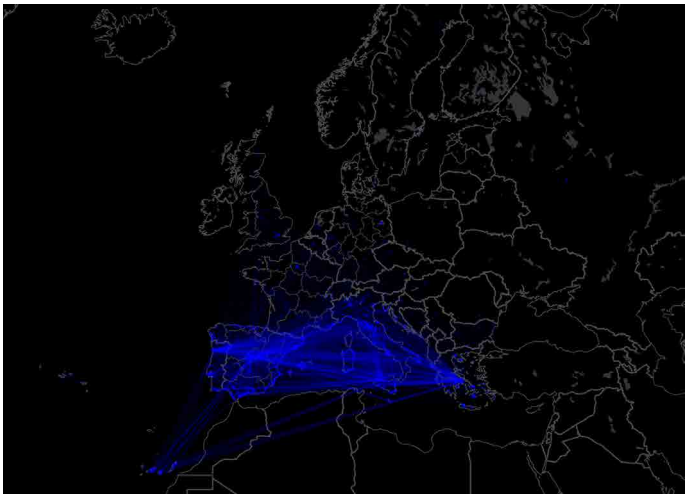
HIGHLIGHTS OF THE RESEARCH ACTIVITY

Platform economies are a capillary presence in today's economic system, through digital transmission and physical expansion they represent a sprawling regeneration of neoliberal structure.

Airbnb, as one of the main peer-to-peer rental platform, captures also the most profitable assets that drive the global economy, the real estate market. The research proposes a reflection on the interpretation of Airbnb as an infrastructural component of today's cities and on the analysis of its urbanization force.

The phenomenon is analyzed in 8 cities (Lisbon, Porto, Madrid, Seville, Naples, Palermo, Athens and Thessaloniki) of the so-called European PIGS (Portugal, Italy, Greece and Spain).

Starting from the 2008 financial crisis, the research retraces the sets of policies at the urban, national and European levels that were made to stress the housing market, such as the liberalization of rents in Portugal, the mortgage law in Spain, the new tax regime in Italy and the wave of evictions in Greece. Those policies led to an exposition of the yet unsaturated housing market, together with programs of capital attraction such as the subsidized tax regime for non- permanent resident or the 'golden visa'. Thanks to these actions finance had the possibility to enter in the former static housing market of Southern Europe. The growth and the evolution of the tourist industry is the other side of the coin. The new model supported by Airbnb is one of the most profitable and most adopted worldwide. A relevant consequence of the unregulated development of the platform is a spreading mechanism of buy-to-let in the range of Airbnb properties carried out by professional actors. In this sense, Airbnb can be seen as a link in the financial chain of the housing market; property managers, real estate firms and broadly, transnational landlords took advantages from the extensiveness and the flexibility of the platform to enlarge their markets.



What will emerge is a complex system of different kind of infrastructures that merge and works together at different scales. The research aimed to propose a zoomed-out and transcalar approach in the studies of platform economies rather than a place-based analysis and thus, focus on the role of Airbnb as an economic, political and digital infrastructure and inscribing it in a political economic perspective to better understand its structure and its performances as a global trend.

NAME **Eloy LLEVAT SOY**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Manufacturing futures. An exploration on Genevan production settlements

TUTOR(S) Angelo SAMPIERI

ACADEMIC CONTEXT

Llevat Soy E., 2019. Un collasso in sospeso. Il dibattito scientifico sulla produzione. In Bianchetti C., ed. *Territorio e Produzione*. Macerata: Quodlibet, pp. 150-155.
Garofoli G., 2017. Territorio, economia e società all'epoca della crisi: alcune questioni interpretative e di metodo. *Territorio*, 81, pp. 71-75.
Sonnette S., 2019. Au PAV, l'industrie est-elle soluble dans le projet urbain? *Tracés*, 10, pp. 14-20.
Grandclément A., 2015. Innovation et compétitivité : de nouvelles politiques industrielles? *Bulletin de l'association de géographes francais*, 92-4, pp. 511-523.

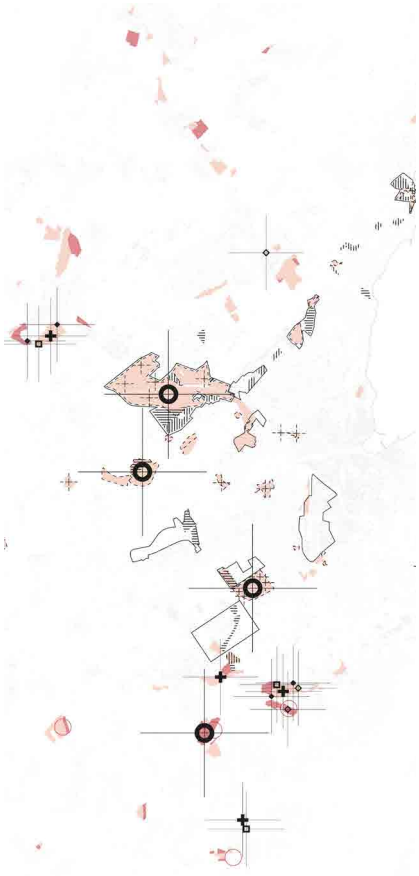
EXTERNAL COLLABORATIONS

- HABITAT Research Center, EPFL, Switzerland
- Lab U, EPFL, Switzerland

HIGHLIGHTS OF THE RESEARCH ACTIVITY

This research addresses the recent transformation of the existing infrastructures for production in the Canton of Geneva. In the last ten years the industrial areas of Geneva have been invested by, on one hand, a massive ongoing and anticipated movement of manufacturing enterprises and, on the other hand, an increased attention from the Canton's urban planning responsibles. The "abandon" of the Praille Acacias Vernets industrial area as a production settlement by the State of Geneva is an ongoing process which has posed major problems for the city and its manufacturing base. How to prevent a massive exodus of enterprises from the Canton? How to adapt the work spaces to the imminent technological changes and to the new demands of companies and workers? How to slow down production processes that negatively impact the natural environment? These new challenges have been welcomed as an opportunity to rethink the future of the industrial areas of Geneva and their role in the transformation of the city as a whole.

A case therefore in which production activities return to occupy the center of the urban stage as a crucial object of spatial planification practices and as a fundamental factor in the urbanization processes. The research explores this issue paying a particular attention to the Genevan urban administration, its urban design production and its architectural projects supervision. Indeed, through the study of official documents and plans, the interviews to directly involved actors, and the examination of public declarations and press articles is possible to piece together the formed alliances, the key intentions, the dominant ideologies, etc., in order to reach a more solid idea of the new uses assigned to these areas. This study of policies and plans is complemented by an exploration of the actual interventions affecting the industrial areas of Geneva: reuses, new industrial building projects, new infrastructures, new open spaces, etc.



NAME **Viola MARI**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Practicing a *third space*. Beyond binary representations of urban marginality

TUTOR(S) Francesca GOVERNA, Patrizia LOMBARDI

ACADEMIC CONTEXT

Anderson B., McFarlane C., 2011. Assemblage and geography. *Area*, 43(2), pp. 124-127.
Aru S., Memoli M. and Puttilli, M., 2017. The margins 'in-between' A case of multimodal ethnography. *City*, 21(2), pp. 151-163.
Governa F., 2016. Ordinary spaces in ordinary cities. *Méditerranée: Revue géographique des pays méditerranées*, 127, pp. 109-117.
Lancione M., 2016. *Rethinking life at the margins: the assemblage of context, subjects, and politics*. London: Routledge.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

The concept of urban margin is linked to its material and immaterial distance from a centre, usually demarcated by the presence of sharp borders. Urban margins are usually depicted as deprived urban spaces, lacking rationality, urban quality, services, order, safety; sacrificed territories, where economic and social problems are mutually nourished, becoming more and more visible and severe. It is not uncommon to find references about marginality as a condition, a sort of disease that leaves a detrimental mark on people and places, a stigma. In reality, urban margins are fluid, heterogeneous, ever-changing, and distant from normative narratives, the outcome of imbalanced power relations, thus extremely complex to bring into focus and represents. Therefore, it is necessary to take a more critical perspective towards urban margins, in order to sketch previously unseen narratives and to understand the complexity that shape places and subjects of marginality.

Drawing on feminist literature and assemblage thinking, the work aim is to investigate the micro entanglements between marginality, women and everyday practices, thus developing a nuanced, more than representational perspective on urban margins able to undermine dominant and biased framings of marginality. The assemblage perspective will allow us to investigate contexts and subjects with a more critical and sensitive look, renouncing to "pre-established paradigm or a priori explanation" (Lancione, 2016), in order to bring to the front new elements of the heterogeneity and complexity of marginality.

This research is based upon an extensive ethnographic enquiry in Turin and Cagliari, two quite different Italian peripheral neighbourhood. The fieldwork has been structure through observations, interviews and informal interactions in order to examine in depth the following research questions: i) how marginal contexts impact and shape women's subjectivities and their daily practices, and ii) how women constantly negotiate their marginal condition and subjectivity through the mediation of work and labour. Moreover, the concept of a third space will be further analysed, in order to investigate if is it possible to unveil new relational assemblages that go beyond canonical and binary representations of life at the margins.

NAME **Francesca MATRONE**
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COURSE XXXIII cycle - 2ndtyear

RESEARCH TITLE Semantic neural networks for 3D multiscale territorial representation

TUTOR(S) Andrea M. LINGUA, Marco ZERBINATTI (Politecnico di Torino), Eva Savina MALINVERNI (UNIVPM)

ACADEMIC CONTEXT

Wang Y., Sun Y., Liu Z., Sarma S.E., Bronstein M.M., Solomon J.M., 2018. Dynamic Graph CNN for learning on point clouds. *arXiv*:1801.07829.
Qi C.R., Yi L., Su H., Guibas L.J., 2017. PointNet++: Deep Hierarchical Feature learning on point sets in a metric space. *arXiv*:1706.02413.
Hackel T., Savinov N., Ladicky L., Wegner J.D., Schindler K., Pollefeys M., 2017. Semantic3D.net: a new large-scale point cloud classification benchmark. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, IV-1/W1, pp. 91-98.
Weinmann M., Jutzi B., Hinz S., Mallet C., 2015. Semantic point cloud interpretation based on optimal neighborhoods, relevant features and efficient classifiers. *ISPRS Journal of Photogrammetry and Remote Sensing*, 105, pp. 286-304.

EXTERNAL COLLABORATIONS

- Università Politecnica delle Marche – Ancona
- ICube Laboratory, Institut National des Sciences Appliquées (INSA) – Strasbourg, France
- MIT Computer Science and Artificial Intelligence Laboratory (CSAIL) – Boston, USA

HIGHLIGHTS OF THE RESEARCH ACTIVITY

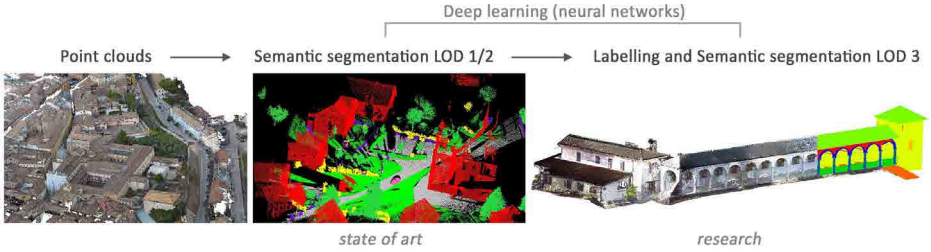
Architectural cultural heritage (CH) is a driving force for the development of a territory and, in this framework, its preservation and its memory for posterity can be supported by the most recent surveying techniques able to acquire data always faster and with higher accuracy. These kind of data, mainly point clouds, lead to the reconstruction of 3D digital models, useful also for multiscale analysis, involving both the GIS and HBIM (Historical Building Information Modeling) domains.

Starting from the aforementioned point clouds, the aim of my research is therefore to speed up the 3D digital reconstruction process of the territory, stepping from the urban scale to the architectural one, with a particular focus on the immovable cultural assets.

In order to do this, a semantic interpretation of the point clouds is essential and a supervised Deep Learning approach, coming from the Artificial Intelligence discipline, has been chosen to label and cluster automatically the point clouds.

For what concerns the semantic interpretation, in order to develop a unified method for labelling the architectural elements, some existing standards are examined, in particular, the .IFC and CityGML have been selected. The first one is meant for the AEC field (Architecture Engineering Construction) with an architectural scale, while the second is mainly for urban and territorial data. Moreover, as the classes included in these two standards are not enough to describe properly a CH, the AAT (Art & Architecture Thesaurus) by the Getty Institute was perused.

On the other side, the point cloud semantic segmentation with deep learning techniques, in the state of art, has reached a level of detail (LOD) suitable for the territorial representation (LOD1/2), so it has been necessary to deepen this classification and to segment the point clouds according to a CityGML LOD 3, hence not yet a part segmentation, but still different architectural elements. With this purpose, 9 classes have been selected (walls, vaults, roofs, floor, door, windows, arches, stairs, columns) plus another one defined as "other" with all the unclassified points, not belonging to the previous ones. The workflow for the labelling the dataset is currently very time consuming and completely entrusted on the manual work of domain experts, far from being automatized, especially in the field of architecture and CH. With this research this aspect should be solved, in addition to provide an annotated dataset available for the scientific community.



NAME **Maria Angela MUSCI**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Automatic techniques for semantic data extraction in precision agriculture/farming

TUTOR(S) Andrea M. LINGUA, Paolo DABOVE and Irene AICARDI (Politecnico di Torino)

ACADEMIC CONTEXT

Kamilaris A., et al., 2018. Deep learning in agriculture: A survey. *Computers and Electronics in Agriculture*, 147, pp. 70-90.
Manolakis D.G., et al., 2016. *Hyperspectral Imaging Remote Sensing: Physics, Sensors, and Algorithms*. Cambridge University Press.

EXTERNAL COLLABORATIONS

- University of Twente, Department of Earth Observation Science (EOS), Enschede, The Netherlands

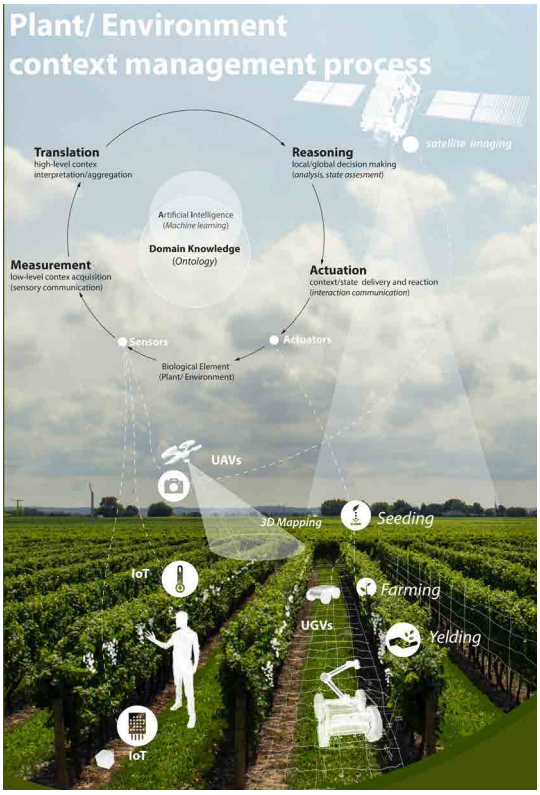
HIGHLIGHTS OF THE RESEARCH ACTIVITY

As the New Urban Agenda Habitat III underlines, precision agriculture is an important challenge for urban and regional planning in term of productivity, environmental impact, food security and sustainability .

As proposed by the "Rural Development Program 2014-2020", it is necessary to provide innovative tools and sustainable solutions for monitoring, conservation, improvement of the production to sustainable development, in order to promote precision agriculture development in large scale area.

This implies the use of more precise and integrated sensors, analysis of big agriculture data, the use of new information and communication technologies and both short scale crop/farm management as well as for ecosystems observation.

In this scenario, the interdepartmental center of Politecnico di Torino for Service Robotics (PIC4Ser), in collaboration with different research groups, aims to integrate innovative solutions enabling service robotics in the areas of control, perception and artificial intelligence. Among the four main application area precision agriculture (PA) is included. In PA application field, the idea of the Centre is the development of a multi-agent and multi-sensors platform, i.e. Unmanned Aerial Systems (UAS) and an Unmanned Ground Systems (UGS), that collaborate among themselves to have different prospective and to overcame the limits of each single platform. Among these limits, for example, there are level of the battery, restrictive directive for the aerial vehicles flight and the reductive prospective of ground vehicles. The concept of the center is synthetized in the Figure 1.



My research work, funded by the Centre, will be focused on geomatics applications for crop classification, detection of plant diseases, such as sensors acquisition, real-time photogrammetry, multisensory data fusion, deep learning and data management.

Analyzing the state of the art of sensors, types of data, automatic techniques for classification and semantic ontologies, the main gaps are related to technologies for radiometric survey and standardized methodologies for multi/hyper-spectral data management. Therefore, the purpose of the research is to define an automatic multi-sensor and multi-temporal methodology based on hyper-spectral 3D models. The use of multi/hyper-spectral data is mandatory in order to characterize objects both from geometric and radiometric point of view and to improve the automatic data extraction and classification.

NAME **Giuditta SOCCALI**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Identity politics and heritage making in Varanasi, UP, India

TUTOR(S) Ugo ROSSI, Alberto VANOLO (Università di Torino)

ACADEMIC CONTEXT

Dodson M.S. ed., 2012. *Banaras. Urban Forms and Cultural Histories*. New Delhi and Abingdon: Routledge.
Desai M.S., 2017. *Banaras Reconstructed: Architecture and Sacred Space in a Hindu Holy City*. University of Washington Press.
Cresswell T., 2014. *Place: An Introduction*. Chichester: John Wiley & Sons.
Goonewardena K., 2019. "Monument", in: *Keywords in Radical Geography: Antipode at 50*. Chichester: John Wiley & Sons, Ltd, pp. 186-191.

EXTERNAL COLLABORATIONS

- Kautylia Society, ngo, Varanasi
- CSDS, Centre for the Study of Developing Countries, New Delhi

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The city of Varanasi, UP, (India), has been longtime described as an "eternal" city, whose heritage and traditions are regarded as "immemorial" and "older than history". Narratives of spirituality, uniqueness and the many myths associated to the city have turned it into a paradigm of orientalist imaginery.

Although usually described as eternal and never changing city, Varanasi built heritage and intangible traditions obviously experienced the passing of time. Muslim dynasties ruled the city for most of its modern history (16th-18th c.), but the history of the Muslim domination is often quickly dismissed as one of destructuive fury, demolishing Hindu temples for constructing mosques, madrasas and other buildings for the cult of Islam. This dominant narration is itself part of a wider rhetoric which presents the city as a space of the Hindus, where different communities – the Muslim one attaining around 25 to 35 % of total population – are occupying spaces of marginality. As a result of history, built heritage in the old city of Varanasi does not date back before the 17° century. As recent scholarly contributions have pointed out, (Dodson 2012; Desai 2017) the British administration and the urban elites had a strong role in the material and discursive (re)construction of the city. Such reconstruction was largely based on the image of the city which emerged in sacred texts which in turn were sanctioned by colonial «pictoresque» accounts.

Today the city is a bursting 2 millions inhabitants metropolitan area, whose local economy is based principally on the sari industry, tourism and the religious economy. As a stronghold of right-wing Hindu party, BJP, whose leader Narendra Modi has been reconfirmed as Prime Minister of the Indian Union (2019), Varanasi plays an important role for maintaining the party's political ideology. A recent urban regeneration project for one neighborhood in the old city – VTC Project– has been promoted by the Prime Minister himself. Such a project evidently aims at using the flagship of modernity and development to beautify religious Hindu structures, in an urban area where also the most important mosque is located.

By analysing the current development projects and the role and action of the civil society in the old city through ethnographic research this thesis aims to discuss how the use of identity politics by the current government at the Indian Union and State levels is deeply intertwined to the promotion, alteration, or destruction of heritage places and narratives and, reversely, how civil action and public action is contributing to feed a climate where sense of belonging and identitarian conflict seem to have become the dominant features of politics in contemporary India and elsewhere.

NAME **Roberta TARAMINO**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Consumers, urban network and retailing.
How consumers' behavior and urban network shape commercial patterns

TUTOR(S) Luigi BUZZACCHI, Giulio ZOTTERI (Politecnico di Torino)

ACADEMIC CONTEXT

Sevtsuk A., 2010. *Path and place: a study of urban geometry and retail activity in Cambridge and Somerville*, MA (PhD Thesis). Massachusetts Institute of Technology.
Eaton B.C., Lipsey R.G., 1979. Comparison shopping and the clustering of homogeneous firms. *Journal of Regional Science*, 19, pp. 421-435.
Porta S., Strano E., Iacoviello V., Messora R., Latora V., Cardillo A., Wang F., Scellato S., 2009. Street centrality and densities of retail and services in Bologna, Italy. *Environment and Planning B: Planning and design*, 36, pp. 450-465.

EXTERNAL COLLABORATIONS

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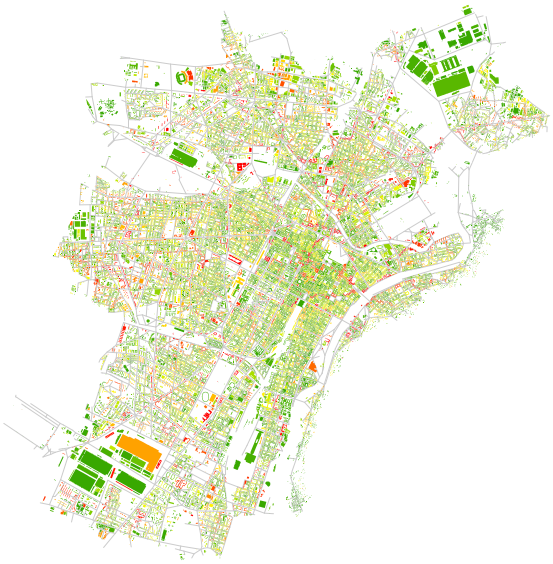
HIGHLIGHTS OF THE RESEARCH ACTIVITY

Retail firms provide consumers with goods and services for consumption. They are an economic institution delivering explicit product or services at an observable market price (Betancourt and Gautschi, 1988), playing in an oligopolistic market.

Retailers follow a two-stages process. First, they decide how similar their product may be with respect to competitors. If their products or services are too similar to those of established firms, in theory, incumbents are not able to woo consumers but if their products are too different, firms may train the potential consumer launching educational campaigns. Second, they decide their best location. In the retail market, location is not meant to be only a spot on a map. The city can't be viewed as if it were located on a featureless plan, on which all land is of equal quality (Alonso, 1960). 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 a juxtaposition 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. One possible outcome of a such important choice, that has never been a consequence of chance, is that activities agglomerate in areas that are considered as accessible and attractive by the consumers (Duranto d building plans create different levels of spatial accessibility of points in space and influence retailer's location choices. On the other hand, attractiveness deals with typical consumers behaviour. Indeed, store owners are expected to locate on the point of maximal demand that is "as closely as possible to the consumers demanding their commodity bundle and to retailers who, by supplying complementary commodity bundles, attract the desired clientele" (Stahl, 1987:33). Indeed, customers who visit several shops benefit from increasing return to scale. This externality is enhanced when multiple shops are located in close proximity (Eaton and Lipsey, 1979). Hence, 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.



Our research has the objective to investigate the existent relationship between retail location choices, urban network and consumers behaviour in order to provide a critical interpretation of the commercial city patterns.

NAME **Alberto VALZ GRIS**
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COURSE XXXIII cycle - 2nd year

RESEARCH TITLE Commodities: Expanding the frontiers of urbanization

TUTOR(S) Francesca GOVERNA

ACADEMIC CONTEXT

Valz Gris A., 2019. Tangling a bi-oceanic corridor. Lo Squaderno, 51.
Angelo H., Wachsmuth D., 2015. Urbanizing urban political ecology: A critique of methodological cityism. *International Journal of Urban and Regional Research*, 39(1), pp. 16-27.
Arboleda M., 2015. Financialization, totality and planetary urbanization in the Chilean Andes. *Geoforum*, 67, pp. 4-13.
Mezzadra S., Neilson B., 2015. Operations of Capital. *South Atlantic Quarterly*, 114(1), pp. 1-9.

EXTERNAL COLLABORATIONS

- CIDMEJu, San Salvador de Jujuy, Argentina

HIGHLIGHTS OF THE RESEARCH ACTIVITY

This research project is funded by and developed at the Future Urban Legacy Lab as part of an interdisciplinary focus on the relationship between cities and production. Its seeks to investigate contemporary geographies of production while critically considering the geographic category of the city: which urban spaces are both intersected with and fabricated by contemporary geographies of production? As argued by critical and heterodox studies of urbanization, more attention needs to be paid in the field of urban studies to the dynamics by which urban agglomerations are produced well beyond their administrative and physical borders, considering the wider metabolic interactions that structurally bind them to extended forms of urbanization.

The present research project proposes to explore this metabolic interaction through the study of commodity chains. This framework not only is a productive heuristics for retracing the unfolding of economic dynamics, towards which studies in economic geography have traditionally employed it, but also an innovative one, I argue, for studying associated dynamics of urbanization. The subsequent operations which ultimately produce a consumable item illuminate in fact a wide array of urbanizing spaces across the chain. Economic geographic literature on the commodity chain concept is therefore reviewed here and critically combined with studies in urban political ecology and critical urban theory so as to formulate novel methodological and theoretical questions.

The project investigates the geographies of lithium-ion batteries - themselves a globally expanding commodity because of their prominent role in sustaining the global agenda towards the reduction of carbon emissions. Batteries are remaking cities worldwide through their rapidly growing adoption in ICT, electric mobility and grid applications based on renewable energy. Their commodity chain, however, reveals a much wider relational geography by which hinterlands of extraction, circulation and manufacturing are fundamentally reshaped with direct correspondence to the transformations occurring in cities. The project explores the dynamic of extended urbanization in the Atacama region in South America (the world's largest agglomeration of lithium reserves) through extractive, logistical and financial geographies associated with the lithium-ion supply chain. As such, an urbanizing Atacama is reconstructed with respect to an array of scales and relations.

XXXIV CYCLE - 1st YEAR STUDENTS

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

COURSE XXXIV cycle - 1st year
RESEARCH TITLE Landscape resilience
TUTOR(S) Angioletta VOGHERA

ACADEMIC CONTEXT

Brunetta G., Ceravolo R., Barbieri C.A., Borghini A., de Carlo F., Mela A., Beltramo S., Longhi A., De Lucia G., Ferraris S., Pezzoli A., Quagliolo C., Salata S., Voghera A., 2019. Territorial Resilience: Toward a Proactive Meaning for Spatial Planning, *Sustainability*, 11, p. 2286.
Brunetta G., Caldarice O., 2019. Spatial Resilience in Planning: Meanings, Challenges, and Perspectives for Urban Transition. In Leal Filho W., Azul A., Brandli L., Özuyar P., Wall T. (eds), *Sustainable Cities and Communities. Encyclopedia of the UN Sustainable Development Goals*. Cham: Springer.
Folke C., 2016. *Resilience, Oxford Research Encyclopedia of Environmental Science*, Oxford University Press, pp. 1-63.
Davoudi S., 2012. Resilience: A Bridging Concept or a Dead End?, *Planning Theory & Practice*, 13(2), pp. 299-333.

EXTERNAL COLLABORATIONS

- LINKS Foundation (Cultural Heritage & Regional-Urban Development area), Turin

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The landscape is living and constantly changing over time. In that framework, permanence, identity and retaining the memory require the integration of co-evolution in landscape planning. To fill the gap between the theoretical concept of resilience and its translations into spatial plans and projects, "landscape resilience" seems the emerging concept useful to this end. In this perspective, is recognized a lack of explicit adaptative resilient tools in the current Management Plans of the UNESCO World Heritage Sites, listed as "Cultural Landscapes", about discounting identity in relation to the newcomers. In literature, the debate around the relationship between cultural heritage and resilience has opened (Brunetta et al., 2019) and fits in the Target 11.4 "Strengthen efforts to protect and safeguard the world's cultural and natural heritage" postulated by the SDG n.11.

So, it appears crucial to grasp the ratio among permanence-memory and dynamic transformations, which interest a vast area in long-term strategies. This highlights how "the capacity to preserve the know-how and approaches to protect cultural heritage depends on territorial governance, which leads to the possibility of increasing the intrinsic resilience of a system" (Brunetta et al., 2019). Compared to the newcomers, it seems vital "[...] the need of local communities to reconstruct their sense of belonging, their history or cultural identity" (Brunetta et al., 2019). Consequently, how is resilience articulated with identity? What is the ratio between persistence and transformation, to reach both the robustness and allow changes for a community-led "active protection"?

In a resilient scenario, a qualitative approach will be carried out including multi and transdisciplinary, as well as systemic methodologies. However, this implies the "acceptance of ontological uncertainties" (Shaw, 2012), in which the "complexity theory is the epistemological basis of evolutionary resilience" (Davoudi, 2018).

Qualitative results, coming from investigations and comparisons of two case-studies, will produce both theoretical outputs, to debate within the academic community, and practical ones, useful for the local communities. Latter could support the managing bodies to "[...] promote practices with incentives to reinforce the community role and the adaptive capacity of systems" (Brunetta et al., 2019), as insert proactive landscape-resilient tools within the UNESCO Management Plans renewal, planned to be every 10 years.

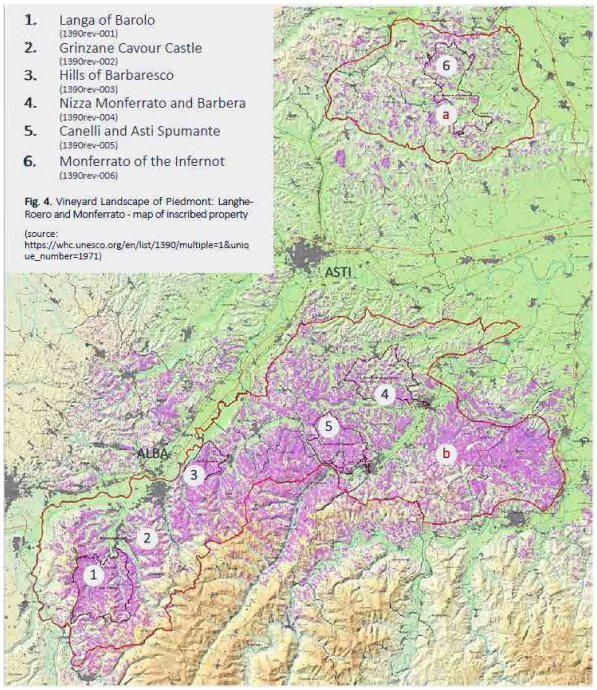

Fig. 4. Vineyard Landscape of Piedmont: Langhe-Roero and Monferrato - map of inscribed property (source: https://whc.unesco.org/en/list/1390/multiple=1&unique_number=1971)

NAME **Velia BIGI**
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COURSE XXXIV cycle - 1st year

RESEARCH TITLE Analysing flood risk in the context of Climate Change through the quantitative definition of flood risk components using the Agent Based Model

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

ACADEMIC CONTEXT

ACADEMIC CONTEXT:

Francesch-Huidobro M., Dabrowski M., Tai Y., Chan F., Stead D., 2017. Governance challenges of flood-prone delta cities: Integrating flood risk management and climate change in spatial planning. *Progress in Planning*, 114, pp. 1-27.
Jenkins K., Surminski S., Hall J., Crick F., 2017. Assessing surface water flood risk and management strategies under future climate change: Insights from an Agent-Based Model. *Science of the Total Environment*, 595, pp. 159-168.

EXTERNAL COLLABORATIONS

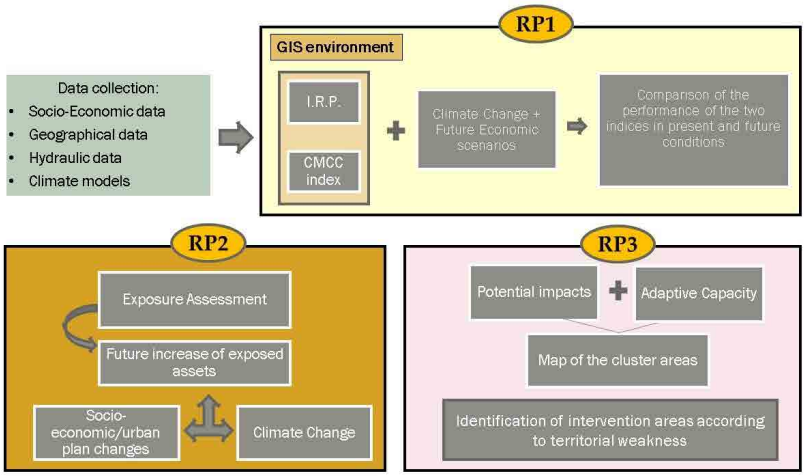
- Regione Piemonte
- ESPOL (Escuela Superior Politecnica del Litoral) & Canton de Duran, Ecuador

HIGHLIGHTS OF THE RESEARCH ACTIVITY

This research aims to address key sources of uncertainties regarding flood risk components. Those are related mainly with the lack of local flood risk's projections and with the application of the flood risk definition in which each factor gives the same contribution to risk quantification.

In the context of Climate Change, the increase of flood risk, as for other natural hazards, will pose a serious challenge. This risk will result as a consequence of higher daily discharges as well as of changes in economic, social and environmental conditions. Since, a more modern approach relies increasingly on flood risk management rather than only on flood protection, the European Member States are subject to compliance with the Directive 2007/60/EC, with the aim of assessing and managing flood risks. In Italy, the National Adaptation Plan for Climate Change (PNACC) requires to evaluate, map and prevent hydraulic and hydrogeological risk at reginal level. The Regione Piemonte is among the leasing regions in this process and already uses a risk quantification instrument. This allows to estimate the expected damages per year, an information that ensures policy makers to set aside an appropriate amount of resources in case of flood events. However, it doesn't shed light on the allocation of resources arrangement neither includes future scenarios. Those gaps prevent the implementation of effective protection measures.

A broader use of the IPCC's definition of risk together with an alternative use of Agent Based Models will enable the identification of intervention areas and the creation of a more refined instrument that identifies the risk's component on which is necessary to act in advance.



NAME **Francesca BLANC**
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COURSE XXXIV cycle - 1st year

RESEARCH TITLE Territorial governance and spatial planning systems in Latin America between international influences and path-dependency

TUTOR(S) Giancarlo COTELLA

ACADEMIC CONTEXT

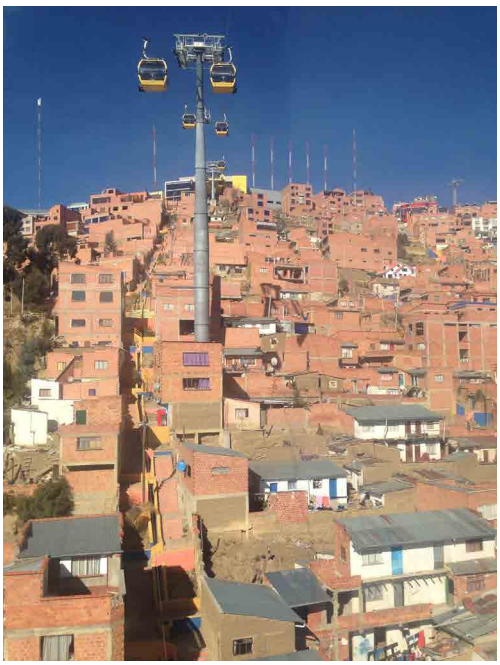
Cotella G., Janin Rivolin U., 2010. Institutions, Discourse and Practices: Towards a Multidimensional Understanding of EU Territorial Governance. In: *AESOP, 24 Annual Conference, Finland 7-10 July 2010*.
Galland D., Elinbaum P., 2018. A "Field" Under Construction: The State of Planning in Latin America and the Southern Turn in Planning. *Disp*, 54(1), pp. 18-24.
Janin Rivolin U., 2012. Planning Systems as Institutional Technologies: a Proposed Conceptualization and the Implications for Comparison. *Planning Practice and Research*, (March), pp. 37-41.
Schwarz A., Streule M., 2016. A Transposition of Territory: Decolonized Perspectives in Current Urban Research. *International Journal of Urban and Regional Research*, 40(5), pp. 1000-1016.

EXTERNAL COLLABORATIONS

- Delft University of Technology (TU-Delft), The Netherlands.
- Universidad de Cuenca (UdC), Ecuador

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The PhD research inquires the influence of international organizations on spatial planning systems and territorial governance in Latin American countries, with focus on Ecuador and Bolivia.
The focus is set on how international influences combine with local community practices in shaping the spatial planning systems in terms of discourse, structures, tools and practices.
Ecuador and Bolivia belong to the Socialism of the 21st Century and they both recently approved new constitutional and legal urban frameworks. They are centralized countries despite the decentralization process begun in the 1990s and they are characterized by a high level of urban informality. The introduction in both Constitutions of the concepts of good living and right to the city represents an attempt to break with the neoliberal and colonial paradigm, enlarging the domain of spatial planning conceived as an 'institutional technology'.
In spite of that, international mainstream agencies still have an important role in influencing local and national spatial planning decisions, through the allocation of funds and aids (e.g. FMI, BID, international cooperation, etc.) and through the implementation of Global Agendas (e.g. UN-Habitat, UNDP, UCLG, etc.).
In the light of the above, the thesis aims at testing recent methodologies settled for the comparative analysis of the evolution of territorial governance and spatial planning systems in Europe in the context of Latin America. As territorial governance and spatial planning are highly context-dependent, and the European and Latin American contexts are highly different, these methodologies will be further contextualized and critically tailored in the context of the 'southern turn in planning'.
Finally, the PhD research aims at contributing to the Latin American urban studies conceived as 'a field under construction', and to critically reconsider the role of Western academics in the light of decolonized perspectives in urban research.



NAME **Francesca Caterina BRAGAGLIA**
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COURSE XXXIV cycle - 1st year

RESEARCH TITLE Ruling the unruled?
The institutionalisation of social innovation in spatial planning

TUTOR(S) Umberto JANIN RIVOLIN

ACADEMIC CONTEXT

Gerometta J., Haussermann H., Longo G., 2005. Social innovation and civil society in urban governance: Strategies for an inclusive city. *Urban studies*, 42(11), pp. 2007-2021.
Eraydin A., Frey K., 2018. *Politics and Conflict in Governance and Planning: Theory and Practice*. London: Routledge.
Moulaert F., Swyngedouw E., Martinelli F., Gonzalez S., Eds., 2010. *Can Neighbourhoods Save the City?: Community development and social innovation*. London: Routledge.
Swyngedouw E., 2005. Governance innovation and the citizen: the Janus face of governance-beyond-the-state. *Urban studies*, 42(11), pp. 1991-2006.

EXTERNAL COLLABORATIONS

- Science Po Paris, France
- Technischen Universität Berlin, Germany
- University of Liverpool, United Kingdom

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Over the past years in many European cities, social innovation has been considered as a partial possible solution to the economic crisis and to the current welfare system failures (Moulaert et al., 2007), leading to the conclusion that civil society can co-operate - and sometimes even substitute government - in urban welfare provision and spatial planning interventions. In this sense, many European countries, with different models of spatial governance (Janin Rivolin, 2017), have recently been trying to organize and stress this great socially innovative ferment - originating outside the governmental apparatus - within institutional frameworks. Amongst the others, the Neighbourhood Plans instituted in 2011 in England with the 'Localism Act', the Conseils Citoyens that since 2014 have profoundly redefined 'La Politique de la Ville' in France, and the process of building the guidelines for citizens' collaboration in the urban and spatial development started in 2017 in the Länder of Berlin are emblematic examples of this new faith in co-creating and co-managing the city with citizens and associations. These new tools are the clear expression that in the current scenario spatial governance can no longer be interpreted from a uni-directional perspective. However, the emergence of these new forms of hybrid governance, calls for a broader reflection on the possibility of codifying social innovation of civil society through formalized instruments.

Starting from a broad theoretical reflection on the concept of social innovation in spatial practices in the academic and policy discourse, this research is aimed at investigating the application of these instruments in three case-study cities, the research project intends thus to understand if bottom-up urban practices of social innovation can be virtuously channelled and pushed through codified instruments or, on the contrary, codification ends up to destroy its innovative character. In more practical terms, the research aims to understand (a) at what conditions and in what institutional settlements it is possible to develop mutually engaging relationships between municipalities and civil society capabilities; and (b) if the new instruments can transform the established power relationships (Arnstein, 1969; Foucault, 1982) between administration and civil society, or they are simply 'flanking mechanisms' (Brenner and Theodore 2002, p. 374) of traditional asymmetrical relationship of power.

Words commonly linked in literature to the theme of social innovation in urban development

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COURSE XXXIV cycle - 1st year

RESEARCH TITLE Integrating Resilience Paradigm and Urban Forms

TUTOR(S) Grazia BRUNETTA

ACADEMIC CONTEXT

Davoudi S., Brooks E., Mehmood A., 2013. Evolutionary Resilience and Strategies for Climate Adaptation. *Planning Practice & Research*, 28 (3), pp. 307-322.
Feliciotti A., Romice O., Porta S., 2018. *From system ecology to urban morphology: towards a theory of urban form resilience*. Conference Proceedings – IFoU December 2018: Reframing Urban Resilience Implementation: Aligning Sustainability and Resilience. Sustainability.
Folke C., 2016. Resilience (Republished). *Ecology and Society*, 21(4), p. 44.
Marcus L., Colding J., 2014. Toward an integrated theory of spatial morphology and resilient urban systems. *Ecology and Society*, 19(4), p. 55.

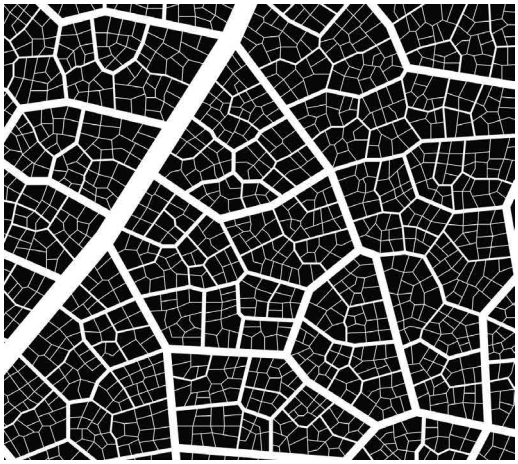
EXTERNAL COLLABORATIONS

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

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Today cities are home to more than 54% of world population and since about the 67% of world population is projected to in urban contests by 2050. This high concentration of population and socio-economic activities in cities makes it fundamental to safeguard them from the threatening effects of anthropic behaviors, natural disturbs, shocks and climate change impacts to urban sustainability. In the contest of increasing uncertainties, uncontrollable disturbs and growing urbanization, cities are working on resilience as the capacity to persist, to adapt or even transform into new development pathways in the face of dynamic change. Focusing on resilient properties is leading to an increasing awareness of the growing complexity of urban system and environmental evolving conditions, with the consequent rising debate on the relationship between city structure and evolutions and on the need to integrate urban form mindset with change.

The thesis joins this debate by looking at urban form through the lens of co-evolutionary resilience. The physical form of cities is one of the most evident manifestation of its internal flows and dynamics and hence of the continuous tensions between visible and invisible, be it conflicting or potentially synergic. However, while the urban form might well be the most tangible dimension of cities this does not exist in isolation, but within a framework of rules and regulations, actors and agents, networks and local cultures within time. Therefore, integrating resilience thinking into urban form theories and practices is important for avoiding undesirable trajectories in both overcrowded-urban-world and new environmental changing scenarios. This becomes particularly relevant when referring to the projected increases in both world urban population and climatic scenarios for the next decades and consequently, to the significant expansion and exposure of the physical built environment.



Nevertheless, the connection of these two dimensions is still lacking in research, as the long debate on urban morphology has scarcely interacted with the complex theories in urbanism and in urban structures. Thus, it might be assumed that city-morphology and transformations are still regarded as separate entities, and that this lack of integration is the main reason for the unpreparedness of built environment in the face of unforeseen shocks and gradual disturbs. Dealing with some key morphological aspects in relation to a selection of resilience attributes, the research discusses possible interdependencies between urban resilience and form and tries to understand if "resilient urban form" is mainly a "means" for planning or rather an "end-point".

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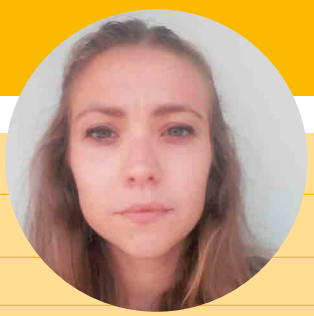


COURSE	XXXIV cycle - 1st year
RESEARCH TITLE	Agent-based model and Geographic Information System (GIS): an integrated approach to test sustainable policies and urban transformation scenarios
TUTOR(S)	Marta Carla BOTTERO

ACADEMIC CONTEXT

Caprioli C., Bottero M. Pellegrini M., 2019. An Agent-Based Model (ABM) for the Evaluation of Energy Redevelopment Interventions at District Scale: An Application for the San Salvario Neighborhood in Turin (Italy). In: S. Misra et al., ed., *Computational Science and Its Applications – ICCSA 2019. ICCSA 2019. Lecture Notes in Computer Science*, 11621, Cham: Springer.
Caprioli C., Bottero M., 2018. Agent-based modelling and Geographic Information System for the evaluation of eco-district's scenarios. In: Leone A., Gargiulo C., eds. *Environmental and territorial modelling for planning and design*. Naples: FedOAPress., pp. 35-45.
Gilbert N., Terna P., 2000. How to build and use agent-based models in social science. *Mind & Society*, 1, pp. 57-72 .
Heppenstall A.J.J., Crooks A.T., See L.M., Batty M., 2012. *Agent-based models of geographical systems*. Cham: Springer.

EXTERNAL COLLABORATIONS

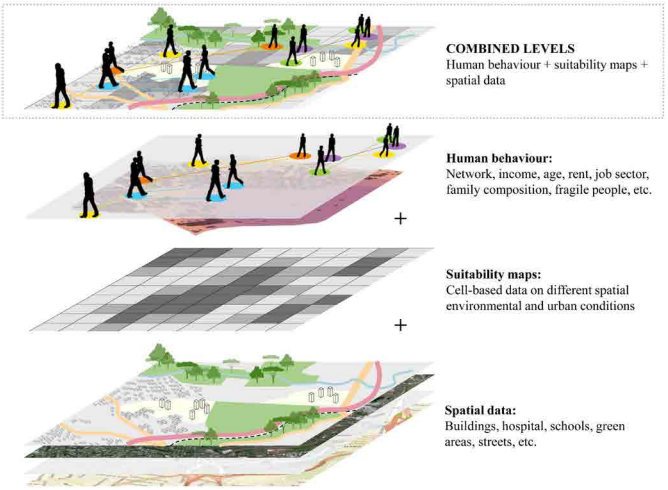
- Queensland University of Technology (QUT), Brisbane, Australia

HIGHLIGHTS OF THE RESEARCH ACTIVITY

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

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

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



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COURSE XXXIV cycle - 1st year

RESEARCH TITLE Development of a geo-spatial ontology to support historical centres and villages valorisation

TUTOR(S) Andrea LINGUA, Antonia SPANÒ, Margarita KOKLA (National Technical University of Athens)

ACADEMIC CONTEXT

Acierno M., Cursi S., Simeone D., Fiorani D., 2017. Architectural heritage knowledge modelling: An ontology-based framework for conservation process. *Journal of Cultural Heritage*, 24, pp. 124-133.
Colucci E., Noardo F., Matrone F., Spanò A., Lingua A., 2018. High-level-of-detail semantic 3D GIS for risk and damage representation of architectural heritage, *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLII-4, pp. 107-114.
Guarino N., Oberle D., & Staab S., 2009. What is an Ontology? In S. Staab and R. Studer (eds.), *Handbook on Ontologies*, Second Edition. International handbooks on information systems. Cham: Springer, pp. 1-17.
Kokla M., Mostafavi M. A., Noardo F., Spanò A., 2019. Towards Building a Semantic Formalization Of (Small) Historical Centres., *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLII-2/W11, pp. 675-683.

EXTERNAL COLLABORATIONS

- National Technical University of Athens - School of Rural and Surveying Engineering – OntoGeo (Geographic Information Science and Geoinformatics Research) Group, Greece
- Turin 1911 Project – UCSanDiego

HIGHLIGHTS OF THE RESEARCH ACTIVITY

This theme of research deals with the Geomatics area and specifically it is about geographical and spatial information. The main topic is the study of ontologies for spatial and geographical data.

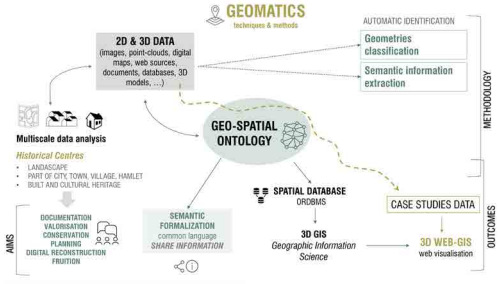
Ontologies are very useful to create a common language and to ensure semantic interoperability, with the purpose to create a unique and standard thesaurus, that will let different discipline and stakeholders talk together. They could help in risk scenario analysis, in regional development, in urban protection, in management activities and landscape planning. Moreover, ontologies allow the digital control of information and relations between different operating systems by communicating with geographic tools (SIT, 3D GIS – Geographic Information System, BIM – Building Information Modeling, H-BIM).

The domain of this study is identified in historical centres and villages in order to document, to preserve and to help the decision-making process of small urban and rural areas in different scenarios (alpine hamlets, city centres damaged by hazards, archaeological sites, …). The research aims to produce an accurate representation of the reality through a multi-scale data analysis approach and with different levels of detail (using standards of geographic information as well as INSPIRE and CityGML).

The research tries to fill different gaps of the nowadays scenario of geographical sciences. Indeed, there is not a yet defined ontology containing useful information to manage, share and collect data on historical centres. Moreover, there is a lack of semantic formalization for built heritage and a lot of interoperability problems and geometries incompatibilities.

To bridge these gaps my study will identify the semantic formalization of historical centres designing an ontology in this domain. To fill the lack of interoperability issues for 3D data, a multiscale database will be created to identify automatically the geometries and to extract semantic information.

The final aim is the creation of a 3D WEB-GIS for a sort of 3D city model web visualisation in which it will be possible to query the geometries of some historical centres and hamlets case studies obtaining information included in the 3D geodatabase created following the ontology structure.



NAME **Giulia DATOLA**
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COURSE XXXIV cycle - 1st year

RESEARCH TITLE Toward resilient cities: measuring urban resilience performance using a System Dynamics approach

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

ACADEMIC CONTEXT

Datola G., Bottero M., De Angelis E., 2019. How urban resilience can change cities: a system dynamics approach. In: Misra S. et al., ed. Computational Science and Its Applications – ICCSA 2019. ICCSA 2019. *Lecture Notes in Computer Science*, 11622. Cham: Springer. pp. 108-122.
Meerow S., Newell J.P., Stults M., 2016. Defining urban resilience: A review. *Landscape and Urban Planning*, 147, pp. 38-49.
Sharifi A., Yamagata Y., 2016. Urban Resilience Assessment: Multiple Dimensions, Criteria, and Indicators. In: Yamagata Y., Maruyama H. ed. *Urban Resilience. Advanced Sciences and Technologies for Security Applications*. Cham: Springer, pp. 259-274.
Tan Y., Jiao L., Shuai C., Shen L., 2018. A system dynamics model for simulating urban sustainability performance: A China case study. *Journal of Cleaner Production*, 199, pp. 1107-1115.

EXTERNAL COLLABORATIONS

- Riga Technical University, Institute of Energy Systems and Environment, Latvia

HIGHLIGHTS OF THE RESEARCH ACTIVITY

The concept of urban resilience has become relevant in the context of cities and it is increasingly applied as a fundamental principle to define urban development strategies (Sharifi, 2016; Yamagata and Maruyama, 2016). Cities are exposed to a wide range of shocks and stresses both natural and man-made and the global community is increasingly realizing that built urban resilience in our cities is needed to mitigate the negative impacts of hazards. For these reasons, planning for resilient cities is now recognized in the political agenda for urban development.

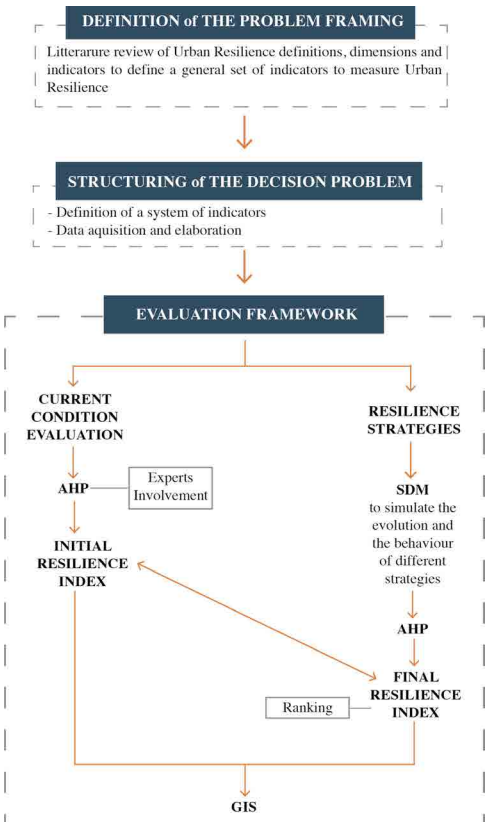
Considering this challenge, it is of fundamental importance to provide to the decision makers specific evaluation tools able to measure the urban resilience performance of a city in the future, given the current state and the hypothesis of intervention.

Starting from these issues and through an in-depth literature review, this research proposes an integrated evaluation approach to measure both the current urban resilience performance and the possible future performance related to urban development strategies.

The first phase of the research is focused on the creation of a system of indicators to measure the performance of urban resilience at the initial state through the support of Multi-Criteria Analysis (MCA).

The second phase consists in using System Dynamics Model (SDM) (Forrester, 1968) to describe and model the mutual relationships between the different criteria included in the evaluation model, in order to consider both the relationships between several elements of the urban systems and their dynamics. SDM will be also used to simulate the evolution of different strategies over time, considering their impacts in the different dimensions. Based on these simulations, the third phase is dedicated to the evaluation of the urban resilience performance in the future.

The final phase will provide the translation of this index in a map through the GIS (Tan et al., 2o10) able to visualize and communicate the results of the evaluation.



NAME **Arianna FONSATI**
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COURSE	XXXIV cycle - 1st year
RESEARCH TITLE	InfraBIM tools and methods applied to organizations' implementation process
TUTOR(S)	Anna OSELLO, Alessandro DAMIANI (Lombardi Ingegneria S.r.l.)

ACADEMIC CONTEXT

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

EXTERNAL COLLABORATIONS

- Lombardi Ingegneria S.r.l.

HIGHLIGHTS OF THE RESEARCH ACTIVITY

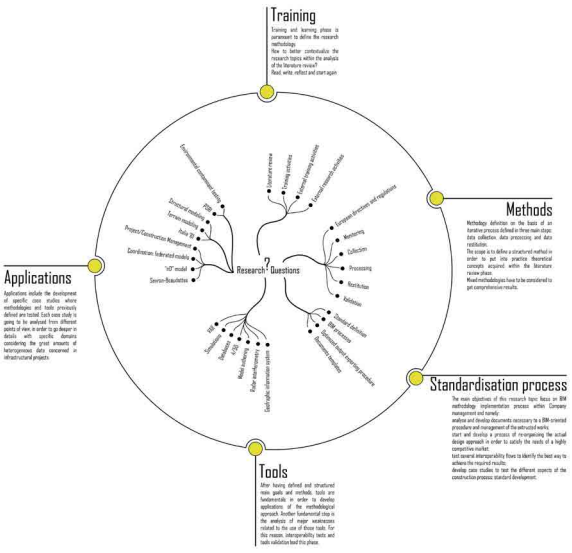
The benefits of a BIM-oriented approach are attractive not only at building level, but as far as infrastructural projects are concerned too. The transition of BIM methodology to the infrastructural domain has emphasized its prospects, providing new challenges and pushing the process beyond any previous limit. Currently, the BIM maturity level within the infrastructure field still needs implementation, because interoperability needs further improvements. The main objectives of the research topic focuses on BIM methodology implementation process and namely:

- Develop Guidelines and standards necessary to a BIM-oriented procedure and management of the entrusted works;
- Test several interoperability flows to identify the best way to achieve the required results;
- Develop case studies to test the different aspects of the construction process;

To sum up, the research aims at combining both knowledge on the specific field of infrastructures and tools-related skills, in order to define strategic planning at company level.

As far as the implementation process is concerned, the expected result of the process of analysis is the definition of standardized methods and workflows "tailored" on the Organization's needs. Furthermore, the result involves the regular update of these documents as necessary; so, another key result is the planning of the update of these documents. As far as the benchmark of methods and tools are concerned the expected results concern optimized and efficient workflows for specific purposes, such as the definition of an application to integrate Project and Construction Management techniques and BIM-oriented tools and methods related to Time and Cost dimensions.

Applications include the development of specific case studies where methodologies and tools previously defined are going to be tested. Each case study is going to be analysed from different points of view, in order to go deeper in details with specific domains considering the great amounts of heterogeneous data concerned in infrastructural projects. Three main case studies have been identified for further developments, subdivided in different fields of application: Environmental contaminant testing within the PSRI case study; Terrain and structural modelling within the case study of the underground station Italia '61 project; Project/Construction Management, Federated models, "nD" and VAR within the case study of the underground station Sevran-Beaudottes.



NAME **Martina GIZZI**
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COURSE XXXIV cycle - 1st year

RESEARCH TITLE Reuse of abandoned Oil and Gas wells for geothermal energy production

TUTOR(S) Stefano LO RUSSO, Glenda TADDIA

ACADEMIC CONTEXT

Alimonti C., Gnomi A., 2015. Harvessing the fluids heat to improve mature oil field. *Journal of Petroleum Science and Engineering*, 125, pp. 256-262.
Alimonti C., Soldo E., 2016. Study of geothermal power generation from a very deep oil well with a wellbore heat exchanger. *Renewable Energy*, 86, pp. 292-301.
Liu X., Falcone G., Claudio Alimonti C., 2018. A systematic study of harnessing low-temperature geothermal energy from oil and gas reservoirs. *Energy*, 142, pp. 346-355.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

The 2030 UN Agenda for Sustainable Development and the Paris Agreement on Climate Change, both adopted in 2015, represent two fundamental contributions to guide the transition towards an economic model that aims, not only profitability and profit, but mostly social progress and environmental protection.

"Responsible production and consumption" is one of 17 Global Goals that makes up the 2030 Agenda for Sustainable Development: in order to achieve this goal it is required that every nation urgently change the way it produce, consume, recycle goods and it manage natural resources.

The main aims for energy company are therefore to provide energy solutions that are increasingly more sustainable, away from those based on fossil fuel and to guarantee access to low-cost energy, through technological development and environmental value.

In this process, the energy production based on the exploitation of geothermal resources deriving from disused Oil & Gas wells represents a considerable economic and environmental potential: it can solve problems associated to suspended wells near municipalities and can allow to hypothesize long-term scenarios for the exploitation, even at the end of the production cycle of hydrocarbon wells, to the benefit of end uses in the industrial, civil and agriculture.

The aim of the research activity is to develop a methodological investigation tool, potentially applicable to each analysed site (Italy and foreign countries), that allows to define the most advantageous hypotheses of geothermal potential exploitation, linked to existing wells, already subject to concession of cultivation of liquid and gaseous hydrocarbons and currently no longer exploited.

The research will involve three main different phases of work: 1) analysis of specific legislation and regulatory regimes potentially activated for the purpose of the retrofitting abandoned Oil & Gas wells for geothermal energy production; 2) multicriteria analysis (MCA) applied on different selected study-sites for the evaluation of site-specific energy potential, by providing an accurate and realistic representation of abandoned wells' heat flow and temperature distribution; 3) analysis of plants development scenarios to understand if it is possible to content energy requests in the territory surrounding the production plants (civil and agricultural districts).

NAME **Chiara GENTA**
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COURSE	XXXIV cycle - 1st year
RESEARCH TITLE	Toward the development of a science-based tool for evaluating impacts of circular economy practices in European urban contexts
TUTOR(S)	Patrizia LOMBARDI

ACADEMIC CONTEXT

Brandon P.S., Lombardi P., Shen G.Q., 2017. *Future challenges in evaluating and managing sustainable development in the built environment*. London: Wiley-Blackwell.
Miola A., Borchardt S., Neher F., Buscaglia D., 2019. *Interlinkages and policy coherence for the sustainable development goals implementation: an operational method to identify trade-offs and co-benefits in a systemic way*. Luxemburg: Publications office of the European Union.
Sala S., Ciuffo B., Nijkamp P., 2015. A systemic framework for sustainability assessment. *Ecological Economics*, 119, pp. 314-325.
Farné Fratini C., Georg S., Søgaard Jørgensen M., 2019. Exploring circular economy imaginaries in European cities: a research agenda for the governance of urban sustainability transitions. *Journal of cleaner production*, 228, pp. 974-989.

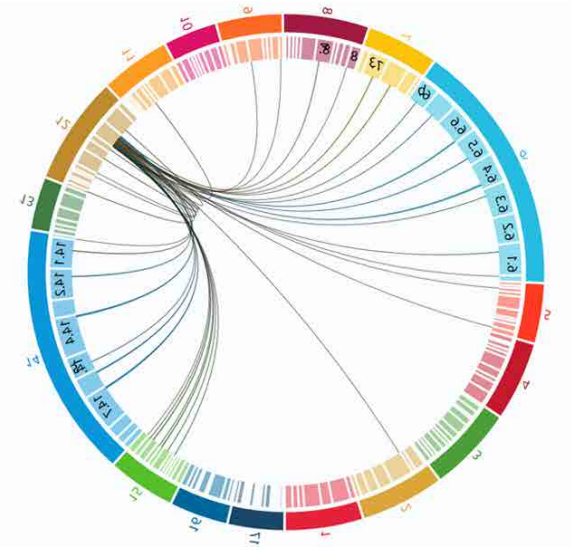
EXTERNAL COLLABORATIONS

- Joint Research Centre, Ispra
- Comune di Torino (Interreg project MOLOC)

HIGHLIGHTS OF THE RESEARCH ACTIVITY

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

The research will try to fill this gap in developing a new interactive tool for analysing interconnections and impacts of circular economy practices in European urban contexts, in the framework of Agenda 2030 and 17 SDGs. The thesis is articulated in two parts. In the first part a detailed literature review about transition cities, circular economy practices and system dynamics theories is developed as a basis for the definition of a preliminary framework of interlinkages and trade-offs between SDG12 (about circular economy) and other goals in urban contexts. In this preliminary phase a system thinking approach is adopted in order to define the new ontology of circular economy imaginaries in urban transitions. In the second part the tool will be developed using system dynamics models and other qualitative and quantitative methodologies used in sustainability evaluation of urban transformations, going beyond simple check-list protocols and using a more metabolic approach. The tool will be then tested in two European cities that already started the implementation of the new Urban Agenda according to European policies.



NAME **Elena GIGLIO**
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COURSE	XXXIV cycle - 1st year
RESEARCH TITLE	The downstream space technologies within the climate change/ environment sector: the technology transfer/spin off process added value
TUTOR(S)	Anna OSELLO, Alessandro DAMIANI (Lombardi Ingegneria S.r.l.)

ACADEMIC CONTEXT

Official Journal of the European Union, REGULATION (EU) No 377/2014 of the European Parliament and of the Council of 3 April 2014 establishing the Copernicus Programme and repealing Regulation (EU) No 911/2010.
European Commission, Baveno, 20 June 2018, *20 years of the Copernicus Programme*, Press relase.
European Parlament, April 2017, *Securing the Copernicus programme Why EU earth observation matters*.

EXTERNAL COLLABORATIONS

- CONICET - Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Satellite earth observation is a very important practice that ensures monitoring and management of the environment, leading to disaster forecasting, management and mitigation.

Some keys initiatives are being developed and will disrupt the EO market by introducing new innovative products/technologies or processes. For such applications/technologies to succeed in the market, the product needs indeed to be shaped according to users' needs and their value to users must be openly demonstrated to the wider user community.

The Copernicus programme in Europe is currently developed by the European Union and aims to create an independent EO capacity and consists of a network of satellites and receiving stations.

The international dimension of Copernicus is of particular relevance in the exchange of data and information, as well as in access to observation infrastructure. Fields of cooperation may be:

- Data acquisition and Quasi Real Time production
- Complementary collaborative data products and algorithms definition
- Core data product dissemination and access
- Development of innovative tools and applications

The JRP will analyze the needs of space and non-space users in South America to develop new applications and/or identifying suitable space technologies to meet these needs pushing also through a technology transfer process. The technology transfer process is a key factor to ensure long term benefits for the entities involved in this project. The activities within the space sector indeed could be classified in 2 big groups: "from the space technology to Earth" (spin off) and from the earth up to the space (spin in). The specific spin off process consists of extracting and marketing space technologies, services and applications by analysing the needs of non-space applications and identifying suitable space technologies to meet these needs. The market of this sector is totally underestimated also due to a lack of knowledge of competences able to process the free and open data made available by the European Commission (eg Sentinel data) and/or other contribution mission (eg COSMO SKYMED).

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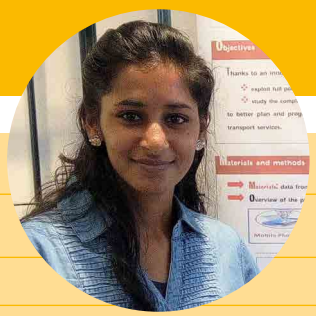

COURSE	XXXIV cycle - 1st year
RESEARCH TITLE	Data and Information Extraction from Multiple Data Sources for Transport Innovation and Sustainability (Mobility as a Service)
TUTOR(S)	Cristina PRONELLO, Silvia CHIUSANO, Giovanni MALNATI

ACADEMIC CONTEXT

Pronello C., Kumawat P., Smartphone applications developed to collect mobility data: a review and SWOT analysis. *TRB 2020 - 99th Annual Meeting of the Transportation Research Board*, Washington, D.C. (submitted).

EXTERNAL COLLABORATIONS

- Sorbonne Universités – Université de Technologie de Compiègne, France

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Nowadays, massive data available in the worldwide web allows tracking words, as well as locations, that are analysed and matched through several databases, allowing the prediction of people's activities and making obsolete the expensive and time- consuming statistical surveys (Hilbert, 2013). Today there are several data sources useful for the project: open data as well as the directed, automated or volunteered sources (Kitchin, 2014), including mobile phone data. The impressive growth of data volume generated annually (Manyika et al., 2011) should have largely improved the knowledge of the urban mobility. The understanding of the factors influencing mobility patterns and travel behaviour is the key to ensure the acceptance of innovations and services that could readdress the mobility patterns to more sustainable behaviours and optimize investments in transport systems. The research aims at exploiting the full potential of big data to describe mobility patterns, extract information from existing massive data sources, crossing it with context-specific understanding of human behaviour, in order to analyse the different ways people interact with one another (Onnela, 2011). The project will provide – through an innovative approach, less invasive than current travel surveys – a cloud based framework for collecting, analysing, and extracting urban mobility information from several massive data sources. Such information is useful to several purposes: the planning and programming of public transport as well as the control of the quality of its services; the management of mobility; the supply of new services for the customers; and the study of the complexity of the interaction between information and travel behaviour.

The objectives are:

1) analysis, integration, and extraction of information from social media, mobile devices and network operators aimed to build mobility datasets/ patterns and behavioural and interactions patterns;

2) evaluation of the collected data in terms of: a) quality and reliability; b) mobility patterns and clusters of users; c) definition of Key Performance Indicators (KPIs) useful to the decision makers for improving services in transport systems; d) individuation of new mobility services.

NAME **Erica MANGIONE**
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COURSE	XXXIV cycle - 1st year
RESEARCH TITLE	University student housing: possible policies and impacts on a medium size Italian city
TUTOR(S)	Marco SANTANGELO

ACADEMIC CONTEXT

Chatterton P., 2010. The student city: an ongoing story of neoliberalism, gentrification, and commodification. *Environment and Planning*, 42, pp. 509-514.
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EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

Since university became a mass and global phenomenon, new socio-economic impacts on urban environments are object to scholar's attention (Goddard, Vallance 2013). Major western country's universities attract increasing number of young, who contribute to change cities, fostering new consumes and behaviors. On the other hand, municipalities can't do without universities anymore: this are now key players in the urban development policy definition.

Such reciprocal university-city relation can be described as a successful one, as well as from an alternative point of view, who concentrates on student population, identifying them as promoter of gentrification processes – the so called "studentification" (Chatterton 2010, Smith 2005). In such academic context, more than one gap need to be filled; not just the one who see at students as aggressive "gentrifiers", but also the rarely appearance of southern Europe university cities in the international debate, despite their involvement in the same global dynamics and urban transformations. Among Italian university cities with higher off campus students' rates, one of the main and most critical issue is about housing.

As a matter of fact, international real estate investors are increasingly attracted to Italian university cities; the positive trend of student housing sector and its ongoing commodification, suggest the reality of a potential risk of speculation. This is even more true when the public institution's intervention is observed: specific policies are weak, if not absent.

University student housing policies are the topic of the research, with Turin as a case study. A policy is intended as a coordinated action, as the result of a collective and willful process of definition of a clear and common objective. According with such definition, the research starts claiming that no student housing policy is actually carried out in Turin. On the other hand, a complex and complicated network of public and private actors are studied, to frame their independent answer to the housing demand, that is causing relevant but still not studied socio economic impacts. Finally, the research wants to investigate the possible conditions that leads to the construction of a student housing supply policy in a medium size university city, in order to understand if and how can be possible to ensure a fair access to housing, at any student and with no restrictions depending on their economic condition.

NAME **Danial MOHABAT DOOST**
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COURSE XXXIV cycle - 1st year

RESEARCH TITLE Social Resilience: Investigating the relation between co-evolutionary resilience and social equity

TUTOR(S) ANGIOLETTA voghera, Grazia BRUNETTA

ACADEMIC CONTEXT

Meerow, S., Pajouhesh, P. and Miller, T.R., 2019. *Social equity in urban resilience planning. Local Environment*, pp.1-16.
Davoudi S., 2013. On Justice: Towards a Framework for "Just Planning". disP-The Planning Review, 49(2), pp.4-5.
Harvey, D., 2008. The right to the city. *New Left Review*, 2(53): 23-40.
Fainstein, S.S., 2014. The just city. International Journal of Urban Sciences, 18(1), pp.1-18.

EXTERNAL COLLABORATIONS

- Nordic hub for sustainable urbanization, Denmark

HIGHLIGHTS OF THE RESEARCH ACTIVITY

Existing research recognizes lots of differences in the role played by various stakeholders, groups, actors, users, and even individuals for resilience building. Taken together, these studies support the notion that managing for resilience requires cooperation among stakeholders. For many stakeholders, elaborating social relations is proven to be useful for promoting their notion of resilience. However, there is increasing concern about the other stakeholders who face difficulties to make their voice heard by organizations.

These groups may even experience significant adverse consequences of the implementation of resilience policies as well. This double exclusion –from both processes and outcomes- creates a development path in which the burdens and benefits of resilience implementation are not distributed equitably. In more details, "Improvements in the lives of stakeholders through stakeholder theories and analyses tend to help those who are already powerful within organizational settings, while those who are less powerful continue to be marginalized and routinely ignored." This theoretical exclusion obviously creates material obstacles on the road to reach equity and inclusion -within the concept of resilience- as significant targets of Agenda 2030.

Accordingly, the primitive aim of this study is to clarify the nexus between the concept of resilience and social equity by investigating the differences in the role played by various actors. The mentioned goal will be followed with a great focus on the groups which are intendedly or unintendedly, marginalized or excluded. The following objective is to unpack the interaction of the excluded actors with the more powerful actors, since the structural relationships between different actors impact both processes and outcomes of resilience building efforts.

Finally, it is hoped that this research will contribute to a deeper understanding of how resilience policies could be implemented following inclusive paths and resulting in even distribution of burdens and benefits.

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COURSE XXXIV cycle - 1st year

RESEARCH TITLE Evaluating processes and outcomes of urban forest governance

TUTOR(S) Claudia CASSATELLA

ACADEMIC CONTEXT

Borelli S., Conigliaro M., Quaglia S., Salbitano F., 2017. Urban and Peri-urban Agroforestry as Multifunctional Land Use. In *Agroforestry*. Singapore: Springer, pp. 705-724.
Lawrence A., Ambrose-Oji B., 2015. Beauty, friends, power, money: navigating the impacts of community woodlands. *The Geographical Journal*, 181(3), pp.268-279.
Rauschmayer F., Berghöfer A., Omann I., Zikos D., 2009. Examining processes or/and outcomes? Evaluation concepts in European governance of natural resources. *Environmental policy and governance*, 19(3), pp.159-173.
Sheppard S.R., van den Bosch C.C.K., Croy O., Macias A., Barron S., 2017. Urban forest governance and community engagement. In *Routledge handbook of urban forestry. London:* Routledge, pp. 205-221.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

In this era characterized by global trends, such as rapid population growth and urbanization, changing climate, depletion of natural resources, and growing socio-economic inequalities, cities play a key role in understanding socio-ecological dynamics and in responding to changes (Grimm et al., 2008), particularly referring to the need of attaining urban sustainability and resilience through the formulation and implementation of plans and policies aimed at protecting natural capital and enhancing human wellbeing and health.

In this context urban forest, defined by FAO (2016:2) as: "all trees and woods in an urban area: in parks, private gardens, streets, around factories, offices, hospitals and schools, on wasteland and in existing woodlands", is globally receiving increasingly attention as a sustainable and resilient multifunctional land-use option due to the numerous services and goods it is able to provide to urban and peri-urban communities.

Being the delivery of forest ecosystem services dependent on the physical structure of urban forests determined by decision-makers and influenced by stakeholders involved in urban forest governance (Fischer & Mincey, 2013), it appears as crucial deepening the research agenda on this aspect of urban forestry to address the knowledge gap in the literature and to foster the planning, implementation and management of cost-effective urban forests (Ostoić et al., 2018; 2015; Ambrose-Oji et al., 2017; Lawrence et al., 2013; Bentsen et al., 2010).

In fact, the great majority of research on urban forest refers to technical challenges, and the benefits, of planting and managing trees in the urban areas, but relatively little has been written about governance modes and their capacity of implementing and managing successful urban forestry initiative in the long-term.

In this vein, the objective of this doctoral investigation is to develop a framework for evaluating the processes and outcomes of different forest governance modes at local scale in order to understand successful, or not, factors characterizing the quality of governance (i.e. good governance) and their biophysical, social and economic/financial outcomes.

NAME **Carlotta SCIOLDO**
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COURSE	XXXIV cycle - 1st year
RESEARCH TITLE	The European Cultural policy in its coordinative, communicative and cognitive dimension
TUTOR(S)	Carlo SALONE

ACADEMIC CONTEXT

Dente B., 2014. Towards a typology of local development policies and programmes. *Local Economy: The Journal of the Local Economy Policy Unit*, 29, pp. 675-686.
Borras S., Radaelli C., 2011. The politics of governance architectures: creation, change and effects of the EU Lisbon Strategy. *Journal of European Public Policy*, 18, pp. 463-484.
Tatcher M., 2019. Direct and market governance paths for the creation of an EU political identity: cultural heritage policy. *Comparative European Politics*, 17, pp. 585-602.

EXTERNAL COLLABORATIONS

- Cosmopolis Centre for Urban Research, VUB Brussels, France
- UCL London, Department of Political Science, School of Public Policy, United Kingdom

HIGHLIGHTS OF THE RESEARCH ACTIVITY

In the recent years, there has been an increasing attention in analyzing the production and consumption of cultural assets through the Local Development Approach. Acknowledging the three fundamental features of the LDA: territorial focus, mobilization of social actors and policy integration (Dente 2014), it is however noticeable that academic attention has been rarely given to the study of the cultural sector throughout these three features. Specifically the multilevel policy integration has been disregarded.

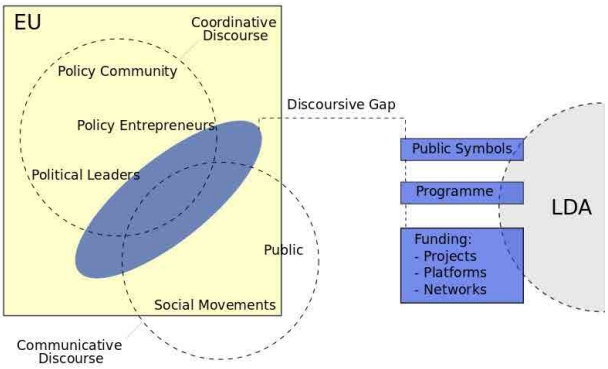
As a complementary element to the local cultural policies and practices, the research aims to bring further insights of this interdependency by analyzing the European Cultural Policy (ECP) in its coordinative (interaction among policy actors) as well as communicative (towards the public) dimension.

The ECP developed since the 80's as a two set of policies acknowledging the dual nature of culture as an economic as well as a socio-cultural asset. Even if from one side this field suffered from legal, administrative, political unclarity, from the other, it is recognized as a valuable tool for building a European political identity and fostering cross-cutting objectives such as territorial cooperation and social cohesion.

Recognizing the complexity of the supranational organization (European Commission) in which this policy sector has been designed and the ideational and organizational shifts occurred at the beginning of 2000s, renders possible to argue that ECP, widely considered as public policy aiming at supporting the cultural and creative sector, serves other implicit objectives such as reinforcing territorial cooperation, shaping European identity, enhancing the EU legitimacy.

Furthermore, the effects of EU cultural policy on the national and sub-national level are meant as 'Europeanization' process, enhanced mainly through negotiations seeking for the creation and the maintenance of meanings and discourse (Radaelli 2017). This research intends to enquire first what discourse has been devised throughout the different phases, second to highlight the role of discourse in the policy adaptation and diffusion on the national and local level, third to question the instruments used to implement this discourse.

The hypothesis consists of considering the EU funded transnational networks, platforms, think tanks and projects as instruments from one side responsible of diffusing knowledge - epistemic go betweens (Douglas, Raudla, Hartley 2015), from the other functioning as local-level Europeanization devising unpredictable assemblage.



NAME **Francesca TAORMINA**
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COURSE	XXXIV cycle - 1st year
RESEARCH TITLE	Envisaging religious heritage as tourism destination: the role of governance on transformative processes
TUTOR(S)	Sara BONINI BARALDI

ACADEMIC CONTEXT

Pignatti A., Baraldi L., 2018. *Il patrimonio culturale di interesse religioso*. Milano: FrancoAngeli Edizioni.
Timothy D. J., Olsen D. H., 2006. *Tourism, Religion and Spiritual Journey*. New York: Routledge.
Pechlaner H., Beritelli P., Pichler S., Peters M., Scott N., 2015. *Contemporary Destination Governance: A Case Study Approach*. Bingley (UK): Emerald Group Publishing Limited.
Kooiman J., 1999. Social-political governance: overview, reflections and design. *Public Management*, 1, pp. 67-92.
Torfin J., Peters B. G., Pierre J., Sørensen E., 2012. *Interactive Governance. Advancing the Paradigm*. Oxford University Press.

EXTERNAL COLLABORATIONS

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HIGHLIGHTS OF THE RESEARCH ACTIVITY

The following research project intends to investigate governance issues for religious heritage as tourist destination. Nowadays religious heritage is globally affected by a paradigmatic process of transformation. On the one hand some sites are exposed to a high threat of decay due to a decreasing attendance and risk of abandon. On the other hand, some complexes are becoming increasingly popular tourist destinations, as confirmed by World Tourism Organisation trends . Tourism at religious heritage destination is also changing. Beyond worshippers and traditional pilgrims, multifaceted targets of visitors lead, in turn, to differentiation of tourism forms: cultural, religious, spiritual etc. Hence tourism for religious heritage can be both a tremendous opportunity for revitalizing sacred traditions, triggering sustainable socio-economic development and at the same time potential source of commodification. While this dichotomy is valid also for other categories of heritage, the religious one is exposed to an intrinsic greater level of complexity being distinguished by the presence of a constructed, and often contested, Sacred space, imbued of distinctive values and manifested in a plurality of forms. Referring to the flourishing academic debate on destination governance, rooted on political and corporate governance theories, the following research will grasp transformation processes of religious heritage destinations, intended as complex set of multiple, and often conflicting, stakeholder groups. The investigation will longitudinally analyse and compare governance evolution (structures and processes) of two case-studies, both UNESCO World Heritage religious destinations: khmer temples in the Angkor Archaeological Park (Cambodia) and churches belonging to the Arab-Norman Pathway in Palermo (Italy). Main aim is to critically inquire relational and interactive dynamics among all the actors who shape each destination, from decision makers to users, in relations to the achievement of collective goals. Through the use of qualitative methods and the acquisition of secondary data (like administrative documents, regulations etc.), the study will address main research questions below:

How governance tackle transformation processes of religious heritage into tourist destination?

Does it enable, or not, a balanced coexistence of multiple and often conflicting institutional logics, values and interests which are peculiar of religious heritage destinations?

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