



INTERNATIONAL CONFERENCE AND WORKSHOP

[CLIMATE-RESILIENT URBAN DESIGN]

NAPOLI October 4-12 2018

Universities

- UNINA Università di Napoli Federico II
- NYIT New York Institute of Technology
- UPEM Université Paris Est Marne La Vallée
- PUC P. Universidad Católica de Chile

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- **Jeffrey Raven** (NYIT - Department of Architecture; UCCRN Urban Climate Change Research Network)
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- **Giulio Zuccaro** (UNINA - Department of Structures for Engineering and Architecture, PLINIVS Study Centre)
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Workshop Scenario

Climate change impacts are already visible today, with extreme heat and precipitation events increasingly growing in frequency and intensity worldwide. Urban climate must be a key consideration in the planning and design of contemporary cities. Climate resilient principles need thus to be integrated in the design process as a knowledge area linked to architectural disciplines.

The issue of climate resilience in urban areas requires the development of innovative design methods that can handle the complexity of the information needed to guide sustainable urban regeneration and retrofitting strategies, as well as to manage the technological and environmental solutions in a multi-scale perspective. Cities represent in this sense the main field of experimentation of innovative and climate-resilient design principles and methods.

The workshop goal is to explore integrated design strategies for creating sustainable and resilient communities that can adapt and thrive in the changing global conditions, meet carbon-reduction goals, provide new public spaces and facilities in relation to community priorities, by configuring or retrofitting compact and mixed-use eco-districts. The proposed design method is process-oriented and focuses on sequential and iterative steps bringing to projects' implementation through a multi-disciplinary and multi-scale approach.



Workshop Steps

[1] *Climate Analysis Mapping* will provide a critical first step in identifying urban zones subject to the greatest impacts associated with rising temperatures, increasing precipitation and extreme weather events, providing downscaled climate projections as preliminary information to orient evidence-based design guidelines. Depending on the scale of the analyses, GIS-based (UMEP, Solweig) and Parametric 3D modelling tools (*Rhinoceros*, *Grasshopper*) allow to refine morphological approaches to urban microclimate and sustainability outcomes, providing further information about occurrence and frequency of air masses exchange, thermal and air quality effects of urban climate (stress areas, insolation rates, shading conditions), buildings-open spaces energy exchange optimization.

[2] *Site surveys and Public Space Evaluation* allow to couple urban climate considerations with insights about needs and expectations of local communities, whose priorities in terms of urban regeneration and building/open spaces retrofitting are often more related to a general improvement of housing and public services, to increase neighbourhood liveability, sustainable mobility and social inclusion. Existing issues such as mono-functional residential areas, interchange parking lots, playgrounds for children, green areas, pedestrian routes and cycling paths can be conveniently integrated in the design proposals to balance climate and community resilience instances.

[3] *Planning and Design Intervention* phase is grounded on a critical review of the collected information to identify the relevant synergies and trade-offs in relation to the planned initiatives in the areas, as envisaged by local authorities in the mid- to long-term. Zoning regulations and building codes frame the boundaries of the design and technical options to be assessed, and the most appropriate strategies targeted for future development. Recurring design topics include: technological and energy retrofitting of buildings (envelope and HVAC systems) to achieve NZEB targets; reduction of urban heat islands through reflecting surfaces and building / urban greening solutions; optimization of urban ventilation via air exchange and wind corridors through variation of building density and mass; regulation of surface run-off through sustainable urban drainage systems.

[4] *Post-Intervention Evaluation* is intended as a sequence of activities aimed at assessing the benefits of the proposed solutions in terms of microclimatic, energy and environmental performance, as well as of compliance with community priorities. The evaluation of design solutions is carried out through GIS-based parametric 3D modelling tools that can simulate climate, energy and environmental behaviour at building and neighbourhood scale.

East Naples Case Study

The eastern area of Naples was the most extended district included in the Special Plan for Housing (*Piano Straordinario di Edilizia Residenziale, PSER*) launched following the 1980 earthquake. The plan of Ponticelli zone (*Piano di Zona di Ponticelli*) has provided 3,700 houses of the 13,000 planned by the Special Plan. The design of the new urban blocks, which accommodate more than 18,000 people, has been driven by the choice of adopting specific building typologies and prefabricated building technologies with the aim of accelerating the construction process in order to satisfy the immediate need of the population and to offer a political response to the urgent situation. The metamorphosis of this area generated by the new building stock was more shocking than the earthquake event itself: from an agricultural landscape and economy already compromised by the near industrial area of San Giovanni a Teduccio, the built and the natural environment shifted to a metropolitan dimension changing the relation between the center and the peripheral belt of the city in a definitive way. The socio-cultural "shock" of the local residents following the massive transfer of people from the heavily damaged popular districts of Napoli city centre has resulted in a mutual segregation of the two communities which is still unresolved.

After almost 40 years Ponticelli represents an emblematic sample of the Neapolitan emergency and re-development process that occurred after the earthquake of 1980. In this neighborhood the post-disaster threefold strategy – temporary houses, new residential complexes, recovery and retrofitting of damaged buildings – still co-exist and define the nature of the district. Several criticalities arise by a complex interaction between the urban morphologies, housing typologies and the use of private and public spaces stressing the social dynamics and the failures of the post-earthquake interventions.



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Currently the main issues characterizing the area, to be intended as direct and indirect consequences of the PSER program, can be summarized as follow:

- *Temporary houses became permanent houses (Parco Galeazzo)*
- *Lack of infrastructures and public services caused by the non-completion of the networks and public activities planned (as in the official Programs and Plans)*
- *Urban fragmentation (social and spatial) with segregation dynamics between PSER urban blocks and private residential complex*
- *Structural and technological decay of the social housing stock provoked by the lack of maintenance, the variation of the intended uses and by the public ownership of the buildings*
- *Exacerbation of emerging environmental risks in particular the climate change related hazards (heat waves and pluvial floods) and the healthy risk (polluted sites) intensified by the transformation model of the area. The district shifted from an agricultural wet-land structured around productive and housing unit of Casali (historical typology of housing unit and farm) to an extended residential zone with a high percentage of sealed soils, lack of vegetation and disuse of historical drainage systems.*

In the perspective of a resilience approach to the urban settlement as a complex system, the study of Ponticelli as an area spatially, socially and culturally scarred by the post-earthquake projects could be conceived both to interpret the multiple failures (architectonic, social and political) of the post-disaster-measures and to configure a transition toward a more sustainable and resilient settlement.

The case study will focus on design answer to three key challenges identified:

- understanding the issues of urban warming / extreme weather events and their impact in dense cities;
- addressing climate-resilient solutions tailored according specific needs in existing districts;
- identifying climate mitigation strategies that yield concurrent adaptive benefits;
- proposing design approaches driven by community resilience principles able to enhance the ongoing initiatives from local associations and residents.

Workshop teams

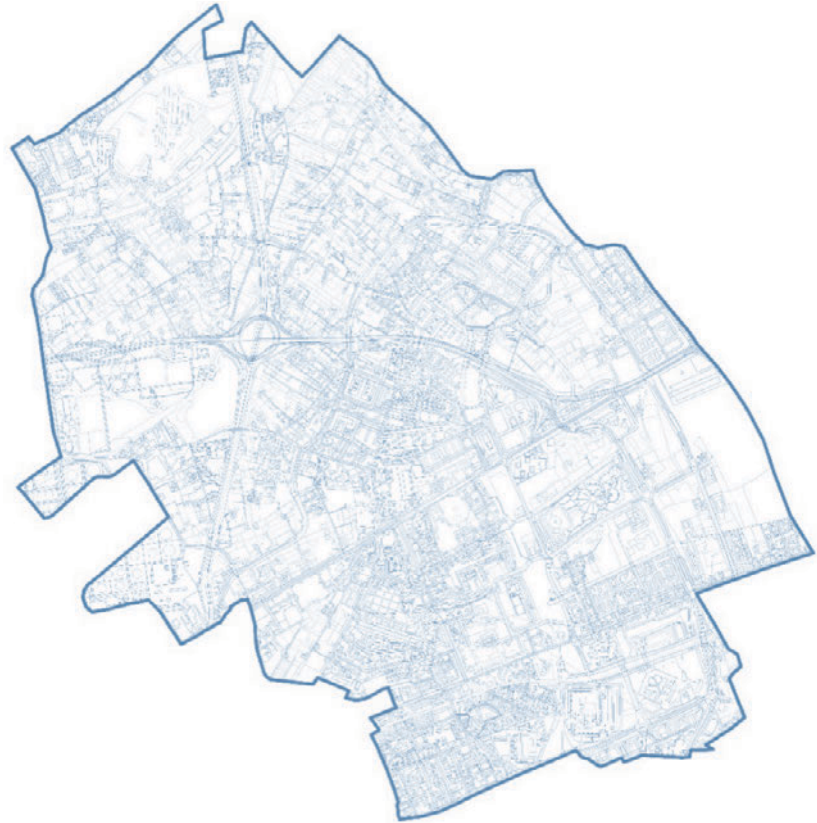
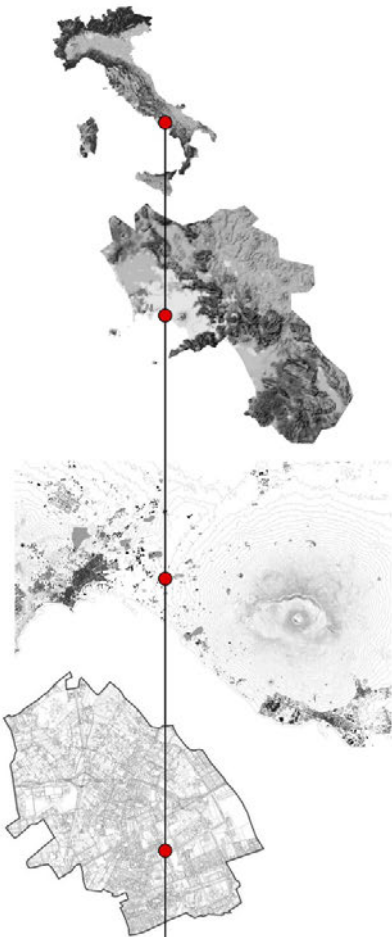
- **DES1** - Climate Resilient District (2 teams, ≈7 students each)
- **DES2** - Climate Resilient Neighborhood (2 teams, ≈7 students each)
- **TECH** - Adaptive Mitigation Technical Solutions for Buildings and Open Spaces (1 team, ≈12 students)
- **COM** - Creative Communication and Dissemination with Local Community (1 team, ≈8 students)

DES1 and **DES2** teams will appoint 2 members each to allow the proper exchange of information with **TECH** and **COM** teams during the implementation of the Workshop Steps implementation.

TECH will focus on identifying and communicating the benefits of adaptive mitigation technical solutions suitable for Napoli area and other sites characterized by similar climate conditions and climate change

patterns. The solutions will be classified in relation to four climate-resilient design principles: Efficiency of urban systems; Form and layout; Heat-resistant construction materials; Vegetative cover.

COM will focus on community outreach and knowledge exchange, enhancing a creative interaction with no-expert actors and inhabitants to provide input to the design implementation and promote awareness on the interlinks between climate resilience and quality of urban environments.

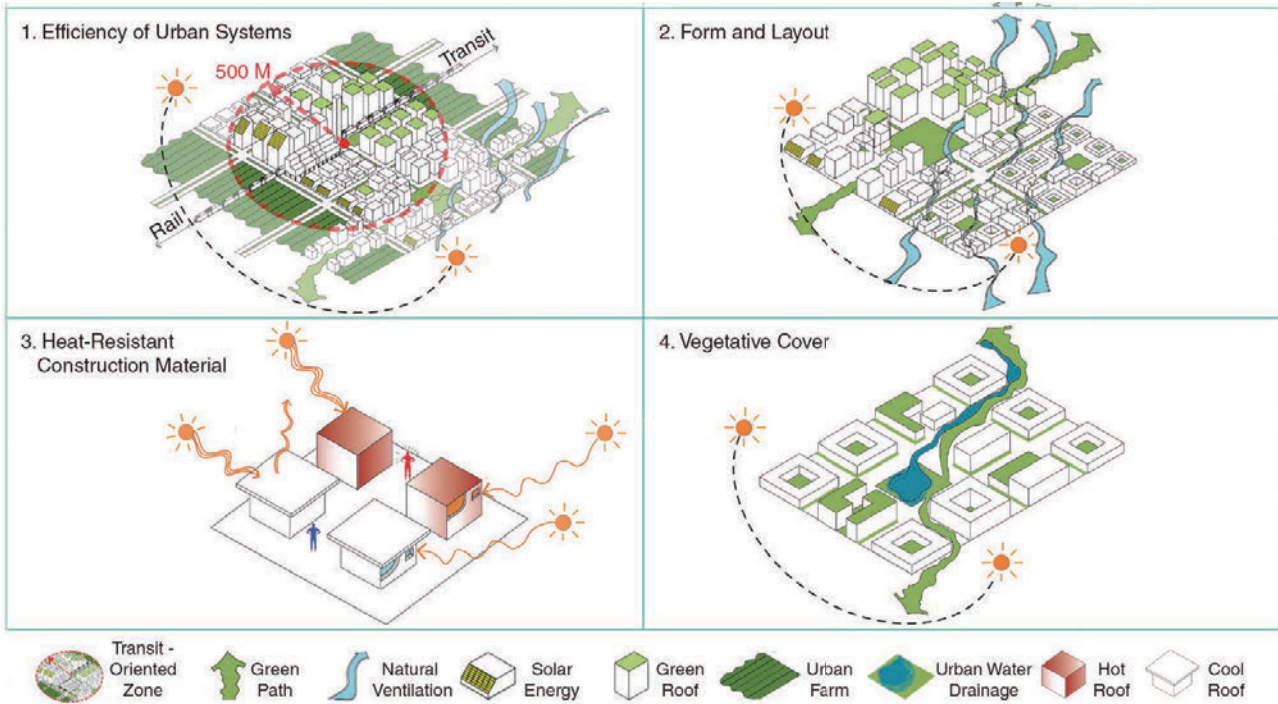


DES1 – Project area

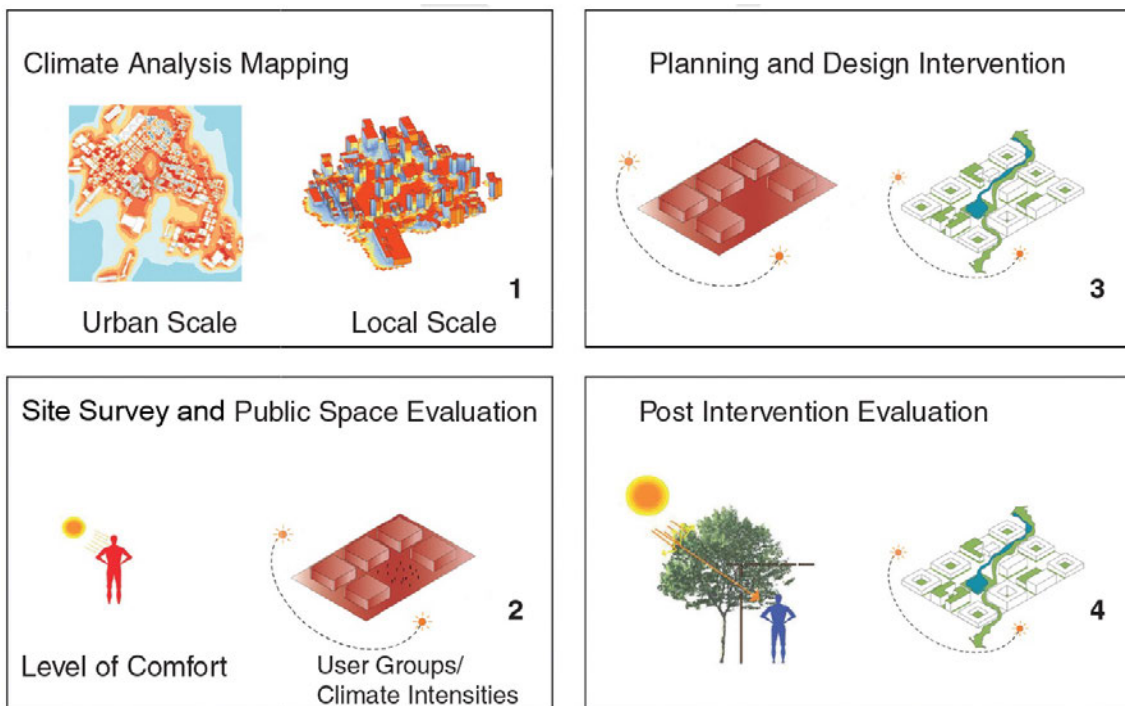


- Outdoor areas within residential blocks (new neighbourhood services and facilities)
- Recently retrofitted residential buildings (new public functions in ground floors spaces)
- Outdoor areas of abandoned buildings (new neighbourhood services and facilities)
- Paved external areas (new neighbourhood services and facilities)
- Residential building in use (energy retrofiting, refurbishment of collective spaces, reuse of ground floors according to users' needs)
- Street network (pedestrian accessibility, sidewalk extension, new neighbourhood services and facilities)
- Abandoned building (new buildings or partial retrofiting for new public functions)
- Undesigned green areas (green areas refurbishment, new facilities, urban gardens)

DES2 – Project area



ARC3-2 Climate-resilient design principles



ARC3-2 Climate-resilient design process

Source: Raven, J., Stone, B., Mills, G., Towers, J., Katzschner, L., Leone, M., Gaborit, P., Georgescu, M. and Hariri, M. (2018), "Urban planning and Urban design", in Ro-senzweig, C., Solecki, W., Romero, P., Lankao, Mehrotra, S., Dhakal, S., Ali Ibrahim, S. (Eds.), *Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network*, Cambridge University Press, New York, USA.



Conference and Workshop Programme

Day	Morning Session (9:15-13:15)	Afternoon Session (14:30-18:00)
Thursday 04.10.2018	-	Book Launch - "Environmental Design for Climate Change Adaptation Vol. 1-2" (Eds. D'Ambrosio, V. Leone M.F., 2016-2017)
Friday 05.10.2018	Workshop presentation - Urban climate factors and design process - Presentation of the Study Area - Knowledge exchange session: showcasing preparatory work from partners	International Conference Climate-Resilient Urban Design - Energy Transition, Climate Change Adaptation and Disaster Risk Reduction - Perspectives in Research and Practice Workshop Welcome Cocktail - Venue: RiotStudio, Napoli
Sunday 07.10.2018	Site survey (see Agenda)	Free
Monday 08.10.2018	Design workshop	Invited Seminar [14:30-15:30] Michael Esposito – Atelier Ten Design workshop
Tuesday 09.10.2018	Design workshop	Invited Seminar [14:30-15:30] Pamela Larocca – PLA Studio Design workshop
Wednesday 10.10.2018	Design workshop	Invited Seminar [14:30-15:30] Marina Rigillo – DiARC Design workshop
Thursday 11.10.2018	Design workshop	Invited Seminar [14:30-15:30] Luca Borriello – INWARD Design workshop
Friday 12.10.2018	Design workshop Preparation of final presentation	- Presentation of the outcomes - Final Critic - Experts: Carmine Piscopo, Assessore Urbanistica Comune di Napoli; Paola Cerotto, Dirigente Servizio Edilizia Residenziale Pubblica Comune di Napoli; Francesco D. Moccia, Massimo Perriccioli, Francesco Rispoli, Università di Napoli Federico II, DiARC; Niels Johan Juhl-Nielsen, Nordic Advisory Team

Mentors

UNINA: Carmela Apreda (PhD); Luciano Ambrosini, Anita Bianco, Ensi Farrokhirad (PhD Candidates), Giovanni Nocerino, Sara Verde (Grad.)

NYIT: Shenger (Anna) Dai (Grad., Dadrar Architects); Farcia Celine Soares (Grad., Grimshaw)

UPEM: Helin Karaman (PhD)

NEEDLE: Salvatore Diana, Saverio Sodano, Stefano Cuntò, Feliciano Napolitano, Antonio Pone



INTERNATIONAL CONFERENCE

[CLIMATE-RESILIENT URBAN DESIGN]

Regenerating cities through adaptive mitigation solutions

Friday, October 5 2018_Aula Gioffredo Palazzo Gravina, Napoli

ENERGY TRANSITION, CLIMATE CHANGE ADAPTATION AND DISASTER RISK REDUCTION PERSPECTIVES IN RESEARCH AND PRACTICE

14:15	Greetings and Presentation
14:40	Mario Losasso (Università di Napoli Federico II, Head of Department of Architecture)
14:40	Maria Teresa Lucarelli, (President SITdA, Università Mediterranea di Reggio Calabria)
14:40	Embedding climate and environmental analyses in the adaptive mitigation design process: SIMMCITIES_NA project
15:00	Mattia Leone, Enza Tersigni (Università di Napoli Federico II, Department of Architecture)
15:00	Climate Adaptive Planning in multi-risk prone areas: integrating DRR and CCA
15:20	Giulio Zuccaro (Università di Napoli Federico II, Department of Structure for Engineering and Architecture; PLINIVS Study Centre)
15:20	Innovative approach of design for Disaster Risk Management
15:40	Pasquale Miano (Università di Napoli Federico II, Department of Architecture)
15:40	Multi-Dimensional Resilient Design: coupling Disaster Risk Reduction and Climate Change Adaptation in action
16:00	Renato R D'Alençon Castrillón, Cristina Visconti (Pontificia Universidad Catolica de Chile)
	Maria Federica Palestino (Università di Napoli Federico II, Department of Architecture)
16:00	Improving the environmental quality of urban morphologies: the choice of performance indicators in parametric design
16:20	Margot Pellegrino, Bruno Barroca (Université Paris-Est Marne La Vallée, Department of Urban Engineering)
16:20	Invisible architecture: climate, energy, environment
16:40	Michael Esposito (Atelier Ten)
16:40	Climate sensitive urban design
17:00	Gerald Mills (University College Dublin)
17:00	The Resilience Labs: Milan and the 100 Resilient Cities. From planning to action
17:20	Piero Pelizzaro (Chief Resilient Officer Comune di Milano)
17:20	Presentation of the book Climate Change and Cities - Second Assessment Report of the Urban Climate Change Research Network
18:00	Chantal Pacteau (Co-Director UCCRN EU-HUB; CNRS), Luc Abbadie (Co-Director UCCRN EU-HUB; UPMC), Jeffrey Raven (NYIT), Gerald Mills (UCD), Mattia Leone (UNINA)
19:30	Climate Resilient Urban Design Workshop Napoli 2018 – Welcome Cocktail
22:00	Venue: RiotStudio, via S. Biagio dei Librai 39 – Napoli (www.riotstudio.it)



Workshop Admission (UNINA ONLY)

The workshop is open to Master and PhD students in Architecture and Civil Engineering. English language knowledge and basic to advanced skills with Rhinoceros modeling software and Grasshopper plug-in are required for the admission.

For the registration, students must send an email to simmcitiesevents@gmail.com, by **15 September 2018**, indicating name, affiliation, mobile contact, and declaring the level of expertise in English language and parametric design tools.

A maximum of 8 students will be accepted.

Acknowledgements

The International Conference and Workshop Climate-Resilient Urban Design - Napoli is funded through a joint partnership of the academic institutions involved.

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