

REFRAMING URBAN RESILIENCE IMPLEMENTATION: ALIGNING SUSTAINABILITY AND RESILIENCE

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1 Urban Futures: Transforming cities for resilience and sustainability

Timon McPhearson

Tishman Environment and Design Center. The New School, New York

"We live on an urban planet. Our cities are complicated, complex, connected, contested, and congested. Creating conditions for social and ecological resilience to climate change driven extreme events is one of the key challenges of the 21st century. At the same time, social inequality is one of the hallmarks of our cities; in many ways our societies are no more equal than they were 200 years ago. In the context of changing climate, rapidly expanding urbanization, and intersecting global drivers of social, ecological, and technological change, transforming towards sustainability and resilience is the great urban challenge. And yet, sustainability and resilience are not the same, and can even be at odds with each other. The focus on efficiency in sustainability conflicts with needed redundancy for resilience. How can we harness solutions for both? Nature-based solutions are an important tool for addressing critical issues of social inequality in access to the resilience benefits that urban nature provides such as improving urban livability, reducing impacts climate change, and improving energy efficiency."

2 The Invisible Houses: Housing, Disaster Risk Reduction, and Reconstruction in Developing Countries

Gonzalo Lizarralde

University of Montreal Fayolle-Magil

Given the current extreme inequalities between the rich and poor, qualitative and quantitative housing deficits can be seen as both the causes and the consequences of today's *unnatural* disasters. We are no longer victims of disasters, but the creators of them. In this keynote presentation, Gonzalo Lizarralde argues that lack of knowledge, institutional disengagement, concentration of decision-making power, and fragmented and narrow agendas often leads to housing solutions that fail to respond to the real needs and aspirations of the poor. In the meanwhile, informal housing in developing countries is created through effective and sophisticated strategies that are invisible to the majority of policy and decision makers. By pointing out common mistakes in projects and policy, Gonzalo Lizarralde reveals links between disaster risk creation and housing conditions in developing countries. He finally explores ways in which professionals can improve housing conditions and reduce vulnerability among slum dwellers.

3 Justice in urban climate practice: From green gentrification to pathways for transformative and equitable adaptation

Isabelle Anguelovski

Universitat Autònoma de Barcelona-BCN Urban Environmental Justice

This presentation will address whether adaptive and resilient interventions protect groups traditionally most at risk of climate impacts and/or least able to adapt to them - or if they result in maladaptive and inequitable outcomes. Adaptation might indeed be repackaging business as usual land use planning practices that have often relegated vulnerable and marginalized residents behind, and trigger new dynamics of climate or resilience gentrification and exclusion. Based on examples from Dhaka, New Orleans, and Medellín, I will explore how climate adaptation interventions can undermine equity concerns. In contrast, I will also examine which combination of urban design, green infrastructure, and political leadership is needed to deploy transformative and equitable adaptation interventions.

4 Urban resilience or resilient justice? Trajectories, politics and outcomes across the urban global south

Adriana Allen

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Many scholars have argued that resilient cities are more just cities. This view stems from the idea that hazards - and also food, water and energy insecurity - tend to affect the urban poor more than the wealthy, making certain social groups and areas more prone to experience environmental injustices than others. But could it be the case that a city's resilience-enhancing measures have embedded within them pre-existing injustices? What if the process of increasing the resilience of the city as a whole happens at the expense of the rights of certain groups? If urban resilience focuses on the degree to which cities are able to reorganise in creative ways and adapt to shocks, do pervasive inequalities in access to environmental services have an effect on this ability?

Zooming into the resilience-seeking practices of ordinary women and men across the urban global south, this talk explores the above questions and ultimately argues for a repoliticisation of resilience, in which justice matters

Topic 1: Post-Disaster and Post-Conflict Resilience

5 Human behavior response to disaster-caused environmental changes: A case of fishermen community, San José de Chamanga, affected by the 2016 Ecuador earthquake

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The resilience is the ability to respond against damages. It can be attributed to the individual or collective ‘substance’, to the ‘process’ that the ability is displayed or to the reactive ‘force’ as its expression. This paper focuses on the third aspect, the resilience as a ‘force’. When the man-made urban fabric of the settlement is experienced drastic environmental changes or damaged by a fatal disaster, the affected community responds with its force of resilience. It is the moment that “the ability of people to shape their own environment”^[1] is highly exercised.

The target area is a fishermen community, San José de Chamanga, in Ecuador affected by the 2016 Ecuador earthquake. The purpose of this paper is to reveal the force of resilience displayed --- how people have been reshaping their own environment after the disaster and the people’s behavior responding the process of government-led reconstruction. Semi-structured interviews have been conducted to 74 people for two months in total. The major findings are:

- 1) People’s access to waterfront land where they had used before the earthquake was endangered because of the damages by the earthquake and consecutively the relocation policy has kept people off.
- 2) People have maintained their access to waterfront and fishing habit using their former houses or survived friend’s houses as a workplace and a storage even if they had moved to relocated houses in inland districts.

It is concluded that the natural reactive behavior of people and the direction of post-disaster reconstruction policy were incoherent. On the basis of these findings, an alternative reconstruction strategy that takes into consideration the force of resilience displayed by affected people is proposed.

[1] Illich, Ivan (1973, 2009) Tools for Conviviality. Marion Boyars. London.

6 Standardization process for urban resilience

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The adaption and implementation of resilience related approaches at urban level via standardization is the key aspect that this paper is addressing. Reframing of resilience practices through standardization will enhance the sharing of knowledge and experiences among especially urban areas.

Several theories exist to support resilience development, but putting this into practical use for example for cities or urban areas need a more end-user oriented development of supporting documents such as standards.

In this regard the European research project Smart Mature Resilience (SMR) has integrated standardization as one of the instruments to transfer the project outcomes and tools into the market, and thus to their potential end-users.

The aim of SMR is to deliver a Resilience Management Guideline that supports city decision-makers in developing and implementing resilience measures in their cities, using the five resilience building tools developed in this project. To support the development and implementation of this guideline, a series of standards called City Resilience Development has been created by conducting several open workshops.

This paper presents the criteria for selecting specific project results for their transfer into standards. It also describes a methodology of using standardization within research and innovation projects, i.e. the process of developing standards out of project results. For example, within the development of the above mentioned standards series not only the seven cities and municipalities of the SMR project were involved, but also it was through the standardization process possible to easily involve other cities and research projects. This is answering the need of the participating cities to have an exchange of experiences with other cities on their resilience challenges and resilience building activities. In the end of this process the city representatives and researchers acknowledge and commit to the standards series as they have been an essential part of its creation.

7 Optimisation of post-disaster assisted self-build housing construction and labour safety in developing countries

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Natural and man-made disasters and conflicts occur constantly around the world, leaving displaced and vulnerable people every year, especially in the developing countries. Among other urgent necessities, this population needs to rebuild their houses. Due to the scarcity of resources in these disaster contexts, many of them opt for self-build or community-based construction of simple houses. Community-based construction can be a solution in these situations, maybe the only one available, but arises other problems such as a scarce awareness and prevention of the labour risks and scarce construction knowledge and skills. Taking into account all the factors, a possible solution to this, proposed by the authors, could be an 'assisted self-build construction'. That is to say, a self-construction by a community, in which the members have been specifically trained in the labour risk prevention and construction materials and techniques they are going to use. This involves a previous analysis with the following steps: (1) study of the local and traditional materials and construction techniques of vernacular houses; (2) study of how they could be improved by incorporating new current construction knowledge; (3) design of different low-tech but high-knowledge housing appropriate for self-building; (4) evaluation of the sustainability of the alternative designs, including the labour risks during construction, and selection of the best one; and (5) definition of the teaching content and plan. The selected design should integrate the local and traditional construction materials and knowledge, which are usually available and sustainable, with the current knowledge, in order to improve the traditional design and make it more resistant to natural hazards such as earthquakes and, at the same time, create a more comfortable house. The labour risks during self-construction should be evaluated, the construction process adapted in order to minimise the risks, and preventive measures defined.

8 Pro-Resilience Governance and (in)Accessibility to Services of General Interest: evidence from the Portuguese Center region after 2017 wildfires crisis

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The public services network determines the existence, structure, quality, and transformability of the territories. That is, network services create conditions to community's resilience. Any node in the settlement structure increases or strengthens its livability and attractiveness through the accessibility to essential (guarantee the minimum of living conditions) and qualified (stimulate progress opportunities) services.

The growing need of assessing efficiency in the management of public service systems led European policies to (partial or totally) integrate that concern into competitive markets. In this context, Services of General Interest (SeIG) play a central role as the main instrument towards the implementation of the European social model. Through the SeIG, public entities can mitigate the risks of the market failures, avoiding situations where the communities' resilience capacity could collapse. In Portugal, the contrasts between metropolitan, urban (mid-sized cities) and rural regions are associated with different levels of accessibility to SeIG and with the resulting cohesion patterns. Along the post-disaster catastrophe of the wildfires in 2017, part of the SeIG systems in the rural areas of the Portuguese Center Region (civil protection, water, electricity, telecommunications, radio and television, housing, road network, transport, health), collapsed or were subjected to high levels of stress.

This article is organized around the following objectives: i) to reorganize the resilience theoretical framework in order to incorporate the importance of the SeIG to minimize the vulnerability of the dispersed settlement structures with low densities (connectivity and accessibility); and ii) to apply this theoretical framework within a concrete situation of crisis/catastrophe. In the second phase, using content analysis methodologies, we will analyze the news stream about this disruptive phenomenon to evaluate, iii) the performance of the governance system managing the SeIG networks and, vi) how this contributed, or not, to increase the resilience (persistence, adaptability, transformability) of these territories.

9 Facing 19th September earthquake in Morelos, Mexico. Eventually effects and organization on the epicentre

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Urban expansion of cities has created a pressure on the territory, particularly in underdeveloped regions; agglomerating more population characterized by unequal and polarized social consolidation. Therefore, the social vulnerability of cities increases their degree of exposure to an event of natural origin, so they have to adjust in order to withstand or confront the negative impacts. In this sense, Mexico registers a seismic activity in three quarters of its territory; for example, on September 19, 7.1 degrees were presented on the Richter scale, where Morelos, Mexico, was one of the most affected States. This paper proposes to study the conditions of vulnerability of its population, prior to the earthquake, which allow to describe the affectation patterns and the self-management capacity that were used; Through the systematization of the process of organization and distribution of the University Collection Center (UCC). The information shows a social and economic vulnerability in the sites most affected by the earthquake, as well as a disarticulation of local forms of social reproduction. The resilience for cases like the one presented in Morelos, Mexico, implies the revision of the multidimensional vulnerability of the localities, but also the generation of a pre-and post-earthquake care strategy.

10 Redefining Resilience in the Developed Cities: Opportunities and challenges of the urban built environment as housing for a post-disaster population, Athens and London

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The multiregional humanitarian crises that have their origins either in natural hazards or manmade disasters are affecting millions of people around the world leading often to their displacement. How cities respond to these crises and to the arising needs of their people is my main problematic. Thus, my research is focused on redefining the concept of resilience through the ability of the developed cities to absorb the displaced population in terms of housing and accommodation within the existing built stock and under any disaster situation. Athens and London, seen from their resilient strategies will be compared and contrasted within frameworks of neighbourhood, local, municipal, national and inter-global scale and through the spectrum of an infrastructural failure as Grenfell in London and the severe refugee influx in Athens. What is their response regarding the vulnerable groups' accommodation in these chronic stresses and/or shocks? Have they used their existing capacity? Drawing on the relevant cases where the immediate shelter was an imperative need, the different scales of the two approaches will be also considered. This means the comparison between the regional level ambitious mechanism of London and the smaller neighbourhood one in Athens and how these included or not the existing housing in their shelter strategy. As the last point to be broached, would be the correlation of the established and institutionalized or not policies with more specific events occurred in the two metropolises, how the theoretical principles were implemented and, finally, if and how the housing needs were covered.

11 Social Production of Habitat and Post Disaster Resilience in Four Rural Communities in Guerrero (Mexico)

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Within the post-disaster framework, top-down strategies have proved to solve the problem with several limitations. The official proposed solution for risk reduction is composed of fragmented actions and distant from the local reality. They also fail to relaunch the local economy, creating, on the contrary, disarticulation in the communities. Abundant literature proposes alternative strategies, but is still missing a model with a long-term holistic strategy.

With this paper we want to highlight the development of Social Production of Habitat (SPH) processes as an effective holistic strategy for the long-term Disaster Risk Reduction and the promotion of the sustainable development and reconstruction.

We analyze the case of 4 communities in the mountainous region of Guerrero State (Mexico), one of the most seismic zones of the country, affected by the hurricanes Manuel and Ingrid in 2013, which caused landslides, crippled infrastructure, destroyed crops, and irreparably damaged more than 5,000 adobe homes.

These processes are structured in 6 levels: 1) Context; 2) Disaster Risk Assessment; 3) Interdisciplinary and participatory methodology to co-design the SPH; 4) Education and improvement of local capacities for self-construction with local know-how combined with modern analysis and technologies; 5) Construction processes with local materials, introduction of eco-technologies, reforestation and agro-ecological techniques; 6) Reorganization of local governance.

Thanks to the SPH process, self-management arises as an essential and effective tool to reconstruct and strengthen the local community. Moreover, technical assistance guides self-management and encourages advances in the Disaster Risk Reduction in a sustainable way, and promotes the replicability of the process. With SPH, the perspective completely changed. The community is then no longer the object of top-down strategies and of the political-economic dynamics of reconstruction, but is an active subject capable of managing and re-organizing its endogenous resources, its local capacities and developing its own local political-economic dynamics.

12 Social vulnerability and flood waters: Responding to flash flood implications in Barcelona, Spain

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Increasing occurrence of flash flooding poses significant social and economic threats to Barcelona. Approximately 65% of the population reside along the coast. Many rely on beach assets to attract 35 million annual visitors that buttress the city's 2 billion EUR tourist sector. Both residents and tourists are vulnerable to late-summer and early-autumn flash floods caused by intense rainfall events that overflow designed urban drainage systems. Unable to effectively treat urban drainage, the overwhelmed sewage and collector network discharge untreated water, reducing beach water quality from 'excellent' to 'poor' during peak travel season. This classification results in beach closures to reduce microbial pollutant exposure. Barcelona has yet to design more comprehensive measures to prevent, reduce or eliminate the cause of this pollution. Additionally, current government post-flood efforts overlook tourist needs by focusing on residents' safety following floods. Regular flash floods in Barcelona indicate an urgent need to develop a water sensitive strategy that comprehensively accounts for point source pollution in this vulnerable coastal region, as well as for its socioeconomic profile. While vulnerability indices have been developed for atmospheric hazards over the past fifteen years, these indices are designed unilaterally for use at a national scale and overlook the needs of temporary residents (e.g. tourists) in social profiling. This research broadens the scope of current vulnerability indices to factor in temporary resident needs in risk management at a regional scale. It specifically integrates variables from Holdgate's Source-Pathway-Receptor-Consequence framework to identify areas of high-risk point source pollution and define social vulnerability implications specific to Barcelona's social profile during the 2018 peak season. The Barcelona-specific vulnerability index can help government planners to better prepare and flexibly coordinate post-disaster management for temporary population groups and environmental stresses.

13 A critical examination of urban resilience in an era of authoritarian environmental governance

Katherine Foo

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This paper examines urban resilience theory and practice under authoritarian urban governance. Urban resilience is framed as a unifying translocal concept for governing cities worldwide. However, urban resilience research expresses largely democratic ideals. This tendency is expressed through the assumption of data-driven decision-making and popular participation in practice and the validity and integrity of data sets, access to formal government proceedings, and elite interviews in scholarship. However, authoritarianism is presently on the rise worldwide. Therefore, it would be wise to evaluate closely the ways in which authoritarianism influences urban resilience.

In this paper, I aim to open a discussion about the relationship between urban resilience and urban authoritarian governance. I characterize the ways in which regime types are relevant to theories, planning, and implementation of urban resilience through a discussion of Singapore and Tianjin, China as models of authoritarian urban environmental governance. I evaluate the controversial claim that authoritarianism is more capable of responding to the complex, multi-scale, socio-ecological problems associated with environmental degradation and climate change. In other words, greater concentration of political economic power and corresponding restriction on individual liberties may be needed to transition toward resilient futures. Then I discuss the practical and methodological challenges that rising authoritarianism raises for the planning and implementation of resilient cities. I conclude by posing a series of questions and challenges for urban resilience scholarship in an increasingly authoritarian era.

14 A framework for conceptualizing the resilience of urban green spaces in transition—The case of Frankfurt Rhine-Main

Pinar Bilgic

Darmstadt University of Technology

This study emphasizes the significance of urban green spaces in urban planning and suggests a foundational framework for conceptualizing their social-ecological resilience through the studied case, the Frankfurt Rhine-Main region. Considering the increased frequency and severity of main urban hazards—namely flood, drought, and heat wave—the role of urban green spaces in adapting the outcomes of a changing climate becomes increasingly important. At the same time, considering the need to densify the urban settings due to increasing housing demand, densification of inner-city areas is often employed as a strategy against urban sprawl. This competition for spatial reserves brings about an urban land-use conflict in many growing metropolitan regions in the world. The Frankfurt Rhine-Main region, with its peaking rates of housing demand and increased intensity of climate-related urban hazards, is no exception to this trend. Although urban resilience can be a very useful concept in understanding global urban phenomena, due to its eclectic nature, scientific works produced in this field usually face the risk of either oversimplification or over-complication. This paper observes urban green spaces as urban social-ecological systems and from the standpoint of social-ecological resilience, it brings together the concepts of (i) land-use conflict regarding the use of spatial reserves either for climate adaptation or urban growth and (ii) supportive or restrictive nature of the urban governance. The suggested conceptual framework lays a context-specific foundation to eventually enable a comprehensive analysis of the current situation (base case) and to inform future interventions (alternative cases).

15 City-university Partnerships and Capacity Building: Integrated resilience planning in Portland, Oregon

Fletcher Beaudoin and Liliana E Caughman

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Climate disasters (such as landslides, floods, droughts and fires) pose an increasing set of risks to the economies, environments and liveability of cities. Specifically, these disasters can have tremendous impacts on the infrastructure within cities (sewer, water, roads, parks) and the people that are supported by that infrastructure – with the most vulnerable populations bearing the strongest impacts. There are very few venues for integrated planning and implementation within cities because of rigid administrative silos, as well as structures and policies that reinforce those silos. Integrated planning and implementation require tight coordination across multiple infrastructure bureaus. Without this coordination, it becomes extremely difficult for the different bureaus to identify and integrate their critical infrastructure interdependencies and address the increasing impacts of climate disasters. This case study describes how Portland State University (PSU) and the Institute for Sustainable Solutions collaboratively launched a new process for systematically identifying infrastructure interdependencies and then developing and resourcing integrated implementation efforts that build resiliency across multiple infrastructure systems. The project is called the Resilient Infrastructure Planning Exercise (RIPE) and is collaboratively managed by the University and 4 infrastructure bureaus at the City of Portland. The first phase of the project focused on building interest in the integrated planning approach as well as developing a collective agenda for advancing the cross-city work on infrastructure resilience. The project is now in phase 2 and has launched a series of interventions that leverage the university's capacity for convening, research, and student engagement to make progress on the collective agenda for resilient infrastructure in the city.

16 City-wide sustainability visioning and real-world laboratories, City of Lüneburg, Germany

Beatrice John and Philip Bernert

Leuphana University of Lüneburg, Faculty of Sustainability

The city of Lüneburg belongs to a larger metropolitan region in Northern Germany which increasingly experiences climate change in form of heavy rainfall and flooding. Preparing the city of Lüneburg for a long-term sustainable future was at the core of the project “Future City Lüneburg 2030+”. Starting in 2015 and together with the local Leuphana University of Lüneburg and its Faculty of Sustainability, a broad city-wide process started to first envision the city’s future for the year 2030 and beyond, and second to strategize about adequate actions to realize this vision. Joint transdisciplinary research efforts delivered four larger clusters of actions: (1) improving housing and local employment situation, (2) enlarging CO₂-reduced transportation, (3) strengthening community and civic engagement, and voluntary work, and (4) greening infrastructure for climate adaptation, and biodiversity increase. All clusters are detailed including resources and responsible actors for the actual implementation and are at the same time embedded into a real-world laboratory design that accompanies and evaluates their implementation. Over the last years of this project a long-term partnership has developed between the city and university. As part of our evaluation we aim to understand how future work can further develop the partnership and unify many previously scattered efforts into a meaningful shared endeavour that carries the work beyond a project logic. These lessons learned will support other cities and universities to frame or diagnose their own partnership within their cultural context.

17 Co-development of positive visions for future urban sustainability and resilience

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Positive future visioning and scenario development are important tools for guiding urban sustainability and resilience planning. Sustainability and resilience pathways for the long-term future are often difficult to envision and may often be different or even be incompatible. The co-development of future scenarios with local practitioners allows for the exploration of diverse plausible and desirable futures, while examining potential social-ecological-technological solutions, conflicts, and trade-offs. In particular, the co-production of scenarios frees both practitioners and researchers from the typically problem-oriented focus on the short-term future and allows for positive long-term visions, social-ecological-technological innovation, and transformational changes. We present a framework for co-developing sustainability-based future scenarios with local stakeholders to explore alternative plausible, desirable, and resilient urban futures. Through a series of workshops with local partners in cities across North and Latin America, we co-develop scenarios to address urban sustainability and resilience challenges, such as extreme climatic events, changing resource availability, and equity concerns. Through the scenarios co-development process, we develop tangible future visions with temporally and spatially explicit social-ecological-technological strategies, pathways, and targets to address the scenario challenges. Finally, we evaluate trade-offs among the scenarios based on qualitative and quantitative sustainability and resilience assessments of each scenario. We present examples from the scenario development process in diverse cities with diverse challenges and future visions, including San Juan Puerto Rico, Valdivia Chile, New York City New York, and Phoenix Arizona. We highlight how visioning of coherent future scenarios and the co-production process can link anticipatory knowledge and visions to action and enhance capacity in cities for long-term planning.

18 Co-Producing Urban Resilience to Extreme Events

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This panel is intended to promote broad-based discussion of key approaches to conceptualizing urban resilience, to compare insights in how to engage with practitioners from a network of cities at all stages of research and implementation, to refine new approaches to co-producing urban resilience to extreme events, and to evaluate cross-cultural differences of perspective on urban resilience and sustainability.

19 Legacies and Tensions while Building Urban Resilience: Exploring Urban Plans in Barcelona and its Metropolitan Region

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In 2013, UNISDR recognized Barcelona as a role model city within the “Making Cities Resilient!” campaign. A year later, UN-Habitat selected the city to host the headquarters of the City Resilience Profiling Programme, a scheme to promote urban resilience beyond UNISDR’s traditional approaches of risk reduction. By the end of 2014, the Rockefeller Foundation incorporated Barcelona as a member of the 100 Resilient Cities network. Finally, in 2015, the UN Sustainable Development Goal on resilient cities was sanctioned by the Catalan network of cities towards sustainability. These international agencies and networks shaped the turn from climate-change urban resilience to multi-hazard urban resilience in Barcelona and its Metropolitan Region. However, as we argue in this article, the conception and operationalization of urban resilience was not only inspired by international agendas and actors, but also mediated by particular local agendas and needs. For instance, in Barcelona, the commitments of the new local government in 2015 brought new topics, such as the reception of refugees or the universal access to basic services, within the terrain of urban resilience. Thus, in this paper we first explore the role of both global and local agendas to transmit and shape ideas and practices of urban resilience. To do so, we review twenty urban plans and institutional declarations, international reports, and press materials referring to urban resilience from the Barcelona Metropolitan Region. Second, we discuss the interplay between globally circulating and locally emerging resilience-building efforts, and we identify potential elements of consensus and dissensus regarding the way to design and implement urban resilience.

20 Modelling urban futures: Resilience thinking in practice

Rocio Carrero and Timon McPhearson

Urban Systems Lab, The New School

In this session we will present and discuss the potential of High Resolution Dynamic Spatial Models to support resilience building in cities. Integrating machine learning, geo-computation, spatial modelling and data visualisation, our team has developed a flexible modelling framework to simulate future urban scenarios according to different development pathways. The model outputs -10 m resolution grid- allow users to visually explore how their city 'could look like' under different trajectories, assess possible trade-offs between alternative futures and quantify potential impacts of extreme events and climate related hazards, such as coastal flooding or heat waves. We have applied our model to cities such as New York (USA), San Juan (Puerto Rico), Valdivia (Chile) and Hermosillo (Mexico), co-developing the scenarios through local collaboration with practitioners and stakeholders. In this session we will i) present the results for the different cities, ii) discuss the challenges faced on the process -e.g. data limitations, model customisation, transforming visions to algorithms, etc.- and iii) ignite a debate on how these models could contribute to foster 'resilience thinking' in cities.

21 Panel: Building effective city-university partnerships for accelerating resilience implementation

Liliana E Caughman^{1,2}, Fletcher Beaudoin^{1,2}, Lauren Keeler³, Beatrice John⁴, Philip Bernert⁴

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Panel Abstract: Climate change-driven chronic and acute weather events, such as flooding and temperature extremes, are already having profound impacts on urban liveability. These challenges are growing in scale and complexity and cities need new collaborations to stave off the worst climate projections and adapt to changing environmental conditions. Universities can play an important role in designing, testing, and implementing solutions for a more climate-resilient city. In this panel, presenters will discuss their experience with city-university partnerships that explicitly attempt to accelerate progress on climate resilience and urban sustainability. The collaborations are part of a network of city-university partnerships in which very different cities and very different universities are coming together to develop solutions to pressing climate challenges. Presenters in this panel include Arizona State University discussing their partnership with the City of Tempe, Portland State University and the City of Portland, and Leuphana University and Lüneburg, Germany. The panellists will also discuss similar work taking place between the National Autonomous University of Mexico and Mexico City, and Karlsruhe Institute of Technology and the city of Karlsruhe, Germany. The aim of the network is to build climate resilience and urban sustainability locally while generating and sharing insights that help other cities do the same. Reframing urban resilience necessitates a reframing of the roles of those involved in ensuring that urban systems are resilient and sustainable. This panel will tackle the critical role of universities and city administrations and the unique partnership they can forge to deal proactively with climate challenges and build better cities.

22 Positive Futures

David M. Iwaniec¹, Marta Berbes², Elizabeth M. Cook³, Melissa Davidson², Nancy B. Grimm², Timon McPhearson³, Tischa Muñoz-Erickson⁴

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What are the futures we hope to create? And, how can we guide the development of these futures? Positive future visioning and scenario development are important tools for guiding urban sustainability and resilience planning. Sustainability and resilience pathways for the long-term future are often difficult to envision and may often be different or even be incompatible. The co-development of future scenarios with local practitioners allows for the exploration of diverse plausible, desirable futures while examining potential solutions, conflicts, and trade-offs. In particular, the co-production of scenarios frees both practitioners and researchers from the typically problem-oriented focus on the short-term future and allows for positive long-term visions, innovations, and transformational changes.

23 The Healing Grid Project: unlocking the potential of Nature Based Solutions in Timisoara, Romania

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Resilience Lab, Timișoara

Urban growth place nowadays great pressures on the peri-urban area, where sprawl-induced processes limit the functioning of green infrastructures. In Timisoara the collapsing network of drainage channels surrounding the city could be renewed putting value of their ecosystem services, in order to un-lock the potential of these nature-based solutions to increase city's resilience.

The Healing Grid Project, framed by the Timisoara Resilience Lab, reveals the opportunity of leveraging on the existing drainage network - in Timisoara's Pole of Growth - to become the inception of a new green-blue healing grid, functioning as a system of interconnected ecological corridors. The Healing Grid would facilitate the access of fauna and flora in the urban tissue, create spaces for recreation and social interaction, stimulate green mobility in the region, allows climate change adaptation and increase the general urban comfort.

The purpose of The Healing Grid initiative is to advocate and capitalize on the role of ecological corridors through bottom-up awareness and top-down actions which will eventually lead to new legislative proposals. The initiative has a participative and multidisciplinary approach, thus facilitates the collaboration between diverse professionals (urban planners, IT specialists, landscape architects, biologists, engineers, geographers) and local actors (academics, institutions, city halls, NGOs, inhabitants).

24 Urban resilience as learning: Building transformative capacity through game-based approaches in Tempe, Arizona

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Cities are facing challenges from climate change. Impacts like flooding and extreme weather, and solutions like green infrastructure and carbon pricing, exploit weaknesses in human cognition and organizational design. Neither urbanites nor city governments are predisposed to prioritizing long-term resilience and sustainability over short-term development. A persistent challenge in sustainability science remains the co-developing of solutions that are desirable, politically viable, and truly sustainable in accounting for impacts across multiple interconnected systems. Recently, some in sustainability have shifted focus to transformative capacity building among key actors in cities as a means of fostering transformation in urban systems toward sustainability and resilience. Transformative capacity in individuals and organizations is conceptualized as constituent of competence, confidence, commitment and power. This paper describes two game-based approaches to building transformative capacity in city administrations and utilizes the concept of transformative capacity to unpack how universities and cities can collaborate and learn from one another and from other such partnerships. The two games, Future Shocks and City Resilience, and AudaCITY, are based on key competencies in sustainability education, the Sustainability Research and Problem-Solving framework, and Transition Management. They aim to develop the competence, confidence, and commitment of players, in particular city administrators, to develop, test and implement solutions for urban resilience and sustainability, while shifting power dynamics in favour of such efforts. The games were developed and tested in Tempe, Arizona with the City of Tempe. They served as the primary transformative capacity building exercise for senior leadership in the city administration in advance of the city's first effort at developing a Climate Action Plan. The paper concludes with insights on the theoretical contribution of transformative capacity to reframing urban resilience as a challenge of human and organizational learning and methodological insights on the role of game-based approaches in enabling such learning.

25 A Participatory Systems Approach to Identify and Quantify Climate Adaptation Tradeoffs

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Here I present a participatory system approach based on cognitive mapping that can be used to identify and relatively quantify climate adaptation trade-offs. Fuzzy cognitive mapping (FCM) allows the integration of different participant views in the form of semi-quantitative cause-effect maps, each expressing particular knowledge or experience of a similar or distinctive part of a system. This particular nature of FCM allows to co-produce knowledge around a phenomenon and can be also used in the context of climate adaptation planning. To show its potential to identify and assess climate adaptation trade-offs, I use a case study that explores heatwave impacts and adaptation options in the city of Madrid (Spain). Based on 22 individual maps elicited from agents with different backgrounds (urban planning, energy efficiency, water, green infrastructures, health, climate change...), an integrated multisectoral representation of urban heatwaves phenomena in Madrid has been obtained. In FCM, each participant interprets phenomena and connects cause and effects in very diverse manners. This information, far from being contradictory, explains the complexity of the system and provides complementary knowledge to assess impacts of different policy options. Alongside its potential as a knowledge co-production method and as a communication and learning tool, FCM allows analysis of what-if scenarios and assessment of cascading effects that would be difficult to identify otherwise. This application enables the identification and assessment of trade-offs of policy options (so-called what-if scenarios). In the case study presented, 4 heatwave adaptation policy options are simulated: use of air conditioning, use of recycled water, deployment of green infrastructures and heat warning systems. Trade-offs of each policy option are identified, quantified and compared. I discuss the benefits of this approach and the limitations of using this information for decision-making.

26 Applying the adaptation pathway approach to increase resilience to flooding: experiences and outlook from the city of Bilbao

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Tecnalia

Flooding is a well-known impact, which cause nowadays several problems ranging from economic loses to productivity reduction and deaths. Moreover, IPCC's (2014) projections foresee coastal flooding as one of the main global impacts. Having this context, specific governance models are required to adapt and enhance resilience of the affected territory.

In this regard, adaptation pathway emerges as an innovative and flexible approach which foster an iterative and adaptive governance and address the climate uncertainty challenge. This approach has been addressed in different case studies previously, which represent different contexts: heat, flood and water supply pathways in London; heat adaptation pathway in Antwerp; or flood adaptation pathways in Thames Estuary, Rhine-Meuse delta, Lake IJssel and New York. Looking to these studies it can be concluded that the adaptation pathway is a good approach to be applied at city or sector level and for analyzing different impacts. But the same studies also detected the needs for further research: in the assumptions made for the acceptable threshold detection (which served for the adaptation objectives definition); or the estimation of the effectiveness and co-benefits as well as implementation conditions and timeline of the measures which enhance the resilience.

The present work investigates the adaptation pathway potential within 3 main objectives: i) explore how the methodology can be simplified (balancing qualitative versus quantitative information); ii) explore the way of sequencing of the adaptation measures into the pathway (additional criteria like life-time, implementation time, costs, etc.); iii) explore the visualization on the pathway. To go through the identified objectives the pathway approach is applied in the city of Bilbao for the flood effect on transport system. As results a selection of the best alternative options for climate flooding risk management are presented and the lessons learned and challenges of this approach for further development are described.

27 Are Spanish Local Adaptation Policies Likely to Be Successfully Implemented and Sustained in the Long-Term? An Assessment of their Legitimacy, Scientific, Policy and Economic Credibility

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Credibility is a critical issue in climate policy for helping to allocate public funding and private investments, and for implementing, mainstreaming and catalysing climate policy. In the context of urban climate adaptation policy, we define credibility as the likelihood of local adaptation plans being successfully implemented and sustained in the long-term. We examine the credibility of local adaptation policies based on three key areas: policy and economic credibility, scientific credibility and legitimacy. Within these three areas, we look at resources, reliability, public and private support, creation of usable knowledge, monitoring, evaluation & reporting (MER), adaptive management, transparency, participation, equity and justice. For each of these components, we define a set of metrics and test it in 20 Spanish cities, a representative sample to capture diversity of a highly decentralised country. Systematic review protocols have been applied to identify adaptation policies and measures. We do not limit to stand-alone climate plans but also to adaptation measures mainstreamed in other urban policies, when the formers are lacking. We analyse and discuss the results in terms of gaps and opportunities for future local adaptation policies. We finalise by discussing the adequacy of these metrics in the context of adaptation decision-making and for assessing the odds of building climate resilience.

28 Building long-term resilience by aligning adaptation and disaster risk reduction policies in cities

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Many cities around the world are undertaking climate change adaptation planning processes in contexts of considerable uncertainty due to climate risks. Understanding if and how these plans are aligned with future risks becomes crucial to assess whether they will effectively contribute to reduce vulnerability. Conversely, failing to account for uncertainty and risk can lead to underestimate climate shocks and hinder resilience.

In this paper, we develop an analytical framework built on the four priorities for action of the Sendai Framework for Disaster Risk Reduction: (i) Understanding risk, (ii) Strengthening governance, (iii) DRR for resilience and (iv) Enhancing disaster preparedness, for each of which we defined a set of indicators to examine the degree of alignment of urban climate adaptation policies to future climate risks. We then test this approach in four cities that are considered early adapters or pioneers in climate change adaptation planning: Copenhagen (Denmark), Durban (South Africa), Quito (Ecuador) and Vancouver (Canada). Cities show the highest score in relation to governance, followed by disaster preparedness, while understanding risk and planning for resilience present the lower scores. We suggest that this result is at least partly explained by the lack of follow-up processes within the adaptation plans. In other words, it is uncommon to find monitoring systems that track the actual effectiveness of the adaptation policies and measures to reduce vulnerability or increase resilience. The first wave of urban adaptation plans should evolve beyond a battery of measures, to focus on a final goal: building long-term resilience.

29 Coastal Resilience Lexicon for Cities

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We are living in a man-made era called Anthropocene, where global warming is its most emblematic crisis and cities are the engines of economic growth and social change. The paradox is that the structures that have made its development possible are nowadays responsible for their lack of resilience. In this context of an over- designed world we may think that this is consequence of bad design. This is even more evident in coastal areas where more than a billion people live. Many of them have already suffered the catastrophic effects of climate change, but all of them are increasingly vulnerable.

Thus, it is necessary a renewed conceptual framework for coastal planning and design that recognizes the coast as complex adaptive socio-ecological systems with the capacity and knowledge to change and adapt to face climate change effects. As a result of this conceptual reformulation special concepts arise which are directly linked to a vocabulary that is unknown in some cases and even inexistent in some others. This is the aim of the Coastal resilience lexicon for cities.

Because prior to the physical changes to promote coastal resilience it becomes essential a conceptual metamorphosis supported by its own semantics, generated through design. Both technical and scientific languages remain always alive and their evolution has addressed their own adaptation to different contexts and societies along the centuries, shaping the substrate of its culture.

The preliminary taxonomy of design families for coastal resilience proposed is the result of the study of strategies and design structures developed in cities worldwide attending to the its hazards under a changing climate. The site-specific development of these new structures will be capable of transforming the demand for simple objects (projects or plans) in renewed coastal landscapes: hybrids of nature and culture, hand in hand with design and technology.

30 Innovative financial mechanisms and stakeholders involvement for climate resilience implementation in Himalayan cities

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The Indian Himalayan region is considered as one of the global hotspots for Climate change. The climate change impact poses additional stress on these cities and its residents and exacerbates the existing challenges on such as Water scarcity, drainage and solid waste management. This article represents a case example from three cities in the Indian Himalayan region (Shimla, Kurseong, Gangtok) and their resilience strategy formulation using ICLEI ACCCRN Process (IAP) toolkit and the process of laying the path to move from developing climate resilience strategies to project implementation through an active stakeholder engagement. Shimla and Kurseong brought forth water supply systems as one of the most fragile urban systems. Whereas, Gangtok recognized the essential need to adopt a proper Solid Waste Management system, especially to avoid clogging of open drains and natural streams in order to reduce the threat of landslide incidences that result in infrastructural, financial and human loss. This case study also focuses on innovative financing mechanism by linking the projects with the Small Grants Fund to create success stories which can further be upscale through convergence with existing federal government schemes.

31 From Reclamation to Resilience: Restructuring Governance for Long-term Climate Adaptation

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One Architecture & Urbanism (ONE)

Following Typhoon Haiyan in 2013, Tacloban City was left decimated. Since the storm, masterplans have proposed technical solutions, yet local and regional authorities charged with rebuilding efforts have struggled with implementation, leaving many plans unrealized and enabling business as usual; this is not unique to the Philippines. Cities around the world are grappling with managing and building resilience through standard governmental processes.

In 2017, One Architecture was awarded a grant from the Global Resilience Partnership to team with the Philippines Reclamation Authority (PRA) and other local stakeholders to pilot a series of ecological restoration projects drawn from a coastal protection masterplan.

As a case study, the Tacloban project confronts disjointed project management from fragmented resilience thinking, competing institutional interests, and a fractured system of concurrent master planning. Our key finding suggests that jurisdictional overlap and ambiguities are the primary impediment in building resiliency for disaster risk reduction in the Philippines

In a low-lying tropical city like Tacloban with its latticework of jurisdictions, the PRA is a central stakeholder with assets along the 36,000-km long coastline. While reclamation is in their name, the PRA is actively reframing their mission. With the increasing importance of disaster risk reduction, this prompted exploration into what makes a *resilience authority*?

- How can we build resilience through streamlined processes that redefine institutional practices?
- What organizational structures facilitate effective interagency coordination?
- How can governmental agencies become part and parcel of resiliency?

It became clear that the incorporation of new modes of practice must focus on holistic integration. The Tacloban pilots aim to disentangle institutional authority and demonstrate how theory can reframe governance for integrated resilience planning. We hope this smoothing of agency functions can aid in advancing resilience planning from the bookshelf into practices focused on long-term implementation and adaptation.

32 Local Climate governance: Interplay between National government and Bilateral aid agencies

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This paper explores the importance of multi-level engagement of the major actors in improving climate change adaptation outcome in the local urban regions of developing countries. It investigates the influences and direct relationship of local government to its central government and major influencer bi-lateral aid agencies in the context of developing world via the case study of Kathmandu, Nepal. While reviewing on local adaptive governance theory, I developed a framework to identify major actors to strengthen local adaptive governance in the setting of developing country. An analysis of interviews with governance actors in Kathmandu was carried out to consider how the role of local actors can be very much influential in building local adaptive capacity to climate change impacts in developing countries. Findings from the research show how national government and aid agencies including with other various actors developers, industrialists, NGOs, energy providers, transportation and civil society activists, etc. all shape climate change adaptation outcomes and can contribute to promoting local climate governance. This study reveals how the role of bilateral aid agencies and its relation with the central government can directly impact the climate change adaptation action at the local level through its policy and financial intervention in the developing world.

33 Nature-based solutions and resilience as complementary strategies for urban governance and planning: A review of assessment methodologies

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Climate change is threatening cities all around the world and local governments are challenged to address climate extreme events that have a severe impact in human safety and well-being. Urban resilience and nature-based solutions are approaches based in ecological principles that are being introduced in urban climate governance and planning. The first one focuses on the ability of urban systems to recover, change, adapt and transform in response to stresses and strains, while the second one tries to increase the capacity of the urban system to provide ecosystem services related with climate change mitigation and adaptation. How do these two approaches address climate change? What connections and differences can be found? The aim of this paper is to answer these questions through a systematic review and meta-analysis of the scientific literature about methodologies to assess resilience to climate change and ecosystem services that contribute to mitigation and adaptation in urban areas. Our preliminary findings are: i) climate resilience mainly focuses on the capacity of the system to recover from climate related disasters while nature-based solutions include a broader spectrum of climate change impacts; ii) resilience assessments usually include infrastructure and social indicators but only a few introduce ecological aspects and; iii) mitigation and adaptation ecosystem services assessments rarely take into account social variables. We conclude that urban resilience and nature-based solutions offer complementary approaches to urban governance and planning and that governments can learn from both of them to reframe climate urban resilience strategies that better integrate the technological, ecological and social components of climate adaptation and mitigation.

34 Policy design and capacity building for urban resilience

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We investigate policy design as a foundation for urban resilience implementation, on two aspects: 1) implications of the resilience paradigm for urban governance, and 2) mechanisms to strengthen urban administrative capacity to integrate resilience principles into urban governance.

Policy design is defined as an “activity conducted by a number of policy actors in the hope of improving policy making and policy outcomes through the accurate anticipation of the consequences of government actions and the articulation of specific courses of action to be followed”. For resilience policy, practitioners are struggling to translate and enact the meaning of resilience within the governance of urban networks. Lack of goal clarity is particularly present in transverse public issues such as resilience and crisis management, because they are complex, fragmented, and lack coordination mechanisms. As such, they require shared governance and a multiorganizational, transjurisdictional, polycentric response network.

Changes introduced by the resilience paradigm in urban governance make it important to assess whether and how adopting resilience as a policy priority leads to any significant differences in how cities are organized and how urban governments conduct their policy-making activities. By comparing changes in key organizational and policy making parameters of cities it could possible to systematically assess the extent to which a resilience perspective actually presents a new mode of governance, or if it is largely a rhetorical commitment with few material impacts. On the one hand, resilience as a policy paradigm can be seen as a radical break with a traditional Weberian approach to governance. On the other hand, the resilience paradigm’s reference to ideal values such as “flexibility” and “responsiveness” of public administration might actually require little in terms of concrete changes to policies, procedures, and structures. Our paper will present the conceptual elements underlying these two aspects.

35 Positively resilient? Public perceptions of urban resilience

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Cities must grapple with rapid changes and an array of risks and hazards. For decades, academics and policymakers have been developing plans and policies to cope with these challenges. These efforts have been couched in terms of building sustainability, hazard mitigation, disaster risk reduction, reducing vulnerability, adaptation, and more recently as a need to build *resilience*. One common explanation for the concept's growing popularity is that resilience has a better social connotation and is more positive than related concepts. Empirical evidence supporting this claim is lacking. Moreover, there is no consensus on how to define resilience. Previous work revealed that definitions differ significantly within the academic literature and among practitioners, but it is still unclear how these 'expert' conceptualizations compare with the broader public's. This study uses three survey experiments to test 1) the widely stated, but largely unsubstantiated claim that resilience has a more positive connotation than other concepts; 2) whether the public is more likely to support policies when they are framed in terms of 'resilience;' and 3) how the public conceptualizes resilience. Specifically, we test support for policies and conceptualization of four terms that are commonly used in the literature: making cities "more resilient," "less vulnerable," "more adaptive," and "more sustainable." Survey 1 was conducted on a convenience sample (n=500) of US-based adults drawn from Amazon's Mechanical Turk crowdsourcing platform. Surveys 2 and 3 were conducted on broad national samples of US adults (n=1000) fielded by Survey Sampling International (SSI). Overall, we find significant differences in policy support and perceived importance, which we trace back to variations in how the concepts are interpreted. The study confirms that framing likely affects public support for policies, but complicates claims that resilience is inherently a more appealing frame.

36 Smart, Resilient and Transition Cities: Reframing Emerging Approaches and Tools for a Climate-Sensitive Urban Development

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This contribution provides theoretical and operational hints for reframing current approach and tools to counterbalance climate change, aiming to better guide planners and decision makers in building up effective climate sensitive urban development processes.

To achieve this goal, we will firstly explore commonalities and peculiarities of three Urban Metaphors - Smart City, Resilient City and Transition Towns – that are gaining an increasing attention by planners and decision-makers, to better understand their roles in supporting climate strategies, their potential synergies and conflicting aspects, and above all their potential in promoting integrated approaches to climate issues.

Then, based on a comparison among different case studies within and outside Europe, we will highlight strengths and weaknesses of current institutional-led initiatives as well as ‘transition’ practices (community-led) addressed to deal with climate change at local scale. In detail, strengths and weaknesses of current practices will be presented according to different research questions: if and how the three considered urban metaphors (Smart City, Resilient City, Transition Towns) effectively frame current practices; current level of integration among mitigation and adaptation practices; mainstreaming of mitigation and adaptation practices into urban planning processes; emerging governance models and, above all, factors currently hindering the paths towards effective climate policies in cities.

Finally, based on the lessons learnt from both theoretical debate and current practices, some key principles to reframe current approaches to climate issues and to overcome barriers and criticalities hindering effectiveness of current strategies and measures, will be provided. These key principles will be mainly addressed to promote cross-sectorial strategies and measures to counterbalance climate change; to enhance the capacity to take into account synergies and trade-offs between mitigation and adaptation strategies and measures; and to promote the mutual capacitation and contamination among different actors and stakeholders.

37 The backside of the city. Marginality and waste landscapes in the Tunjuelo watershed.

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The Tunjuelo River is one of the most important tributaries of the Bogota River, it is a highly populated territory on which different realities converge. Approximately three million people inhabits the Tunjuelo watershed. The watershed was urbanized in less than 100 years, mostly by informal settlers that occupied areas with landslide risk and progressively encroached the floodplain.

The modernization of Bogotá after 1930s displaced industry to the outskirts of the city and demanded a constant supply of building materials. Since then the extraction of clay and gravels focused on the Tunjuelo River due to its geological configuration. This drastically changed the course of the river and its ecology. Small industries for tannery and other activities also found a place in the Tunjuelo River, in the edge between the countryside and the city.

The river is one of the main elements of the city's ecological structure. However, the sewerage system is the poorest in the city. The river receives wastewater from most of the surrounding residential areas, chemical pollution from small industries and discharged pollutants from the main city's landfill. In addition, communities settled in the watershed suffer from lack of accessibility to public spaces while the area defined as ecological corridor is a narrow strip.

Until recently, Bogotá's city planning was disassociated from watershed planning. Mining, industrial activities, landfills, informal settlements, expansion areas, rural settlements and natural reserves coexist in a conflictive manner. This paper presents a cartographic investigation of this contested territory that highlight also the potentialities of the landscape. It also critically analyzes existing projects of informal upgrading and mobility infrastructure. Through this revision the article reflects on the principles of contemporary urban design. It also presents strategies for increasing landscape resilience while addressing the socio-economic challenges of the watershed.

38 The governance of Blue Green Infrastructure Funding: A case study comparison from the UK and the Netherlands

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It is well understood that BGI can deliver benefit beyond water management to wider societal matters such as social, aesthetic, health and biodiversity. Funding such boundary spanning projects is complex and pathways vary between projects. Little is known about the governance of such siloed funding processes and connections between potential stakeholders are not always made. In particular, involvement of health agencies is lacking despite strong evidence of health benefits of blue and green space.

This paper describes work in progress comparing two case studies from the UK (Bradford) and the Netherlands (Dordrecht). The research will consider funding governance in three key areas:

1. The type of funding, whether co-financed, own funds, an ad hoc subsidy or a structured programme and key players and drivers of financing
2. How cross sectoral collaborations are facilitated, how they operate, who is involved and how conflicting agency interests are managed
3. Whether there are any health agencies involved and how greater involvement of health agencies could be incorporated

The Bradford Projects involved developing a currently under used area of open space alongside expansion of an existing highway which runs beside Bradford Beck. The project intends to develop the adjacent greenspace, de-culverting the beck and enhancing biodiversity. In Dordrecht the case study is in Vogelbuurt. This deprived neighbourhood faces both flood risks and social problems. The municipality of Dordrecht aims to combine sewage management with redeveloping the sport facilities.

The evidence generated from this study will help to develop the theory and practice of BGI funding governance. By deepening understanding of governance of funding siloes and investigating the potential role of health agencies in BGI, this study will enable practitioners and policy makers to gain insight into the funding process, thereby helping to bridge the gap between theory and implementation of BGI.

39 A social-ecological-technical systems approach to understanding urban complexity and building climate resilience

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Urban areas—their inhabitants and their infrastructure—are often concentrated in exposed areas like coasts and drylands and thus vulnerable to extreme events. Climate change is driving increasing frequency and magnitude of such events, such that risk to people and infrastructure in cities is one of the prime manifestations of the interaction between these two major components of global change. As a result of this accelerating risk, there is increased awareness of and interest in the concept of resilience among city practitioners and urban scholars alike. We present a conceptual framework for urban social-ecological-technical systems (SETS) that integrates three domains: social/equity/governance, environmental/ecological, and engineering/built environment/technology issues. We assert that socioecological systems and socially sensitive engineering approaches that fail to incorporate the third dimension may reduce resilience to climate-related disaster.

The Urban Resilience to Extremes Sustainability Research Network is exploring: 1) potential solutions such as green infrastructure and safe-to-fail design, 2) modifications of ecosystem services approaches and vulnerability and resilience assessment under a SETS framing, and 3) participatory visioning of sustainable, resilient futures to guide urban transformation. A SETS approach enriches these activities through sensible balancing of the three domains, evaluating tradeoffs among them and opportunities for emergence that can support transformation. The infrastructure of the future must leverage ecosystem services, improve social well being, and exploit new technologies in ways that benefit all segments of urban populations and are context specific. Contexts are defined not only by the biophysical environment but also by culture and institutions of each place. The SETS conceptual framework is being applied in ten diverse western hemisphere cities to co-develop, with city practitioners, visions of resilient SETS infrastructure for an uncertain future.

40 Can Fugarolas: A Story of Urban Resilience

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The concept of Resilience and its application to the management of the urban environment and urban planning has taken great relevance in recent years. However, most of the works related to Urban Resilience are focused on improving the capacity of the urban environment in the face of stochastic events derived or produced by climate change and natural effects or by terrorist acts. Therefore, these works conceive of Resilience as a property of the system, so that we will speak of resilient cities.

As a part of the doctoral Thesis I am working on, a practical case is presented based on the regeneration process of some old auto repair workshops in Mataró (Barcelona) and its reconversion into a social and cultural center from the conception of Resilience as the own adaptive process and, therefore, as the transition from a situation of stagnation (obsolescence) to a stage of reorganization of space. For this, the application of the heuristic of the Adaptive Cycle and the Panarchy (Gunderson and Holling, 2002) is proposed as the ideal theoretical framework to analyze the evolutionary trajectory along the different phases of growth, accumulation, liberation or destruction and reorganization, as well as to analyze the mechanisms of interaction (Revolt / Remember) with other systems - social, regulatory, economic - at different spatial and temporal scales that determine the process. In addition, we use this same approach to analyze the process of reusing the own interior space, mapping its reorganization dynamics and identifying links between the formal, structural and temporal conditions of that space and the nature of the social groups that use them and the activities that are developed, on the one hand, and the legal and regulatory framework, on the other.

41 Designing Anticipatory Knowledge for Resilient and Sustainable Urban Futures

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The challenge of ensuring that urban resilience agendas do not compromise sustainability and equity goals demands that our cities be capable of envisioning future pathways and anticipating trade-offs of resilience strategies and solutions. While future-thinking is a common practice in urban planning, cities will need to get more ambitious about how they factor in foresight and unintended consequences of actions at very distant temporal scales into the knowledge systems that underpin their planning and decision-making. We ask, to what extent is the knowledge coming to bear on urban resilience planning and strategies inclusive of sustainability and equity goals? What kinds of upgrades or innovations are needed to make city knowledge systems more anticipatory? We draw upon the knowledge-action systems analysis (KASA) currently implemented in multiple US and Latin America cities to explore the types and networks of knowledge shaping urban resilience in different context and how conducive they are to moving beyond risk-based knowledge systems to enhancing anticipatory capacities for cities.

42 Don't Blame it on the Sunshine! An Exploration of the Spatial Distribution of Heat Injustice Across Two Antwerp City Districts

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Many global cities experience temperature differences on a micro-scale across urban areas due to Urban Heat Islands, revealing deeper climate injustice as many socially and economically marginalized communities are more likely to live in warmer neighbourhoods. These areas often have less access to cooling features, like green spaces, which improve climatic conditions. Many local governments lag behind in recognizing the unequal vulnerability of certain populations or taking steps to mitigate injustices related to green space planning. We created and tested a Heat Injustice Scale model to explore how different areas of the city face spatial disparities in heat vulnerability and heat resilience as a result of green space planning. Drawing on critical urban theory and environmental justice, we seek to uncover the processes of neoliberalism and social exclusion that drive spatial heat injustices, and explore how resident perceptions of right to the city and climate resilience align with the reality of climate change. The Scale incorporates GIS data, ground-truthing surveys, and stakeholder perception-based mapping, a novel approach to measure climate resilience and mechanisms of heat injustice. Findings from a preliminary study within two districts of Antwerp, Belgium indicate an unequal distribution of cooling features according to size, proximity, and quality; but moreover, revealed the reality that local residents in all districts – particularly those with lower social capital -- are systematically disadvantaged by and dissatisfied with municipal green space planning. Through future research, we hope to provide an interactive, participatory platform for residents and city planners that will illustrate areas of heat vulnerability and resilience in the city utilizing the Heat Injustice Scale, and incorporate resident narratives on accessibility to cooling features to highlight heat-related planning issues. This research contributes to both the “Climate Resilient Governance and Planning” and “Urban Design and Management: Infrastructures and Services.”

43 In Pursuit of Urban Resilience

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Resilience has become ubiquitous as a policy goal, despite a lack of consensus and often outright confusion as to its exact definition. Cambodia is no exception. Given the country's high level of exposure to economic losses due to climate change, the national government is actively pursuing policies which purport to cultivate resilience, with the support and often leadership of development partners. But what does this pursuit of resilience mean for communities on the frontline of climate change and urbanization? This case study, based on more than 8 months of field work in Phnom Penh, examines how a community of urban farmers is watching their livelihood slowly unravel thanks to the dual processes of human-induced environmental change and urban expansion. Contrary to policy narratives that optimistically point to community-based adaptation as a way to preserve traditional practices, urban farmers do not see a future in agriculture. Instead, their vision of the future centres around the family unit, rather than the wider community and is dominated by the need to invest in the education of children and leave behind their precarious livelihood. This highlights the disconnect between the discourse of resilience and the real aspirations of urban dwellers. Does this mean resilience is not the right objective for Cambodia's climate change policy? Or is it feasible to pursue a more nuanced version of resilience that represents the diversity of urban residents?

44 Planning in Central America in the 21st. century: possibilities and limitations for resilience implementation

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This work examines the evolution of the planning field in five Central American countries [1] in the last 15 years in order to discuss different approaches to promote urban resilience and its implications for planning governance at the multinational, national, and metropolitan levels. Study focuses on how these countries have incorporated comprehensive risk management and climate change adaptability as major planning policy goals in the context of a vulnerable region with diverse institutional frameworks. For this, research examines a series of regional, national, and metropolitan planning instruments and corresponding organizations to focus attention on their coherence with sustainability principles and detect the emergence of innovative planning practices.

The study of Central American planning cases permits to identify four tensions which are relevant for the discussion of the linkages between resilience implementation, planning, and governance. First, despite official discourses based on global climate change agreements and carbon neutrality goals, numerous contradictions persist with ongoing strategic economic ventures and large infrastructure projects as coordination between environmental and economic ministries is still incomplete. Second, new issues incorporated into national and metropolitan development plans, such as: gender equality, human rights, and civil society participation pose diverse implementation challenges for traditional planning organizations and professionals. Third, the achievement of social, environmental, and economic development objectives is limited by conservative legal frameworks as legal disputes around private property and plan implementation continue. Finally, numerous stakeholders such as multilateral organizations, local governments, private investors, and grassroots organizations have not been fully involved into planning processes preventing multiple interests to be considered in the decision making process. As a result, effective planning governance and lack of flexible institutional arrangements appear to be the main limitations for effective resilience implementation in Central America.

[1] Costa Rica, Nicaragua, Honduras, El Salvador, Guatemala

45 Resilience and Scales: how to embrace the metropolitan dimension of urban resilience implementation?

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Resilience is the new framing principle for cities tackling the development challenges on this century, facing population growth, climate change and environmental degradation. Many cities around the world are implementing through plans, projects or setting new units specialized on resilience in their municipalities for operationalizing the guidelines promoted by the most important global frameworks as the Sendai Framework or the UN New 2030 urban Agenda for Sustainable Development. However, the challenge of tackling resilience through its effective implementation goes far beyond administrative boundaries of cities, highlighting the fallacies of some initiative while emphasizing the need of better re-framing how resilience is to be shaped through across scales collaborative institutional agreements. METROPOLIS already explored the challenges of addressing the metropolitan scale of resilience during an international workshop held in Barcelona in November 2017.

This panel aims at further discuss the most relevant questions emerged through the workshop, as for instance:- How the concept of resilience could help framing across scales agreement, minimizing the spatial trade-offs (one part of the city/region benefitting from another increased exposure to threats)?- Which could be the funding mechanisms to ensure across sectors and boundaries collaborations?- How public-private or public-public co-management agreements could foster inter-municipality cooperation in building resilience?- How resilience could be adopted through strategic planning at the metropolitan levels? Is planning a proper tool for framing the enabling conditions for building resilience at the metropolitan level?

46 Resilient Planning Implementation: the Case of the Politecnico di Torino University Campus

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The main goal of this contribution is to explore the role of the Masterplan project (MP) of Politecnico di Torino concerning the implementation of a resilient planning framework for a university campus. In a complex negotiation process involving different institutions inside and outside academia, as well as architects and urban designers, the MP took a major role on the technical, political and cultural level of the actual city transformation. This paper takes MP as a case study to reflect upon the importance of the spatialization of data and problems to nurture and activate innovation in a resilient urban making process. Lessons from this case are drawn in the light of the current literature review of city resilience implementations, as well as of the evolving twofold role of university both as urban development protagonist and its relationship with the city. Many resilience drivers are indeed envisaged in the MP case study, which meets basic needs, supports livelihoods and employment, promotes cohesive and engaged communities, fosters economic prosperity, enhances and provides protective natural & man-made assets, provides reliable communication and educational activities, promotes leadership and effective management, empowers a broad range of stakeholders and fosters long-term and integrated planning. Recommendation concerning skills and methodologies for a new city-university relationship are drawn by the MP success case: deictic, resilient (adaptable), able to catalyse different cultural, political and architectonical views and connecting different level of transformation. Eventually, this contribution acknowledges the crucial role of a platform enabling top-down policies and bottom-up initiatives, that is still missing in the panorama of effective implementation strategies, paying the price of the vague discourses gap between theories and practices, moving away from the usual normative statements characteristic to the literature around urban resilience.

47 The Resilient Melbourne Experiment: mobilising transitions in urban resilience governance and planning?

Susie Moloney

RMIT University

This paper examines the Rockefeller Foundations 100 Resilient Cities initiative in Melbourne and frames this as an experiment in urban resilience governance and planning. Drawing on sustainability transitions and urban low carbon experimentation literature (Bulkeley et al 2011; Evans et al 2016; Sengers et al 2016), the necessity to foreground the politics of urban transitioning is highlighted (Luque-Ayala et al 2018). This draws attention to questions of: what it means to be low carbon (and resilient); what and who is involved in the transition; how does the transition unfold and how would we recognise a transition when we see it? Melbourne is one of the first wave of 32 cities involved in 100RC and the release of the Resilient Melbourne Strategy (2016) is the first attempt at resilience planning in this city which is seen as “a starting point that brings together individuals and organisations critical to the resilience of Melbourne and its diverse communities (www.resilientmelbourne.com.au). We examine its role in mobilizing ‘urban resilience transitions’ reflecting on the what, who and how of this as a governance experiment. With no metropolitan mandate and located in the City of Melbourne office, we examine the relationship between the 100RC Melbourne initiative and other key local, metropolitan and state climate change policies and planning strategies. Through this analysis we reveal the extent to which resilience thinking is influencing (and transforming) mainstream planning, how urban resilience has been framed and adapted as the 100RC Melbourne initiative has evolved and the prospects for a more integrated and inclusive mode of urban governance and resilience planning.

48 The urban resilience perspective of Sustainable Development Goals: reframing definitions and indicators

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The global increase of urban population and environmental related disasters were the scenario to the increase of several debates on urban issues, including urban resilience. This idea was incorporated by international agencies as a core concept for urbanization and sustainability, inclusive in the Sustainable Development Goals (SDG). Specifically, the SDG 11 recognizes the need to “make cities and human settlements inclusive, safe, resilient and sustainable”. In this sense, urban resilience has already been framed and promoted in a global scale as a normative and analytic concept. However, local and regional dynamics puts specific challenges in relation to resilience implementation and measurement. In this paper we analyze this global scenario, evaluating SDGs and the new urban agenda in relation to Brazilian urbanization. For this, we consider its extremely unequal territorial development and its lack of urban services and infrastructure. Discussing the set of global definitions and indicators that grounds policies with a specific direction for urban-environment relations, we argue that the complexity of urban resilience theory, which involves urban form, land-use patterns and spatial ecological processes, is not sufficiently considered by global agencies that defines resilience goals. The Brazilian case illustrate how some resilience indicators are not specific and measurable, beyond the low adherence to its reality. Although local stakeholders and government actors take resilience as a main goal to urban planning, these analyses show how the promotion of this specific idea of resilience is insufficient to achieve a real increase of wellbeing and of the capacity to deal with changes. Within this, the paper enhances the need to think the local contexts of urban resilience, the lack of linkages among indicators and targets in the SDGs, as well as the limits of this framework and indicators to induce effective changes in inequality, housing and urbanization in Brazilian cities.

49 Towards climate resilient and inclusive urban development in Latin America: showcasing a participatory planning project in Colombia, El Salvador, and Argentina

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This presentation is based on the "Participatory Planning for Climate Resilient Urban Development in Latin America" project that takes place in the cities of El Salvador, Colombia and Argentina. This project developed a practical and inclusive participatory-planning methodology that not only builds resilience, but also leads to sustainability through the reduction of inequities in the urban development process.

The primary objective of this project, as part of the Climate Resilient Cities in Latin America Initiative (CRC), which is funded by the Climate and Development Knowledge Network (CDKN) and the International Development Research Center (IDRC), is to identify and apply a practical, innovative and participatory methodology and tools to support a climate resilient and inclusive urban development in the rapidly growing small and medium sized cities of Latin America. The project uses a decision support tool and methodology in a multi-stakeholder setting and test and assess in different contexts issues such as risk, vulnerability, urban development and decision-making. The methodology included a) stakeholder mapping and interviews, b) participatory workshops and the use of QuickScan tool, c) validation process, d) options portfolio and policy recommendations, e) implementation. The goal is to explore different options to integrate disaster risk reduction, climate change adaptation and resilience building strategies that will also ensure increased awareness and empowerment of stakeholders through a participatory process. The presentation will showcase the project implementation in three cities that led to a variety of resilience options and projects, some of which are currently implemented by local government - stakeholder partnerships. It will also discuss the operationalization of the concepts of research and pros and cons of the methodology used, while elaborating on the results, discussing similarities and dissimilarities of the three cities and recommendations for similar projects and research going forward.

50 Tradeoffs between regulating and cultural services as a potential source of hazard risk in urban areas

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Green areas in and around the city have often been used by urban inhabitants as a source of food and timber, for recreation, cultural and aesthetic purposes, or as a source of fresh air and other health benefits. More recently, their hazard regulating functions are increasingly valued and acknowledged as a desirable strategy goal to reduce risk to climatic and hydro-meteorological hazards. However, this often generate tradeoffs. Most of the literature on ecosystem services' tradeoffs has concentrated on provisioning versus cultural and regulating services. The potential tradeoffs arising between managing nature for recreational, spiritual, mental benefits and for hazard regulating functions in urban and peri-urban areas have rarely been explored. In this paper we assess cultural and regulating services in the Carmel peri-urban forest of Haifa (Israel) using participatory mapping GIS-based methods. We interview local stakeholders and users of the Carmel peri-urban forest area. We explore tradeoffs between cultural and regulating services (in particular for fire mitigation) and we link these tradeoffs to different understanding and uses of nature. We find that the stakeholders preferences for cultural purposes and the preservation of the forest often clashes and increases hazard and fire risk. The idea of a cultivated forest landscape has in fact emerged as a strong cultural ecosystem service in Israel, while the transformation of the forest from a less cultivated type improves regulating services, reduces especially fire risk. We conclude that the tradeoffs between cultural and regulating services are a potential measure of hazard risk.

51 Urban planning: Integrating resilience and sustainability in the regulatory framework

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The interrelation between actions towards sustainability and urban resilience is an aspect of great significance in the development of cities. The paper focuses on resilience from the urban planning perspective to be applied in the national legal framework of Spain, based on the extensive experience that sustainability has acquired in this discipline. However, the difficulty of introducing risk mitigation measures and climate change adaptive strategies in the regulatory framework means rethinking mechanisms to transform urban processes. The research carried out focuses on identifying the deficits that exist within the legal framework to make spatial planning, itself, a resilient and sustainable tool. The reformulation of new standards in local spatial planning, especially those related to green and blue infrastructure, allows redrawing the decision-making process from a holistic point of view, combining environmental, social and economic sustainability with urban resilience issues. Our study offers a taxonomy of regulatory modifications in spatial planning at local scale associated with indicators and standards useful for spatial development. The introduction of new calculation parameters when establishing the surface and location of the open spaces network (green and blue infrastructure) favours a sustainable and resilient urban planning. Some strategies, such as the ones developed in Red Hook (New York) and the Zorrotzaurre area project in Bilbao present innovative solutions in the alignment of sustainability and resilience. The paper will contribute to a greater understanding of the application of knowledge acquired on sustainability and resilience in spatial planning actions supported by an appropriate legal framework in the Spanish context.

52 Urban Resilience. An Approach to Urban Dynamics. The “Urban Gaps” of Mataró

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This working paper explores the new and emerging issues related to the application of the theory of Urban Resilience and the concept of Panarchy (Gunderson & Holling) to the understanding of urban dynamics. To do so, it will analyse the “Urban Gaps” of Mataró, studying the interaction and the feedback relationship between urban planning and social initiatives, as a continuum interaction of dynamic cycles at different scales.

The first part of the paper aims to show the evolution of the different meanings of Resilience concept, from its original conception from the engineering industry, characterized by the capacity of a system to go back to an starting point; the socioeconomic resilience, highlighted by the amount of resistance facing stochastic events; until the socioecological one, where the emphasis lays on the adaptive capacity of the system and the interaction between adaptive cycles at different time and space scales (Panarchy).

The second part includes the main field work body of the project consisting on the characterization of each dynamic cycle interacting at each space and time scale. Thus, the smallest and fastest one (parcel) is associated to social motion initiatives; the medium (neighbourhood), is identified with successive urban planning reviews; and finally, the biggest and slowest (city) is linked to “Urban Gaps”.

This part includes the localization and characterization of the urban gaps of Mataró, the review of all the urban planning since the approval of the Local Master Plan in 1977 and the identification of several social actions that have taken place from then till nowadays.

Finally, as the innovative part of this work, Panarchy schemes are drawn showing the different mechanisms and processes through which the different stakeholders and actors interact and the urban dynamics happen, providing a better understanding of the evolution of the whole system.

53 Transnational City Resilience Networks as facilitators of Policy Learning and Implementation?

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Increasingly regarded as climate governors cities are joining together in transnational city resilience networks which provide platforms for city-to-city learning. However, it is still unclear how useful these learning processes are in driving practices on the ground. In this presentation we present the results of a global survey addressing key networks and interviews to city representatives, exploring the mechanisms of the learning opportunities leveraged from city networks. While results reveal that under certain conditions these learning exchanges can lead to implementation, we raise the question around how pioneering cities could effectively transfer their examples to most of the smaller cities looking for policy support.

Topic 3: Urban Design and Management: Infrastructures and Services

54 Emerging practices for mainstreaming resilient critical urban infrastructure governance

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University of Warwick

Conventional urban governance has largely focused on protecting critical infrastructure (CI) from specific threats and tends to manifest in silo-based practices that frequently overlook interdependencies and socio-political factors shaping local adaptive capacity (Coaffee & Clarke, 2016). Recent urban planning models (e.g. SDG11, 100 Resilient Cities) call for a transformation of governance to stimulate resilience-building and sectoral integration. It is of equal importance for planning and monitoring systems to be relevant to the local context – especially concerning vulnerable residents – and to account for the extent to which the above factors vary across neighbourhoods and cities.

We therefore argue that a key feature of these models is their ability to draw on new stakeholders. The focus is on communities, as their contextual and diverse knowledge can be instrumental for identifying synergies at the local level. Regarding reframing resilience, embracing uncertainty then is about the ability to align heterogeneous perceptions of criticality, to reduce the possibility of exposure and flexibly mobilise networks for mitigation. Thus, this research explores the potential of aligning of heterogeneous perceptions to resilience-building and contextualisation of global planning models. We propose a framework to analyse changes of governance processes in terms of their adaptiveness based on three components: (1) changes in networks, which refers to the diversity of institutional and individual actors represented; (2) in discourses, such as the framing of issues in policies and proposals for interventions; and (3) in evaluation practices, such as the sectoral integration of targets for CI provision. Based on our ongoing research in one of Nairobi's informal settlements, we apply this framework to analyse the extent to which the introduction of community-based participatory data generation for healthcare service provision triggers adaptive governance processes.

To conclude, we will highlight the potential advantages of, and illuminate the barriers to, mainstreaming transformation towards resilient urban governance.

55 Making Sponge City by Deciphering Indigenous Ecological Wisdom: case study of Chengdu, China

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As the impact of the climate change, the city flood in China has been becoming more and more serious recently. Under this circumstance, government in China started to push a new city construction concept called Sponge City. In 2014, the Ministry of Housing and Construction set 30 cities as the pilots for the implantation of Sponge City. The Special Planning of Sponge City had been made out to support the development of the pilot cities. More than 3 years passed, the term Sponge City has become popular all over China, more and more cities started to accept the Sponge City concept, and tried to find the proper way to make plans and to implement. To improve the way to build sponge city, an important way is to summarize the experience and problem in the past 3 years. Based on the accumulations of the planning documents, selected sites surveys and interviews and questionnaire surveys of the officials from the 30 pilot cities, this research tries to summarize the present paradigm of building sponge city in China and analyzes the problem on planning making and implementation performance.

56 Resilience on Economic Transition of Post-industrial Cities: Evaluation on Industrial Heritage Tourism Potential in Tianjin Based on Spatial Analysis

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Current studies on urban economic resilience focus more on overall evaluation rather than specific economic sectors, thus lack effective directions on implementation. As for post-industrial cities, Industrial heritage tourism (IHT) is one effective strategy to make use of large amount of industrial heritage (IH) during social-economic transition. Tianjin, one of the most important cradles of Chinese modern industry, is also facing new challenges in the era of “New Norm”. The government is promoting IHT as one important increasing point of urban economy, and the potential of IHT makes great contribution to urban resilience of post-industrial cities. As tourism industry highly relied on spatial factors, in this paper, IHT in Tianjin are evaluated based on spatial analysis to examine to what extent IHT could contribute to urban resilience. To be specific, based on mode of tourism potential evaluation, two aspects are focused, namely, inner resources and outer support using GIS platform and polimetrics.

The former includes spatial patterns, cluster effect and spatial network. Firstly, the spatial patterns based on industrial types are explored through GIS platform using data of Tianjin IH Preservation Planning and that offered by the tourism sector. Secondly, the cluster effects are analyzed using NNI methods to identify the extent of IHT attractions affecting each other. Thirdly, the spatial network is analyzed to measure accessibility of each IHT attraction. The outer support evaluation mainly includes the policy intensity. These policies will be valuated according to their administrative level.

From the analysis above, the potential of IHT in Tianjin could be revealed. The results are also compared with Beijing and Shanghai which are more experienced on IHT development, to clarify the extent of IHT coordinating with urban planning and its contribution to urban resilience. The result could also be used to evaluate the current development problem.

57 Urban Green Infrastructure: a study of type, opportunity and constraints for greater urban resilience

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Contemporary research on urban systems looks at resilience as a framework to produce policies and projects that better integrate urban planning and design to make cities more capable of responding to sudden perturbations, to adapt to long-term future changes and to achieve higher levels of sustainability over time. Green infrastructure is recognised as a non-traditional approach to deliver a wide set of ecosystem services in cities and is increasingly recognised as a way to operationalize concepts of urban resilience through better delivery of urban planning and water sensitive urban design. This paper argues that the first step in delivery of effective Green Infrastructure planning and the improved delivery of ecosystem services is the identification, calculus and visualisation of the full spectrum of urban green space. In this research, three diverse case study cities – Rome, Sydney and Hanoi – were selected for their diverse geographical origins and planning history and the identification of a spectrum of Green Infrastructure types made via a transect mapping exercise. This revealed a diversity of public parks and plazas, streetscapes, terrain vague and domestic gardens and through analysing these cities urban fabric we propose how these identified spaces could theoretically deliver a range of beneficial ecosystem services for greater urban resilience, particularly concerning the increased adaptation capacity to climate change that can be obtained by multifunctional Green Infrastructure. We then considered the existing planning rules, strategies and mechanisms within each city, comparing the potential to better recognise and activate these spaces as critical pieces of overlooked green infrastructure into the metrics of a sustainable and resilient future city.

58 **BEGIN: experiences, methods and guidelines to accelerate effective city-to-city learning to reach transformational change**

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City-to city (C2C) learning (learning from peers and their best practices) is of crucial importance regarding topics (i.e. urban resilience) in which cities do not have time to re-invent the wheel. This abstract outline why it is important, how C2C learning can be done most effectively and the mayor challenges regarding C2C learning.

When confronted with an issue, cities look at their peers for capacity building and inspiration. Moreover, C2C learning has several side benefits such as the acknowledgement cities get, the possibility of exploiting political and media attention and the fact that people simply enjoy exchanges. Hence, C2C is an often-used method. Cities have been doing it for decades and there are many initiatives (i.e. ICLEI, 100 Resilient Cities).

C2C learning *can* be an effective way of accelerating learning leading to transformational change. However, it is often done in an unstructured way which leads to limited follow-up action. Within BEGIN, participants engage in a transnational learning exchange programme with expert teams that facilitate joint implementation of BGI projects. Bax & Company has developed several tools and methods based on experiences within BEGIN and academic research which enhances the effectiveness of C2C learning. C2C learning experiences should focus on practice and implementation, have structured engagement (according to expertise and strengths and needs), have continuous participants and contact moments, be documented and lead to a call for action. The short conference paper will discuss these guidelines more into depth using concrete examples and methods used in the BEGIN project.

Some challenges regarding C2C learning remain. The foremost challenge is to implement lessons learned on an organisational level. Another challenge would be to upscale our current learning approach to other sectors or participants (i.e. delta-to-delta learning or farmer-to-farmer learning).

59 Design for Social Innovation in the context of Urban Resilience

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This paper presents two design projects as case studies where service design thinking and practice is employed in addressing the challenges of engaging communities in the maintenance of Blue-Green Infrastructure (BGI). The design projects were initiated by the Royal College of Art in partnership with Enfield council, UK. The aim was to develop service propositions that encourage shared ownership of Broomfield Park between local communities and the council set against the backdrop of a blue green infrastructure intervention that requires active involvement from the public.

In these projects, Design for Social Innovation approach was used, known as a constellation of design initiatives geared toward making social innovation more probable, effective, long-lasting, and scalable. In this approach, designers employ a human-centred design process that uses collaborative, creative and experimental methods to bring local communities into the processes of design and delivery of services and space.

The involvement of communities in city strategy is considered crucial to the success of any resilience initiatives and services. In recognising that simply consulting citizens is insufficient and ineffective in achieving sustainability, there is a need for a more integrated and inclusive approach to designing and managing urban resilience. From the perspective of Design for Social Innovation, the fundamental principle lies in the need to develop partnership with citizens to co-create and co-produce services, in order to effectively address the needs of people. More importantly, by including communities and other stakeholders in the design and delivery processes, the solution becomes legitimate within its social context and sustainable in the long term.

These case studies demonstrate the value of Design for Social Innovation in the design and management of urban resilience through BGI in its potential to fundamentally transform the traditional way in which public services are designed and implemented.

60 Tianjin Future Science City: A Chinese Flexible Planning Experience for Industry New Town

Bin Ge, Jiming Yu and Yan Chen

Archiland International Cooperation.

During the past three decades, the development of high-tech districts and economic-development areas became one of the main pillars that support the radical social and economic growth in Chinese Cities. with a planning agenda that pursues fast completion of construction, these towns contain unitary land use and inadequate considerations of urban uncertainty in the future development. Nowadays, as China became the second largest advanced and emerging economies in the world, well-planned and smart urban growth replaced the intensive urban expansion. Therefore, utilizing resilience to confront uncertainty in future development has become an important task in modern planning.

The planning provision of Tianjin Future Science City regularized the project's overall framework and designed un-identical development disciplines for individual grids at the site to exploit elastic space that embraces uncertainty. The design scheme provides the urban infrastructure with a large-scale grid of 1kmX1km, which provides a basic development framework and accommodates usage changes within the grid. Variable development contents are allowed in each grid as long as they respect the fundamental planning guidelines. Similar to Lego, the grids are diverse but connectable elements that could be combined and transformed by planners to conduct variable development contents. However, it is true that such development methodology requires careful and dynamic maintenances, as well as deep integration with planning administrations.

From the practical point of view, the construction and operation of Tianjin Future Science City are generally considered successful. In conclusion, the thesis indicates the practical experience of Tianjin Future Science City and explaining the significance of resilience planning in assisting planners to increase land use efficiency and intensity. It is believed the experience also demonstrates resilience planning's advantages in responding to market demands, and by no means evidenced the feasibility of elastic design method.

61 A Tale of Two Rivers and Resilience in Tel-Aviv's Metropolitan Region

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This paper offers a comparison of two diverse approaches to infrastructure resilience planning and socio-environmental sustainability in two urban rivers in the Tel Aviv Metropolitan Region: the Yarkon and Ayalon. The Yarkon flows from the north-east through relatively high-income areas before transforming into the centerpiece of Tel Aviv's main metropolitan recreational park. Here, resilience is framed mostly as protecting the metropolis' 'green lungs' and the flow of clean water in the face of recurrent incidences of upstream pollution. By contrast, the Ayalon stream flows from the south-east through more socially-deprived areas and the metropolis' most dense transportation 'bottleneck' (encompassing the Ayalon Freeway and the national railways). Thus, the Ayalon's resilience is framed as infrastructure-dependent, and involves large plans for water diversion, flooding control, and complex interactions with transportation planning. Consequentially, the persistent north-south socio-environmental divide that has structured the metropolitan region both historically and contemporarily is also manifested in the re-workings of these two urban rivers and their reframing in terms of resilience. We investigate this *ecology of unequal resilience* along several dimensions, by analysis of a decade of discussions and decision making: the tensions between 'old' and 'new' functions planned into the two rivers; the contrast between the 'slow', recreational water associated with the Yarkon against the 'fast' seasonal flows of the Ayalon; the contrast between the 'green' sustainability approach of the Yarkon compared to the 'gray' infrastructural resilience of the Ayalon; and the planned futures of both rivers, which are entangled in complex calibrations of infrastructural resilience, environmental regulation and social equity. Overall, the paper seeks to narrow the gap between aspects of socio-environmental sustainability and urban resilience in the context of infrastructure planning and design.

62 A theoretical framework for building the risk-resilience of basic infrastructures and services using Open Data

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In recent years, cities have been confronted with increasing risks induced by climate change and natural hazards with their consequences. The experience gained highlighted that how cascading failures of critical infrastructures can affect both inherent and adaptive capacities of cities in time of an adverse event and create post disaster conflicts. Against this backdrop, there is a local to global interest in resilience as a de facto framework to address unexpected shocks. At the same time, international policy circles have acknowledged the need to link resilience into social inclusion for preventing the post disaster conflicts such as social trust gaps.

Critical infrastructures are the backbone of human communities and play an important role in achieving resilient cities. They contribute to the different phases of disaster risk management including preparedness, response, and adaptation. In addition, equitable access to critical infrastructures can positively affect the community cohesion.

Therefore, understanding the link among different dimensions of critical infrastructures can lead to find out the interdependencies of them and move from a reactive model to a proactive approach. To perform this task, this study first, intends to present a synthesized-adaptive framework for assessing the resilience level of critical infrastructures based on their essential characteristics. Then, a composite index was developed covering three critical types of infrastructure including (1) physical infrastructure (energy, transport, emergency operation systems, water supply and sanitation); (2) social infrastructure (schools and universities, green spaces, and hospitals); (3) institutional infrastructure (civic society organizations, governmental organizations, and institutions). This proposed framework was applied in City of Tehran, Iran. The results depict comparative resilience level of critical infrastructures within 22 urban districts, which demonstrate the strengths and weaknesses of each district in each dimension.

63 Analyzing transit-based heat exposure and behaviors to enhance urban climate adaptation and mitigation strategies in the southwest USA

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Public transportation systems represent an intersecting point between urban climate change adaptation and mitigation strategies. Increasing the use of public transit systems can help cities meet a wide range of sustainability and health goals including reductions in greenhouse gas emissions. Simultaneously, public transit use typically necessitates exposure to outdoor weather. In extreme climates, uncomfortable or dangerous weather conditions may suppress public transportation system without sufficient infrastructure to moderate exposure.

This paper will present results from a suite of ongoing research projects in the hot desert city of Phoenix, Arizona, that aim to understand and improve public transit riders' experiences and resilience to heat. Researchers have been using a wide range of methodologies to assess environments, conditions, and the behaviors and perceptions of public transit riders, including observations, surveys, ridership data, in situ and transect-based micro meteorological measurements, and handheld and satellite-based thermal imagery. Results support the importance of shade provision for public transportation use in the summer, including the availability of nearby shade at bus stops from surrounding trees and buildings. Survey and observational data revealed key behaviors and perceptions that should influence transit stop design strategies: stops with more design and natural features are perceived as more thermally comfortable by public transit users; riders identified infrastructure elements and coping behaviors that make them feel cooler. Findings also showed that current infrastructure standards and material choices for bus stops can increase the air temperature at the stop, and, thus, contribute to heat stress accumulation.

As the City of Phoenix intends to make large investments in public transportation infrastructure in the coming decades, continued attention to the experiences and preferences of transit riders—especially during the summer months—will improve the likelihood that the region can meet or exceed its public transportation and sustainability goals.

64 BEGIN- Blue Green Infrastructure through social innovation

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Cities across Europe are committed to improving quality of life and working together to protect people, the environment and support sustainable growth. They recognise the need to create resilient, adaptable environment for citizens that are both practical and address future needs.

Practical solutions to demonstrate improved climate change adaptation solutions through blue-green infrastructure (BGI) in urban areas in combination with the mobilization of self-organizing capacity of communities can be implemented together to regenerate and create resilient urban network. Citizen participation as the main driver of the implementation process of climate change adaptation is highly innovative.

Bradford has potential to make quality GBI one of its defining characteristics. Doing so will help our economy to prosper, enable people to enjoy a greater quality of life, and further enhance and utilise our natural capital. Our vision is to expand GBI so that everybody in the District is within easy reach of outstanding and well used network of BGI.

The benefits of BGI go far beyond attractive environment. They include supporting good mental and physical health (e.g. by tackling obesity and diabetes); reducing the frequency and severity of floods; bringing diverse communities together; the economy by regenerating areas of need; providing a home for wildlife; acting on climate change and enriching the quality of lives. BGI adds value to new development, attracts tourism and investment, supports businesses, jobs and training and ensures the resilience of our assets and infrastructure.

BEGIN has successfully brought projects together and enabled council officers to successfully develop detailed projects, measure/evaluate their success and develop innovative ways of involving communities and groups in the design and delivery. This enables partners to really inject GBI into these projects, giving consistent and coherent approach. This has not been apparent in other projects

65 Building Urban Resilience of Public Places in Volos (Greece). Perspectives and possibilities of related contribution of digital tools.

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The proposed article explores the contribution of public places for building urban resilience in Volos (Greece) and investigates the role of digital tools to overcome challenges of urban resilience. This article provides reviews of different approaches to urban resilience and its integration with sustainability targets, where urban resilience is described as a sustainable process, providing capacities for positive change and ability to move forward and improve in response to stresses. The article argues that public places can be considered as useful tools for risk mitigation, emergency response, recovery and adaptation if they have social, economic and environmental capacities. Strengthening social capacity of public spaces and building place capital through inclusive practices contribute to their resilience to face natural disasters and social risks. During an emergency time, public spaces are mainly used as places for shelter, gathering and distribution of services, goods and information. In cases of social crises public spaces shape the relationship between local community and affected social groups.

This article investigates risk mitigation and emergency response practices in urban environment in Volos, identifies physical and social resilience credentials of its public places, and analyses the related institutional framework for disaster prevention and management. It argues that there are deficiencies in disaster management in Volos, and low capacity to adapt to different anticipated and unexpected risks. Consequently, it proposes strategies to increase the adaptive capacity of public spaces in Volos and argues that digital inclusion can reinforce their resilience and facilitate coordination, management, implementation and disseminating of existing risk mitigation and emergency framework (Xenokratris Plan). Within this framework, the study investigates the potential of Blockchain technologies to provide the resilient alternative to the standard IT systems, facilitate a decentralized and more reliable infrastructure of the city and autonomous interactions for public participation, decentralized governance, controlled by local communities.

66 Design for walkable neighbourhoods in Singapore using Form-based Codes

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Walkability is often regarded as a key resilience and liveability indicator for urban neighbourhoods and the city (Robertson and Hachem-Vermette 2017). Singapore often tops the rankings as the most liveable city in Asia, especially due to its easy access to public amenities (The Strait Times 2018). However, active mobility, including walking and cycling, only account for a minority of all ridership in the city (CLC and ULI 2017). This raises two key questions: 1) what factors hinder walkability in Singapore and 2) how can the built environment be improved to promote active mobility.

This study argues that the lack of detailed urban design guidelines impedes the creation of pedestrian-friendly environments, especially for public housing neighbourhoods that form the main urban landscape of Singapore. It then explores the possibility of using Form-based Codes (FBC) to improve walkability for the public housing neighbourhoods. Such codes have been repeatedly proved in the Western cities as an effective design guideline to regulate the built environment and create walkable neighbourhoods (Hansen 2014). However, they have never been applied in the Asian context.

Methodologically, this research first diagnosed main problems pertaining to poor walkability of public housing neighbourhoods based on a comprehensive review of existing studies and site survey. The problems then provide a lens to assess the literature and the best practices of FBC, identifying the strengths and limitations of applying such codes to Singapore's public housing neighbourhoods. On this basis, a framework and key principles for developing new FBC were derived, and new design guidelines were tested using two case studies.

This study for the first time explored applying FBC to high-density tropical cities in Asia. The research findings indicate that the FBC principles and methods for improving neighbourhood walkability are potentially useful for enhancing liveability and resilience of other similar urban environments.

67 From system ecology to urban morphology: towards a theory of urban form resilience

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As cities grow in scale and complexity, the extent to which their urban forms will be able resist, adapt to or co-evolve under unpredictable circumstances and fulfil needs different from those they were originally designed for, may be crucial for the very survival of cities. In this context, the concept of resilience, originated in ecology as a way to deal with change and uncertainty in ecological systems, particularly in its 'evolutionary' interpretation, has gained salience in relation to urban systems where, not unlike in other kinds of complex adaptive systems, change can both be triggered by *external* idiosyncratic shocks and emerge gradually from *internal* processes of self-organisation, and is now considered as pivotal for the design and management of the built environment.

Whilst several authors have tried to build a bridge between resilience thinking and urban design, the role of the morphological structure of cities in enabling or constraining resilient responses has never been addressed systematically and, indeed, evidence that the framework of evolutionary resilience can be extended to the urban form is hardly systematic. To overcome this gap, this article seeks to evidence the link between urban form and resilience theory. This is done by building a parallel between concepts, models and organisational principles developed in system ecology to explain dynamics of change in ecosystems (i.e. *Adaptive Cycles*, *Panarchy*), to analogous models developed independently in the discipline of urban morphology to describe dynamics of change in urban form (i.e. *Burgage Cycle*, *Territorial Development Cycle*, *Urban Form Compositional Hierarchy*). On this basis, a new theoretical model of urban form change grounded on an understanding of urban form as complex system, is formalised, substantiating the application of evolutionary resilience urban form.

68 Measuring the physical profile and use of Park Connector Network in Singapore using deep learning and big data analytics.

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Park Connector Network (PCN) is a system of greenways strategically planned to link parks and open spaces across the entire Singapore (Tan 2006). It functions both as nature corridors that effectively strengthen biodiversity and ecological resilience, and open spaces for people's everyday life that help to enhance community resilience and social sustainability. However, literature on Park Connector Network largely centred on its ecological performance. Little is known about people's daily use of the greenways, and how their activities are related to the physical environment.

This research aims to bridge this knowledge gap using cutting-edge deep learning technologies and big data analytics. First, a three-stage location-tagged video survey with GoPro Hero 5 and Canon 5D was conducted to capture people's use of the PCN throughout the entire network. Their presence was plotted and geo-registered using object detection with a Mask R-CNN model (He *et al.* 2018). And the specific physical, social and recreational activities were identified and inferred using spatio-temporal action localization with models trained on AVA datasets (Gu *et al.* 2018). Second, the physical environment of PCN was assessed at a fine-grained scale using semantic segmentation with a PSPNet model (Zhao *et al.* 2017), which can detect and quantify up to 150 different objects such as sky, trees, buildings, chairs, lampposts, etc., based on a large number of panoramic images of the greenways captured with NCTech iSTAR Camera. A huge database was then constructed that enables in-depth examination of the correlations between environmental qualities and human activities, and identification of the most salient environment features on PCN usage.

These innovative methods for measuring, analysing and evaluating environment-behaviour relations potentially can help to inform decision making in the planning and design of future PCN and other green spaces in Singapore to further enhance its ecological and social resilience.

69 MOVING INTO PERI-URBAN MOSAICS. *Building resilient relationships along the margins: The Green System Plan of Ravenna for a new liveability*

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The ongoing process of urbanization and its expression in intensive land exploitation, fragmentation of natural areas and cycles gave shape to our cities. A renewed centrality of the soil guaranteeing essential functions and services for the local communities' welfare is necessary, particularly in zones of friction and marginality such as urban voids and peri-urban fringes. Bearing in mind the definition of a mosaic where the settlement, the agricultural and the environmental systems interact and coexist together (Kipar, 1994), a formal and functional reconstruction of peri-urban fringes is crucial: they could give back a sense and the identity to the undefined spaces produced by a controversial planning tradition, due to their potential of conversion and transformation. The paper deals with a clarified reciprocity between built environment and open territory, outlining project actions measured to the current challenge – such as climate changes –, setting infrastructural intervention and new energy sources. Focusing on the case study of the Green System Plan of Ravenna (Italy), the attention is given to model planning policies towards design actions able to create physical and ecological connections between the city and the territory. Therefore, the peri-urban fringes become places of experimentation, guaranteeing the interaction between different functional layers and improving the urban resilience: the result is coexistence of the anthropic development with the preservation and implementation of environmental ecosystems, in a systemic and programmatic vision, throughout landscape ecology design approach for a resilient and ecological city. Within this system, the infrastructures would have a renewed role in building miscellaneous geographies between urban and rural areas and on landscapes vulnerability: the defined resilient factors and spaces could be innervated along the main corridors, grafting onto the obsolete and dismissed urban spaces, in an osmotic process and a wider vision of urban metabolism recovering the elements of the city.

70 **Rusty dinosaurs or phoenix from the ashes? Investigating the role of urban utility companies for the resilience of socio-technical energy systems in transition**

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In Europe, socio-technical energy systems in urban areas undergo fundamental changes. First, liberalization changed the pre-existing, stabilized governance structure; second, decarbonization goals and the increasing share of renewables in energy production changed the technological structure and led to decentralization; third, digitalization, recently opens up entirely new technical and managerial opportunities to design decentralized, renewable and diversified urban energy systems. While these fundamental transition processes are providing phaszinating social and technical innovations and new opportunities, the energy system still is a critical infrastructure which needs to remain functional and resilient to provide crucial public services - while undergoing change.

For the social and technical resilience of urban energy systems in federalist states, the so called urban utility companies play a crucial role. These public firms, which are owned by the city, provide the urban system with all public services (energy, water, mobility, waste management) and manage all the critical infrastructures (grids, production sites).

In our contribution, we first present a theoretical concept, to operationalize and analyze resilience of socio-technical systems in transitions. The concept builds on two core attributes of resilience: diversity and connectivity, for which we propose an indicator set encompassing three fundamental diversity properties—variety, balance and disparity—and three basic connectivity properties —average path length, degree centrality and modularity. Subsequently, we apply this concept to the case of urban energy systems and question, which role the urban utility companies play for its social and technical resilience. Thereby, we build not only on our theoretical considerations but also on empirical evidence from large cities in Switzerland and Germany (Geneva, Zürich, Basel, Munich, Cologne and Hannover). In so doing we provide rich insights on urban energy system resilience and self-governance in urban infrastructure management, which can be applied to planning practices and policy making.

71 The Design Politics of Flood Infrastructure in the Age of Resilient Urbanism

Zachary Lamb

MIT Department of Urban Studies and Planning

Many contemporary efforts to address climate change-linked flooding aim to correct the failings of previous heavy-handed infrastructure projects by including a broader range disciplinary expertise, including an increased role for designers. These projects are frequently rooted in concepts of ‘resilient urbanism,’ which prize flexibility and adaptation. Drawing on ecological planning and recent Dutch water planning, these strategies are often labelled with terms like ‘living with water’ and ‘design with nature.’ This paper asks: What are the opportunities, challenges, and dangers of increasing the use of design tools and methods in urban water management and flood infrastructure planning?

The paper presents analysis of recent proposals from two flood prone cities, New Orleans and Dhaka. It supports this analysis with archival research and interviews with participants, experts, and critics involved in these projects.

The paper finds that the tools and methods of design hold promise for improving the process and communication of urban adaptation projects. However, it also finds that the power of design visualization is deeply tied to the specific values and expectations of image producers and consumers, limiting how readily such methods may be transferred between different settings. The research also indicated that design visualization is sometimes used to ignore, obscure, or invoke urgency to bypass conflict, depoliticizing adaptation, evacuating dissent, and silencing non-dominant voices.

This research has critical implications for an emerging area of resilient urban design. To realize the value of urban design in flood adaptation, it is necessary to develop a clearer understanding of how these tools can both enrich and obscure public deliberations. By illuminating the opportunities and challenges of flood infrastructure projects in two cities on the “front lines” of climate adaptation, this paper provides insights regarding the role of urban design in adaptation more broadly.

72 The resilient cycle network. The case study of Montesilvano

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In recent years, in Montesilvano, the frequency of urban flooding resulting from extreme weather events is increasing. This is the reason why the Research Convention between the Department of Architecture of Pescara and the Municipality of Montesilvano wants to verify if the cycle networks can help solve this problem. Legislation, guidelines and good practices do not provide useful information because their priority is the realization of the greatest number of kilometres of cycle paths where safety, functionality of the route and intermodality are guaranteed.

To find operational references, it is necessary to consider plans to combat climate changes that include the integration of the relationship between cycling networks and rainwater management. As it happens in:

- Plan Melbourne (2017/2050) with the La Trobe Street bicycle lane
- Philadelphia Citywide Vision (2011/2050) with the Green Street Design Manual
- Copenhagen Climate Adaptation Plan (2011/2025) with The Copenhagenize Current -Stormwater Management and Cycle Tracks

The comparison shows that the relationship between cycling networks and rainwater management can contribute to urban resilience if the project involves at least three main actions: get out of the logic of the sector, work on the space of the network and on its associated space and give importance to the relationship with the context.

In Montesilvano, within the two north-south parallel roads (Strada parco and Lungomare) and the five perpendicular east-west (Great hotels, via Strasburgo, via Marinelli, via Torrente Piomba, Palaroma), it is necessary to identify where it is possible to plan a cycle network which is not only an infrastructure for slow mobility but also an equipment that contributes to urban resilience.

73 Urban Form Resilience: From Theory to Implementation

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In 2015, the United Nations set 17 Sustainable Development Goals (SDG). Of these, Goal 11 is about making cities “*Inclusive, Safe, Resilient and Sustainable*” and stresses the importance of adopting and implementing integrated policies in support of urban resilience. This theme was further reinforced by the New Urban Agenda (2017) which calls cities to “*build resilience and responsiveness to natural and man-made hazards, and foster mitigation and adaptation to climate change*” (United Nations, 2017: 7), also recognizing how “*urban form, infrastructure, and building design are among the greatest drivers of cost and resource efficiencies, through the benefits of economy of scale and agglomeration*” (ibid. p: 4).

Whilst these documents attest the global recognition of the importance of the design of urban form in pursuing more sustainable development trajectories, the concept of resilience in the vocabulary of urban designers remains little more than a buzzword. Indeed, today, urban resilience remains still largely approached from an ecological-environmental perspective, that fails to integrate consolidated theoretical knowledge, methods and practices typical of the urban design area of research and pays little attention to the morphological structure of cities which, in turn, is highly relevant to urban designers. This is a major impediment for urban designers and resilience scholars to unleash the full potential of SDG 11.

To overcome this limitation, this panel tackles the link between urban form and resilience from different perspectives, addressing the meaning and implications of “*urban form resilience*”, from theory to implementation. During this panel, theoretical work on the application of the framework of evolutionary resilience to urban form will be presented along with several contributions focusing on the link between urban form resilience, urban design practice and economic value of places, in relation to the guidelines for action set by the New Urban Agenda.

74 BEGIN: Blue Green Infrastructure through Social Innovation

Sebastiaan van Herk

UNESCO-IHE & TU Delft in Climate Adaptation & Flood Risk Management

Blue-Green Infrastructure (BGI) (i.e. green corridors and raingardens) is one of the most promising solutions for increasing urban resilience (Ghofrani, 2017). BGI can achieve flood-reducing performance of 30% by connecting hydrological functions with urban nature (green) and water (blue). BGI is especially promising because of its multiple benefits such as improved liveability of cities, increased biodiversity, carbon sequestration, heat reduction and water purification. Despite numerous benefits, wide scale implementation of BGI is hampered due to financial and governance barriers. BGI projects have higher upfront costs, benefits from BGI are dispersed and hard to monetise and consolidating long term citizen buy-in is challenging. Making the business case for BGI is essential to overcome these challenges. This includes using tools to generate monetary valuations of BGI (i.e. TEEB, BEST) and crafting a carefully designed brand and specific communication messages for different audiences. Strategically framing and presenting the relevant benefits for specific stakeholders is key in successfully pitching BGI.

BEGIN is a European collaborative project that brings together 10 cities (Antwerp, Ghent, Aberdeen, London Enfield, Bradford, Kent, Dordrecht, Hamburg, Gothenburg, Bergen) with 6 leading research institutes (CIRIA, UNESCO-IHE, University of Sheffield, TUHH, Royal College of Arts and Erasmus University), which are frontrunners on the project's thematic areas. BEGIN focuses on overcoming implementation barriers to BGI via Social Innovation (SI) and city to city learning. SI empowers multiple stakeholders to contribute (in kind, funds) to the design, construction and maintenance of BGIs. Transnational collaboration within BEGIN is done via a unique transnational city-to-city learning exchange programme with transnational expert teams that facilitate joint implementation of BGI projects.

The panel relates to the topics Climate Resilience Governance and Planning and Community Resilience by sharing expertise and lessons-learned within BEGIN on BGI, SI, city to city learning and overcoming implementation barriers related to BGI.

75 Creative partnerships for emergency solar charging stations

Beth Ferguson

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Creative partnerships that meld solar energy with place making and design thinking are yielding adaptive solutions for resilient cities. How can we train and empower youth to become active participants in a broad network of climate change innovators? Learn how design and engineering students have worked together on collaborative campus solar charging station projects with environmental sensors at the University of California Davis, Stanford University, and the University of Texas at Austin. The presenter will share lessons from her work using renewable energy education in university and community settings over the last ten years. Her collaborative campus solar charging station projects offered students and community members the opportunity to gather in the shade while recharging their laptops, phones and electric bicycles via standard electrical outlets. The stations have 2-4 solar panels (500-1000 watts) and a 1000-watt inverter, they provided a WiFi workstation for four people and solar laboratory for students during the day. Batteries extend the charging capacity on cloudy days and into the night with vibrant LED lighting, and data loggers track station use. Student researchers have assessed the impacts of multiple solar charging stations, including intensity of station and shared vehicle use, travel patterns, and modes and trip types being replaced with two-wheeled electric mobility. This integrative project represents innovations in mobility, charging station design, and solar energy. Learn how you can incorporate solar design curriculum and skills to foster public awareness of renewable energy through hands on learning for a variety of audiences and outcomes. We will examine how the design process enacts a community mindset – a combination of problem solving and creative thinking that engages participants from different disciplines.

76 Deconstructing urban flood resilience building: toward a tentative observation framework

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Flood risk is a significant challenge for cities across Europe. Policies and management schemes developed to support risk reduction and to enhance preparedness increasingly refer to urban resilience, defining it as an inherently positive guiding principle. Limited attention, however, is paid to the mechanisms through which this resilience is (possibly) built and co-produced in practice by actors embedded in more or less formalised relational networks.

The paper presents the preliminary results of a review of activities carried out in selected European cities that have been recently affected by flood events. This exploratory mapping exercise aims at inductively identifying relevant governance and knowledge-related dynamics that affect the capacity of local actors to (co-)design and implement context-aware risk reduction strategies and measures.

Through the review of post-flood reorganisation strategies, measures, and practices, this explorative analysis identifies institutional, political and organizational factors that trigger or hinder the ability of cities (and citizens) to resist, respond and reorganise in order to reduce risk, support governance innovation and enhance social and institutional capacity building in the contexts observed. Results are discussed to identify dimensions that may support the analysis of urban resilience building to floods also in different contexts.

This paper, therefore, provides a methodological contribution to the urban resilience debate by laying the ground for the development of an observation framework to be used to support a situated understanding of barriers/enablers that affect the capacity of social and institutional actors to learn, decide and act in the face of wicked risk-related problems. Also, it provides insights into the policy debate on urban resilience, questioning the appropriateness of procedural approaches based on scientific and institutional panaceas.

77 Disaster Resilient Residential Planning through the Integration of Humanitarian Charter and Minimum Standards in Disaster Response to the Economic and Socialized Housing Project Standards in the Philippines

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The rapid rate of urbanization is concentrated in megacities worldwide. The increase of urban population consequently requires an increasing demand in basic human needs, such as food security, adequate shelter, and the attainment of good quality of life. In addition, megacities face the challenge to provide infrastructure development, including socialized housing that integrates the concepts of sustainability and resilience into the built environment.

The resilience concept in the built environment in relation to the disaster risk management cycle highlights the importance of adaptability and resilience as integral components of planning and design of buildings. By examining the fundamental components of the International Humanitarian Charter and Minimum Standards in Disaster Response vis-a-vis the fundamental components of the Socialized and Economic Housing Project Standards in the Philippines, and by looking at components of the two standards, this paper aims to synthesize essential components that are complementary to the disaster risk management cycle. Furthermore, this paper aims to integrate components of urban resilience as recommendation in creating sustainable and disaster resilient housing standards for the future.

To make future housing projects adaptive to future needs in times of disasters, incorporation of necessary standards in humanitarian charter and disaster response would lead to a better development of communities worldwide. Making future socialized housing projects that incorporates adaptability and social inclusivity will not only address urban development problems but will also contribute to the transformation of sustainable and resilient communities. Designing spaces that are flexible and adaptive, while integrating a socially-inclusive design process will enable physical development professionals achieve social sustainability and strengthen disaster resiliency. Putting resilience components and the core principles of recovery, rapidity, robustness, and resourcefulness into future built infrastructure would enable a better integration of resilience theories into practice and real-life application.

78 **Disturbances – Early detection as a prerequisite for resilience**

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Every city represents a storehouse of memories. At the same time today's cities are dynamic systems characterized by constant change. Technical and architectural structures of different scales that are approaching the end of their utilization cycles must be identified and reviewed. My paper will propose to extend the term resilience as the early detection of spatial or functional disturbances within the cities infrastructure followed by a strategy for maintaining the state or use of the building or structure. Using the example of our architectural practice for a conversion of a former thermal power station in Munich, I will present how a revision of the conventional assessment strategy resulted in a transformation of an obsolete piece of technical infrastructure again into a dynamic architectural and social system. Since then we have been searching for methods to identify similar potential in obsolete pieces of infrastructure and to react on disruptions in the urban environment. In the end architects – using their expertise – could turn into early detectors to identify these disruptions and by that give new meaning to the whole profession that has reached a turning point in constantly creating the “new” - while often wasting resources, materials and labour force. Instead of reacting on questions of fashion, style and floor area, architects may convince their clients to reshape the cities of tomorrow by puncturing the urban environment where its needed. That is the new “new”: parallel to the usual planning from scratch on whiteboards we must take into account the potential of the cities obsolete infrastructure and transform it into useful architecture to avoid areas of decay. For this is how resilience becomes possible: As the ability of a system to react to disruptions, to use them to renew itself, without changing its core.

79 From rhetoric to practice: getting to new governance forms for urban blue-green infrastructures

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Grey infrastructures in cities are increasingly considered inadequate for coping with the impacts of climate change. Blue-green infrastructures (i.e. permeable paving) are proposed in order to make cities more resilient. Whereas grey infrastructures typically have a mono-functional aim (i.e. ensuring water discharge), blue-green infrastructures are multifunctional and can serve a wide range of additional purposes, related to for example ecology and recreation. This multifunctionality calls for innovative forms of governance, in which citizens, companies and public governments co-produce. These new governance forms can be considered examples of "social innovations", with new relationships and responsibilities between state and non-state actors. Public governments play a crucial role in fostering social innovations, as they have to be able to reframe their governance modes in order to become more resilient. However, to date, public governments struggle with this, which hinders the delivery of these much-needed infrastructures. Consequently, we postulate that urban resilience highly depends on the governance capacity of public governments to develop a governance system that fosters social innovation.

This paper presents a framework for analysing how social innovations come about in the context of delivering urban blue-green infrastructures: how do public governments organise and facilitate new forms of governance for co-producing blue-green infrastructures? We analyse this in ten case studies from six different European countries, combining questionnaires, in-depth interviews and field visits. Our preliminary findings demonstrate an "implementation gap" between what is being said on paper and what can be seen in practice. Although public officials indicated to be welcoming to allocating responsibilities to citizens, in practice public governments remain risk-averse and want to remain in charge. We conclude that the resilience of urban systems is hindered by public governments, because they adhere to more traditional styles of public management.

80 Guayaquil: critical analysis of its approaches towards urban resilience

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Guayaquil, the most populated city of Ecuador, evidences the urban dynamics that have determined the urban development of the region. In its fragmented urban landscape, inequalities, social fragmentation and environmental degradation configure simultaneously formal and informal territories of self-exclusion, spatial segregation and ecological risk. In the context of these socio-environmental vulnerabilities, it becomes necessary to position urban design practices in relation to socio ecological resilience frameworks to develop guidelines for spatial intervention.

At a global scale, discourses dealing with urban vulnerabilities have positioned urban resilience as a desirable goal and a strategic topic for governments and planners, often focusing the implementation of top down approaches aiming to cope with the impacts of climate change and natural disasters. Leaving aside the socio-spatial dimension of the urban environments and a wide range of other vulnerabilities, plans and policies have not completely incorporated the complexity of the interplay of natural, human and spatial systems. Furthermore, only few of them have explicitly made reference to urban design, operative at the intermediate scale.

Similarly, in Guayaquil, emerging concerns about the consequences of climate change have led to the development of adaptation and resilience-based strategies focusing on risk mitigation measures. The aim of this paper is to present a critical review of the approaches on the formulation of these strategies and programs. Through the review of urban resilience definitions and urban design literature in relation to resilience principles, the analysis assesses the conceptual and normative aspects behind the institutional responses for areas in the vulnerable urban edges of the city and also presents the challenges and opportunities to operationalize urban resilience through urban design.

81 How can the concept of resilience be applied to housing market problems?

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The emergence of urban housing crises and responses by local authorities represent a complex, dynamic process involving various drivers. Among these drivers, demographic change (e.g. population growth or shrinkage) is a slow-burning but prominent catalyst to urban housing markets. As population shifts are hardly predictable, especially at the local level, they can be considered as a shock to a city's inert housing supply. While the resilience of social-ecological systems seems to be a well-developed approach in research related to urban resilience, community resilience and regional economic resilience, few attempts have been made to apply this approach explicitly to housing market problems. Yet, policy makers already employ the notion of "resilient housing policy", though its theoretical and empirical essentials remain unclear.

In order to conduct empirical research on the conditions of transforming housing markets and policy from a resilience perspective, we seek to analyze existent resilience frameworks and indicator sets which already include housing aspects or can be linked to this issue. Some useful indicators can be drawn from these frameworks, while others are considered inappropriate for understanding resilience in housing policy from an evolutionary perspective. The structural potential, institutional capabilities as well as the interlacing of civic sector, public sector and private market actors have to be studied thoroughly. Proceeding from these basics, we present a preliminary set of factors that could promote housing market resilience in regard to demographic shocks. The overall aim is to provide a framework for a qualitative case study on housing policy in the city of Leipzig. Leipzig has seen extreme demographic changes over the past 30 years: urban shrinkage and severe housing vacancy, as well as unexpected rapid growth leading to a constricted housing market today.

Besides the theoretic proposal, we can provide first-hand insights from the ongoing empirical study.

82 Implementing the New Urban Agenda: a platform of Sustainable Urban Design Interventions (IDUS) in Latin America and the Caribbean (LAC)

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With the aim of supporting the implementation of the NUA agreed at Habitat III, the Network of Sustainable Urban Development for Latin America and the Caribbean, REDEUS_LAC, aimed at selecting, disseminating and, where possible, monitoring Sustainable Urban Design Interventions (IDUS, for its acronym in Spanish) in the LAC Region. Aware of the complexity of determining the sustainability of urban interventions of different scale and scope, an international group of fifteen members of REDEUS_LAC with different experience -academics from social areas, urban planners, architects, economists, together with professionals from public and private sector organizations- have devised a peer review and evaluation system.

The design of such a system involved discussing both the traditional definitions of the term 'sustainable development' as well as the 'resilience' perspective to urban space. The consensual decision was to consider four dimensions –socio cultural, environmental, governance and economic– which were subsequently operationalized in 17 attributes. A rubric was designed considering that each blind evaluator qualifies them by awarding points and stars by dimension. Thus, a digital IDUS platform with two or more stars is built. This also considers the possibility that, later, comments and opinions regarding the subsequent sustainability of the work will be added, enriching the state of the art and promoting open and informed debate to all the sectors involved in the construction of the city.

The proposed article describes the sustainability evaluation system: the data matrix to post IDUS on the platform, the rubric, and the categorizations/typologies of IDUS determined up to now. Finally, as an example, three cases are presented according to their scale and type with their respective evaluations: one 'local replicable' IDUS, another 'city unique', and finally a 'metropolitan/regional strategy' IDUS implemented in LAC.

83 It Takes A Micro-Village: A new understanding of the relationship between Socio-spatial Infrastructure and Equitable Resilience

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Humanity's societal values and priorities are reflected in the spatial organization of the environments we create and occupy. In the United States, *laissez-faire* capitalism has shaped not only society's economic, political, and social infrastructure, but also the spatial infrastructure of the nation. As a result, American societal infrastructure has concentrated decision-making power within an oligarchical minority, systemically privileging those who embody the 'idealized' archetype of the capitalist, white, patriarchal, nuclear family propagated by 'the American Dream', and disadvantaging those who do not. **This has inhibited resilience and perpetuated vulnerability by limiting diversity, and restricting bottom-up access to decision-making and autonomy.** While alternative spatial and interpersonal arrangements such as communal living, co-parenting, and transitional villages are currently utilized by an unconventional minority as tactics of adaptive resilience, alternative living environments are not readily accessible to the general public. Instead, single-family homes and apartments dominate housing options, severely limiting diversity, and hindering resilience. It is imperative to understand how the organization of our spatial environments impacts equitable access to the fulfilment of human needs. Subsequently, this research proposes to reconceive our multi-scalar comprehension of spatial ecosystems as Micro-Villages, Macro-Villages, and Multi-Villages. To this end, this investigation seeks to identify a diversity of infrastructures and pipelines which can effectively facilitate equitable access to the ecosystem of human rights through a critical analysis of case studies and secondary sources. However, a crucial obstacle in challenging the systemic inequity imbued in American infrastructure and effectively transitioning to resilient spatial organizations is cultural mentality. To deconstruct this sociological barrier, this exploration aims to develop and test a diagramming technique through a series of semi-structured interviews, in an effort to promote a new cultural understanding of the relationship between our socio-spatial infrastructure, human rights, and societal resilience.

84 On smart cities, sustainability and resilience: understanding the digital city revolution

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This talk revolves around critical perspectives on the smart city digitalization and its repercussions for a resilient urban society. The talk will deal with issues regarding who will benefit from implementing the smart city model and the talk will also cover how the smart city model may interact with transformations of human behavior linked to both climate mitigation and to the resilience of intertwined infrastructure-Internet systems of the smart city whilst global warming. While applying a critical perspective, I plan also to address the potentials that may open up by the digital city revolution. For instance, it is already a fast development of using smart technologies as new planning practices and simultaneously as novel research methods. For instance, 'citizens as sensors approaches' are now being developed rapidly. The talk will cover both what kind of new understanding of urban sustainability and resilience such technologies may bring as well as its ethical implications, including environmental justice perspectives, and how smart city technologies may affect social health and human-nature connections

85 Reframing Urban and Transport Planning: High Stakes for Our Health

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In the Anthropocene age, human activity will determine the course of the planet, and most of this activity will occur in cities. Public health concerns formed the foundation urban planning. In the 21st century, the disciplines drifted apart, leaving a legacy of environments and exposures detrimental to people and the planet. Current global urbanization offers an unprecedented opportunity to rethink the way we design and live in cities. Including health transversally to reframe urban resilience is critical to achieve SDG11.

Methods: Health evidence often fails to reach those responsible for planning, and is poorly integrated into many urban platforms. In response, ISGlobal created the Urban Planning, Environment and Health Initiative (UPEH). UPEH offers an organizational model to generate impact in policy and society through research. Using Barcelona as a case study, we explore how evidence can be translated to promote healthy urban environments.

Results: The UPEH strategy works with government agencies in Barcelona to bridge gaps between theory and practice by: building technical capacity, creating transdisciplinary communities, engaging with urban and transport planning sector partners and translational events and media. Over the past two years, UPEH has developed collaborations with five government agencies. We are conducting health impact assessments of interventions such as the Superblock, evaluating local environmental exposures, offering trainings and creating tools to bring health criteria into urban and transport planning processes and policy (i.e. PMUs). Challenges identified include: aligning political and research cycles, breaking down silos, creating value for translational work within academia and understanding governance mechanisms and the influence of acquired rights such as private motorized transport.

Conclusions: Urban and transport planning are fundamental public health interventions. Health evidence can be used to create paradigm shifts and policy change. Novel approaches such as citizen science and health impact assessments are key to addressing challenges.

86 Resignification of degraded public spaces in Guanajuato and in Bordeaux: citizen reappropriation in the frame of intensive workshops developed by the University of Guanajuato (UG) and the superior national school of architecture and landscape of Bordeaux (ensapBx)

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The intensive workshops Bordeaux - Guanajuato have been developed since 2015 by mixed teams of students of ensapBx and the architecture, art and design division of the UG. Beyond the interest of constituting a cross-cultural project experience for students from different continents, these workshops involve diverse actors concerned in issues of the citizen's agenda since they are articulated with the existing international cooperation agreement between the local governments to which belong the two universities. These workshops, two per year, take place alternately in the State of Guanajuato and in the metropolis of Bordeaux, working on different types of obsolete spaces. This is the case of the public spaces of intermediate cities currently not recognized by the population as spaces of the community, despite being part of their built heritage, or of the natural spaces located in the heart of small cities practically ignored by the population whose recent developments turn their backs on them. In these workshops the urban project is conceived not only as a large-scale design action but as a trigger to contribute to the change of the perception that the inhabitants have about their public spaces in disuse and contribute to a resignification and appropriation of them as elements of identity and reinforcement of community ties. The concept of resilience appears here as the capacity that an obsolete territory offers to generate strong social bonds thanks to a joint action of spatial conception that associates universities, institutional actors and inhabitants.

87 Resilience and mobility demand. Towards a redefinition of urban polycentricity. Madrid Urban Area analysis, 1996-2004-2014

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In the current context of resource scarcity, urban resilience should be related to the reduction of fossil fuels and mobility demand. Thus, urban areas should increase their capacity to meet population's needs (employment, retail...) in closer proximity.

Both scholars and European institutions have developed the concept of "urban polycentricity" over the last decades. "Polycentricity" is commonly related to the balance of incoming mobility flows between different parts of urban areas. Less attention has been given to these flows distances and mobility requirements.

Thus, "polycentricity" can be redefined from the perspective of resilience. "Polycentricity for resilience" should be based on a higher proportion of short-distance flows (such as internal trips in districts or municipalities) within the urban area functional structure. Urban planning and policies should integrate this perspective to reduce mobility demand in urban areas.

The present research aims to analyze the evolution of Madrid Urban Area in recent decades according to the above-mentioned definition of "polycentricity for resilience". The source has been the Madrid Regional Travel Survey data for 1996, 2004 and 2014. The period under study represents the last phase of Madrid Urban Area configuration, which has grown from 4,8 to 6 million inhabitants between 1996 and 2014.

From these data, districts or municipalities functioning as "centers" or "subcenters" have been identified according to indicators as average distance covered, total mobility flows attracted, or internal travels generated. The evolution of Madrid Urban Area functional structure in last decades has been assessed from the perspective of resilience. Successful and unsuccessful planning strategies have been identified, in order to define the main challenges to achieve more resilient and close proximity-based urban areas in the near future.

88 Uneven (green) landscapes of resilience and protection: Climate gentrification in urban climate adaptation

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As resilience strategies have become a prominent orthodoxy in city planning, green infrastructure (GI) is much heralded as a win-win solution for enhanced social-ecological protection from climate risks and impacts. In this paper, we aim to understand whether “green” and “resilient” interventions protect and secure social groups traditionally most at risk of climate impacts and/or least able to adapt to them – or, if they result in maladaptive and inequitable outcomes (i.e., displacement or climate gentrification). Neighbourhoods with a higher proportion of lower-income and minority residents have already shown trends of gentrification when benefiting from new green amenities – a process known as green gentrification – but much remains to be understood about the role of resilience, or climate adapted GI, in climate gentrification. Philadelphia, USA, a forerunner and model city in the implementation of green stormwater infrastructure, is used as a case study to examine resilience in relation to urban systems of neighbourhood change and historic conditions of uneven development through processes of dis-/re-investment, suburbanization and re-urbanization. Our study uses a quantitative and spatial analytical approach to identify *sites of omission* and *sites of commission* in GI plans and interventions, assessing overlapping landscapes of GI, social and ecological vulnerability. Next, we empirically test possible pathways involved in climate gentrification, and further assess differential levels of vulnerability to gentrification. Our findings point to an association between change in poverty levels and racial composition of census tracts in relation to areas of higher concentrations of climate-adapted GI. The paper contributes to reframing resilience research and practices to integrate a deeper understanding of social-ecological insecurities and inequities than currently considered in urban climate adaptation planning. The blog references additional cases where green and resilient infrastructure in the US, Canada and Europe may generate similar outcomes.

89 Urban Choreographies: Bangkok Cases, Catalysts and Qualities

Sonja Berthold

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This paper describes the catalysts, strategies and tactics of Bangkok's urban transformation. It links the essence of Bangkok's historic economic development in relation to the city's urbanisation and offers a framework for understanding the urban spatial productions of resilience in rapidly transforming and developing political economies of Southeast Asia. The concept of Urban Choreographies localises resilient Siamese urban development practises of selected inner-city neighbourhoods in the larger body of contemporary urban transformation theories. Addressing adaptive reuse and renewal, creative production and consumerism, it invites the reader to rethink urban qualities and spatial production less according to a building's size and programmes (scale) but rather in terms of its experience over time (urban intensities). Supported by interviews, photographic documentation and cartography, this paper offers a balance of personal narratives, spatial theory, economic history and the singularity of urban change. Learning from this study, the reader can derive and further develop site-specific quality criteria and strategic urban planning frameworks for rapidly evolving urban planning conditions.

90 Urban Fabric and Socioeconomic Resilience: Real Estate Properties, Governance and Socioeconomic Activities

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In the recent context of global development, the social and economic structures of cities are expected to have dramatic changes. A city with strong socioeconomic resilience capacity will be better transforming in these changes. For socioeconomic resilience, this study will focus on socioeconomic inclusiveness for building public good, which refers to the diversity of economic activities and the facilitation of social relationship.

In the field of planning and design, studying relationship between public space and public life is a popular approach to understand urban space and socioeconomic activities for enhancing urban capacity and improving quality of living. After the prevalence of rational urban planning, some researches and designers believe that physical environment is the chief culprit of lifeless public life. Consequently, they considered that small scale traditional urban fabric is more resilient than large scale modern urban fabric.

However, the study in Singapore reveals that physical environment may not principally determine socioeconomic life. In the observations of shopping malls, shopping streets and shopping complexes, even if sites share similar urban fabric, different modes of governance of capital, plots and buildings significantly affect the socioeconomic activities taking place on these sites. In this discourse, governance refers to ownership, operation and management of real estate properties. It could be conducted by owners such as individual, family, company, Real Estate Investment Trust, cooperative, government and so on. It is believed that the owners are determining the mode of governance and shaping urban fabric.

The paper will reveal, except for physical environment, how governance of real estate properties impacts the socioeconomic resilience of city. This will shed light on policy decision making and urban planning for governing and building a more socioeconomic resilient city.

91 Urban form Resilience Urban Design Practice: Masterplanning for Change

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The idea of cities as complex systems in constant adaptive change is finally engaging urban thinking. However, we are still far from having this idea guide practice. UN-Habitat recognised this challenge in the *“New Urban Agenda”*, establishing the link between configuration of places and their performance in terms of prosperity, inclusiveness and equality, and environmental sustainability. However, we lag behind in understanding how urban places work from a resilience perspective, and urban planning and design are not ready to give directions for successful place-making, and design beautiful places that work for people, the environment and the economy.

The need for ideas to repair the hiatus generated in the past generation of planning ideology is growing: something practical and yet advanced enough to embrace this unique challenge. In this work we propose that designing urban places that work for all should be pursued under the new framework of spatial resilience, interpreted as a preliminary condition to sustainability, where urban form is understood as a complex adaptive system per se.

On these basis, we re-frame place-making under the new light of resilience and introduce an innovative approach to place-making here defined as “masterplanning for change” which, learning from the very same rules that drove the development of adaptive and successful places in history to date, calls for an urban design practice that designs places much less and much better, with implications for policy-making. Far from an ideological manifesto, our approach is: 1) evidenced based: having learned to identify the recurrent successes of resilience from the observation of cities in history up to our days, it uses them to design the city of the future. 2) practical: it advocates a reformed process of place-making, and provides the tools to deliver it, making it an essential reference for designers and policy-makers.

92 Urban resilience in Spanish legislative and regulatory framework

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Nowadays, urban resilience is a broadly mentioned concept, both in scientific literature and in official documents regarding the challenges of current society. This concept will be key for the future of urban areas. However, to implement consistent and integrated policies using resilience, an inclusive perspective of the concept needs to be embedded in the regulatory framework. Therefore, the aim of this research is assessing to which extent the transposition of the concept includes an integrated approach in Spanish legal framework.

This research undertook the following analyses:

- Identifying the reference framework documents within Spanish, European and international documents related to sustainable urban development where “urban resilience” or “resilient cities” are mentioned as core concepts.
- Conducting a systematic data collection of the Spanish legal framework looking for texts which explicitly mention either “resilience”, “resilient(s)” or any of the reference framework documents.
- Identifying the importance given to resilience in the legal framework, evaluating how deeply resilience is considered and assessing its use as a tool to integrate different sustainable policies.

As the results show, resilience is mostly used to address climate change and natural hazards without including references to other aspects and, when doing so, it does it in a fragmentary manner. The documents analyzed consider neither a formal definition nor the possible negative trade-offs and fail to fully integrate all the aspects of resilience as a strategy for sustainable development. The final considerations provide a few guidelines to policy decision-makers, such as including an official definition of the concept, providing funds for plans and programs which include resilience as a core strategy and implement resilience policies throughout an interdisciplinary approach that include the analysis of the consequences. This research could have the potential to be transferred to other international contexts.

93 Urban waterways in Bangkok - A spatial resilience approach towards a more amphibiously-sustainable living space

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Deltacities, especially in Southeast-Asia are increasingly challenged concerning the resilience of their water-infrastructure towards extremes of drought and/or flooding. These challenges have been tried to tackle by hydraulic engineering infrastructure (dams, walls, pumps, gates), leading to lock-in situations concerning upcoming challenges in several decades caused by continuing ground-subsidence and sea-level rise. The existence of dams and flood-walls lead to a felt safety, yet reduces resilience of the inhabitants to possible leakages, floodings and problems related to the safety-level that once has been applied to the built form of the infrastructure. Yet, infrastructure, such as urban waterways, are multidimensional and multiscale embedded into the urban fabric. Therefore the resilience of water-infrastructure needs to be reframed and combined with that of the urban form and of the inhabitants themselves to address several SDGs. By analysing the built form adjacent to waterways in Bangkok, this approach tries to extract properties of urban morphology qualitatively. This will be done with GIS mapping tools, analysis of architectural components, (such as relative height of ground floor, adaptability of floorplans), expert interviews and a categorization of morphological properties, such as typology, topology, modularity, diversity and capacity. Applying properties of spatial resilience (like from GS Cumming) into the understanding of urban morphology leads to a matching in properties. In connection with the institutional and the regulatory framework and including the socio-spatial sphere of the inhabitants, the spatial resilience approach can reframe sectoral urban resilience strategies towards an intersectoral, multidimensional and multiscale decision support tool for integrated amphibious urban design.

This tool would need to be adjusted in each location, but may help to basically overcome single perspectives.

94 Water sensitive urban design: Addressing flooding resilience in Ho Chi Minh City

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Events related to water systems such as flooding are often evident consequences of inadequate land use and changes in climate that are altering the natural water cycle and are already compromising human health and amenity for urban dwellers. Hereby, transitions to more sustainable ways of water management have been recognized as urgent shifts to achieve necessary resilience in cities. Current discussions point out that approaches that integrate water management into urban development and urban design such as Water sensitive urban design (WSUD) are powerful strategies to support the sustainability of cities. They have the potential to ensure water resilience and also to improve quality of life in urban areas. Due to insufficient planning practices and policies to protect permeable areas and natural resources, Ho Chi Minh City in Vietnam (HCMC) becomes one of the ten top cities worldwide with higher risks for population and infrastructure over flooding events (World bank, 2010). Great part of the city suffers frequent flooding events and severe disruption on built infrastructure and people's wellbeing (Storch et.al. 2002). It shows the urgency in developing integrated planning strategies and policies that are robust enough to protect the city against flooding risks and improve quality of life in urban areas. The central question that this research aims to investigate is in how far more integrative approaches in water management have the potential to address uncertainty regarding flood risks in HCMC while at the same time, improve quality of life in the urban area. This study is applied to a housing settlement in HCMC and evaluates morphological data by qualitative methods combined with quantitative assessments of flood extends. The expected outcome is to orient the city to adopt more integrative planning practices and policy recommendation for land use control based on water sensitive urban design (WSUD) indicators.

95 [Eco]systems of resilience practices: a reframing from the Experience of Italian Resilience Practices Observatory

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Over time, an increasing number of institutions, both public and private bodies, are investing in resilience of communities and territories, supporting local based practices and actions. Launched in April 2015 and promoted by a partnership between Academic institutions (Politecnico di Milano as coordinator) and the REsilienceLAB association and funded by Fondazione Cariplo (Italian bank foundation), the Resilience Practices Observatory (RPO) takes as its overall strategic objective the enhancement of territorial resilience through the strengthening of resilience practices. This mainly by a integrated and incremental assets of activities including: collection and interpretation of practices; coproduction/co-designing activities, reframing activities for innovation in methods, tools and design criteria; capacity building and dissemination activities from a cultural and methodological perspective.

Inside the RPO activities, a specific working space has been devoted to three crosscutting issues (governance, knowledge co-production and economy) that are crucial in enhancing the feasibility and the stabilization of resilience practices and in contributing to social and territorial resilience in the long-run.

The essay first offers a brief introduction to the RPO working experience (engaging more than 100 practices), which, in these three years, based on a strong interdisciplinary and collaborative approach, proved to be successful and able to highlight strengths and weaknesses of the resilience implementation from the operational perspective and to envisage innovative tools to be applied in a new generation of multipurpose projects.

Then, a specific focus on the three crosscutting issues will be introduced, highlighting main conceptual reframings and toolboxes developed. In the final part of the essay, reframing frameworks, methodological and operational factors will hence be discussed (in particular on the concept of ecosystems of resilience practices), in order to highlight emerging trajectories for the improvement of resilience practices and policies to guarantee systemic and synergic benefits in resilience capabilities enhancement of complex territorial systems.

96 Participation as a tool for building resilience in children and young people in disaster situations

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Disasters are becoming increasingly common and complex, not just because of their causes, normally a complex combination of natural, social and cultural factors, but also because of the quantity and diversity of players and strategies that must be involved and coordinated in order to cope with them. To this must be added the diversity of reactions and behaviours by the populations affected by the disaster (driven by social class, age, gender, race, etc.) and the effect that disasters have on the culture(s) of the various groups affected. However, legal frameworks and emergency plans tend to homogenize the population and overlook the distinctive features of the various groups and individuals affected. This is particularly so in the case of children and young people. They are one of the most severely affected groups in a disaster situation and, in part, this is because their voice and agency are systematically ignored. This paper will provide arguments for a transformation in children's roles in disaster, evidence for the effectiveness of their input into decision-making and some practical steps (a framework) to assist policy makers and practitioners create more participatory and child centred ways of working in disasters. Drawing on our work in the project CUIDAR: Cultures of Disaster Resilience Among Children and Young People, funded by the EU H2020 Secure Societies Programme, 2015 – 2018, we will show how such policy change benefits at risk communities as a whole.

97 Resilience thinking transforming urban governance: The case of Thessaloniki, Greece

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Any initiative for building resilience is only as successful as the underlying governance; hence, resilience policies should not be characterised *de-facto* as beneficial but rather aim at restructuring urban governance and breaking operational silos in advance of physical planning implementation.

In 2014, Thessaloniki became a member of the 100 Resilient Cities network. This project was the first manifestation of resilience policies in Greece signifying a new era in the national local governance. The Resilience Office has transformed the way city is operating, particularly by representing a point of reference for several public authorities and private stakeholders not adequately communicating in the past.

Changes in the delivery of urban governance go along with the principles of urban resilience, thus transforming communication methods and facilitating decision-making through the wide participation of local communities. Along these lines, local authorities in Thessaloniki have started to consider the local community not only as a recipient but also as a designer of urban policies. Thessaloniki's Resilience Strategy is attempting to move away from traditional top-down nationally-driven policy-making towards integrated local place-making, by encouraging citizens and local communities to actively participate in co-designing place-based projects. This fundamental shift in conceptualising urban governance as a holistic process not exclusively delivered by the local government, but rather administered by it, emphasises on 'responsibilising' a wider spectrum of individuals and organisations and is currently transforming the way the city is operating.

The values of resilience thinking are transforming urban governance by facilitating horizontal coordination of actions and mobilising the local community in the design and implementation of urban projects. The city of Thessaloniki is a notable example of this phenomenon as of resilience has functioned both as a conceptual framework and as an incentive for urban stakeholders to reorganise the traditional governance apparatus and break operational silos.

98 Community led infrastructure upgrading in informal settlements in Manila: communities defining climate resilience for themselves

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According to the United Nations (2017) “Already in 2014, 30 per cent of the urban population lived in slum-like conditions”. Those living in informal settlements face significant threats to their livelihoods due in part to climate change related extreme events such as drought, and flooding. These individuals’ vulnerability to climate related extreme events is exacerbated by other risk factors such as insecure land tenure, poor housing, precarious settlement locations and little to no access to government services. In all cases the services that are provided are inadequate, leading individuals and communities to help themselves. Given the self-help nature of these environments, our project utilized action research to explore examples of citizen-led community infrastructure projects in urban informal settlements in Manila, the Philippines. Our research illustrates how, through self-initiated upgrading efforts, communities are defining for themselves and taking action in support of “climate resilience”. Given continuing socio-economic vulnerabilities, a key challenge is to find the ways and means of linking informal self-help actions to formal policy and programs in support of sustainable, resilient and inclusive urban spaces.

99 Considering culture variability when implementing urban resilience

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The implementation of urban resilience relies, among other mechanisms, on the communication, the coordination and the cooperation of individuals, groups of people and organizations belonging to different sub-systems of the city (government, private organizations, civil society, citizens, etc.) in routines, emergency, crisis and disaster situations. The diversity and the complexity of the cultural dimension that is to say share meanings, beliefs, assumptions, understandings, norms, values and knowledge influence individual, collective and organizational behaviours (decision-making, communication, actions, etc.) and consequently the efficiency of resilience associated-tasks.

The panel aims to contribute to the understanding of the impact of culture variability on urban resilience and its implementation with theoretical, empirical, and practical contributions.

- Theoretical contributions objective at firstly characterizing culture variability and its effects on communication, coordination and cooperation processes. Secondly to study how culture variability influences urban resilience efficiency and implementation.
- Empirical proposals aim to identify the role of culture variability affects individual, group and organizational behaviour during accidents and disasters.
- Practical communications objective at proposing methodological and technological solutions for considering culture variability when designing individual, collective and organizational tasks, when assessing resilience performance, when simulating resilience situations or when defining scenarios for exercises or simulations.

The panel will contribute to the objective of the conference with considering resilience and urban systems on the perspective of the dimension of culture and with describing how to find this dimension in practices with the description of examples of methods and tools supporting resilience implementation that considered cultural variability.

100 Considering Inter-organizational breaks when implementing resilience

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In most recent cases of cross-border disasters, inter-organizational coordination and cooperation emerged as a burning stake. According to Pendall et al. (2012), the resilience of a region depends on the governance of responsibilities of communities and networks. Empirical evidence reveals that mutual and coordinated actions within and between communities can make a difference in the outcome of a disaster. However, coordination between various organizations, anchored in multiple professional, culture and political settings can generate crisis within disaster response. While research has emphasized uncertainty and complexity as inherent features of coordination, the variables that account for collective action collapse remain largely unknown. Our contribution aims at proposing the concept of inter-organizational break as a relevant lens to address this lack. Inter-organizational breaks (IoB) correspond to social disruptions that result in conflicts amplifications (Ansell, Boin, Keller, 2010) and an erosion of social links between organizational responders (Moynihan, 2009). In cross-border disasters, tensions that generate IoB stem from three potential sources: i) professional diversity among responders, ii) diverging expertise and iii) cultural diversity.

Cultural diversity, especially, represents a burning issue in that it can catalyze collective action collapse. Cultural diversity embodies into diverging legal frames, divergent crisis policies and contradictory agendas between the two sides of a frontier (Ansell, Boin, Keller; 2010). In addition, cultural diversity can account for frequent misunderstandings (Dayton et al, 2004).

Highlighting IoB allows tackling major practical issues that have remained unaddressed so far, such as:

- Governance fragmentation (lack of organizational and collective empowerment or on the contrary emergence of several local leaderships to handle the disaster)
- Communication breakdown (rumors, information retention, delay, overloaded information, information unreliability)

We propose i) to detail the insights from reliance on this concept, ii) the practical implications of IoB on the future of crisis response in borderland, iii) a research agenda on IoB and resilience in cross-border regions.

101 Possibilities for Resilient Grassroots Urban Planning: strategies used by a neighborhood movement in Belo Horizonte, Brazil

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The paper tries to answer the following question: In response to environmental injustice, what are the strategies used by peripheral neighbourhoods to propose and implement resilient grassroots urban planning? A case study in Belo Horizonte, Brazil will present what can be learnt from bottom up initiatives that react to everyday life shocks caused by environmental degradation. Ribeiro de Abreu is a low-income peripheral neighbourhood in Belo Horizonte, located on the banks of the Onça River, one of the most important water courses in the city. Although still maintained in its natural course, the river is highly polluted and degraded, in contrast with the environmental quality of high-income parts of the city. In response to the neglecting of the river and its surroundings by the municipal government, a strong neighbourhood movement has been organizing a series of socio-environmental activities and advocating for the implementation of a linear park on the riverbank, followed by the cleaning of the water. The analysis of this case study is an on-going research based on semi-structured interviews with activists, local residents and municipality staff. So far, it has been noticed that urban social movements propose and implement grassroots resilient planning through a two-folded strategy: putting the government under pressure and organizing self-built improvements in the surrounding environment. Also, resilience is achieved through partnerships with the municipality, professionals and universities, connecting local and technical knowledge and allowing the access to resources. Finally, activists and local residents have a holistic and systemic perception of the causes and possible solutions for the environmental degradation of the river and its surroundings.

102 Regenerative Design for Community Resilience in a Historically Black, Low Income Neighborhood in Houston, Texas: Frameworks, Processes, Housing & Infrastructure

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The Prairie View A&M University School of Architecture is educating students to redefine what resilience means through a public interest design studio. Applying living systems thinking and regenerative design processes, the role of designer is reconstituted and applied. Step one sets the framework for what resilience is, moving beyond a “gaming the system” approach to reinserting humanity into a value-adding role in the social-ecological system at the local level. Step two infiltrates the social-ecological system at the local scale in order to discover the potential of Place. Step three is to understand what role the designer must play in order to catalyze regenerative processes, primarily understood as community agency. Finally, the students and faculty together engage community members in designing for resilience at various scales ranging from the single family house to civic structures up to community wide infrastructure.

Houston has experienced a 500 year flood in each of the past three years, with Hurricane Harvey surpassing a 1,000 year event. The most vulnerable communities are hit the hardest. Independence Heights is a historically black, low-income community north of downtown Houston. It is bordered by Little White Oak Bayou with the areas closest to it falling within the 100-year flood plain, and half of the neighbourhood in the 500-year flood plain. Without the resources to recover from repeated hits dating back to Tropical Storm Allison, much of the community has been left vacant. Economic strains such as gentrification, freeway construction, and historic redlining practices have also played a major role. The result of vacancy is a loss of the strong, interdependent social fabric that the community was founded on during the Reconstruction. For the past four years the studio has worked intensely with Independence Heights to imagine a regenerative future for the community.

103 Resilient Affordable Housing Strategies: A methodological approach to analyzing the impacts of Barcelona's inclusionary housing policy on affordability in gentrifying neighborhoods

Walker Toma

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Housing unaffordability, gentrification and related residential displacement and exclusion are well-documented stresses that limit the resilience of a given urban place. The Barcelona City Council is dedicated to alleviating these stresses through a comprehensive strategy comprised of a variety of policy initiatives addressing housing affordability. As part of this broader strategy, the City Council has proposed a citywide inclusionary housing measure requiring 30 percent of all newly developed or significantly rehabilitated housing units to be dedicated as protected public housing. This paper fits within a larger research effort seeking to better understand the proposed initiative's impacts related to its purported goal of public housing production as well as broader implications on the housing market. To do so, this paper provides a methodological framework for assessing these policy implications using neighborhood-specific economic feasibility modeling. Through the examination of inclusionary policies in comparable cities in the U.S. and Western Europe, this paper will form a basis from which to critique the proposed policy due to its inflexibility and lack of neighborhood-specific adaptability while maintaining that a well-designed inclusionary policy can generate significant public benefits to the City of Barcelona.

104 The role of networks in insuring health shocks. The case of poor urban communities in Accra

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Health risks are increasingly threatening the welfare of households in urban areas and the economic effects of sickness carry consequences on the resilience capacities. The empirical evidence in household ability to smooth consumption is mixed, while the general policy trend has been towards promoting publically funded health insurance to provide financial protection. However, the demand for health insurance is surprisingly low, and the scholarship has not been able to solve the puzzle of scant demand despite the benefits offered.

A promising strategy for understanding the factors that influence the uptake of health insurance is accounting for network effects, given that the social connections have a powerful impact over decisions and they usually offer the only means of protection over shocks.

The understanding of the way in which customary risk pooling arrangements contribute to the formalization of insurance can only be addressed by using a holistic approach, since insurability of consumption may be driven by different responses to different shocks. The aim of this work is to detect the influence of social networks in individual choices regarding risk preferences. The study site is the Accra Metropolitan Area, and as many other urban areas in the global south, is experiencing a rapid urbanization dynamic, increasing health risks, increasing urban poverty, and changing food systems occurring along with demographic and epidemiological transitions.

Data obtained from the Socioeconomic Panel Survey and household level interviews will be used to recover the parameters of a general network formation model. To identify boundaries and efficiency levels of the risk reduction strategies in place, a Pareto risk efficient allocation model at community and household level will be used. Moreover, to estimate how the probability of adopting certain risk reduction strategies is affected by the social networks, a series of probit models for each strategy will be employed.

105 Urban Resilience Definitions and Principles: European perspectives

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While scholars skepticism about urban resilience has been growing during the last decade, city practitioners just started to approach the complexity of the concept. Recently a paper published by Meerow and Stults explored the different perceptions about urban resilience from the academic literature and US cities practitioners. Results highlighted that practitioners are still interpreting resilience as a concept linked to "bounce back", robustness and endurance characteristics. Herewith we explore European perspectives around the meanings and principles associated to urban resilience. We gathered more than 150 answers to a questionnaire proposed to scholars from different disciplines. Before discussing the results, we also interviewed a dozen of city practitioners, to get their point of view, and offering thus a comprehensive discussion from this research. This presentation contributes to the advances in the understanding of how the evolution of the interpretation of the concept is held by scholars and practitioners in Europe, and how this differs from other contexts.

106 A Multi-Agent System to Improve Resilience of Critical Infrastructure in Cross-Border Disasters

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The course of natural disasters is hard to forecast. Especially, these events do not stop at man-made borders between countries. In order to achieve a high resilience, it is important to overcome language and culture barriers and thereby to fasten the information and capacity exchange. Hence, a scenario-based simulation of cross-border communication and cooperation in crisis management yields a high potential to analyze different trajectories of a crisis and to find strategies for fast and robust reactions. Thereby, it can lead to a significant improvement of the resilience in a cross-border region. To this purpose, the paper outlines the scope for an agent-based simulation of cross-border cooperation in the case of a power blackout. For selected scenarios the simulation illustrates the dynamic evolution of the crisis where the failure of critical infrastructure together with people behaviour directly affect the coping capacity of the health system. Taking an event-based perspective, it is possible to identify the root cause or first order effects of cascade failures which makes it possible to propose appropriate preventive measures. A second type of analysis refers to the interoperability of authorities. It can be analyzed how communication and coordination among actors of different nationalities can be improved such that delays in information flows are minimized. The mentioned multi-agent system is developed as part of the INCA-project, a decision framework for improving cross-border area resilience. Apart therefrom, the project comprises behavioural studies, expert interviews and workshops, which lead to a deeper understanding of the character of a cross-border area. By finding a robust strategy for the optimal intervention to dampen cascading effects in critical infrastructure and to minimize delays in information flows, the project aims to strengthen the resilience of the border region.

107 Assessing Community Resilience of Rural Villages supported by the Korean Authoritarian Regime

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This paper examines whether the Korean New Village Movement (Saemaul Undong, New Rural Community Movement, or the KNVM) driven by the authoritarian regime of President Park, Chung-hee in the 1970s enhanced community resilience of rural villages. As a reaction to rapid Korean urbanization, the KNVM supported rural villages, transformed long-standing human settlements rapidly, and created social-ecological sudden changes of population and resource management. Given the historical context, I assess the community resilience of rural villages supported by the KNVM to rapid urbanization in two dimensions of demography and ecology, addressing the cross-scale and cross-sectoral interaction of the KNVM to population change and resource management change.

The paper takes the following four steps: I clearly identify the mechanism of the KNVM and other central government plans in the 1970s such as the Korean Family Plan for population change and the Korean Reforestation for resource management change. I then create a variety of spatiotemporal patterns of demography and ecology, using a macro overview based on national-scale statistical data, a cross-scale analysis based on multi-scale spatiotemporal data, and a micro survey based on village-scale sample data. Third, I conduct demographic and ecological resilience assessments of community resilience based on three main variables respectively (i.e., total population, age structure, and fertility for demographic assessment; forest growing stock, primary energy type, and foreign energy dependence for ecological assessment). Finally, I discuss short-term efficacy and long-term vulnerability of strong top-down implementations by the Korean Government such as the KNVM, the Korean Family Plan, and the Korean Reforestation, which is associated with a lack of diversity in development strategies including transformation of human settlements, population planning, and reforestation planning.

108 Bridging the gap between stakeholder requirements and technical needs in community resilience measurement

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The concept of community disaster resilience is an increasingly important discourse on environmental changes and has been under debate on international academic and policy circles over the past decade. While conceptualizing disaster resilience is increasingly seen as a significant and requisite undertaking in hazard mitigation, reduction, and planning, there exist only a few numbers of frameworks in the literature presenting systematic methodology and guideline for empirical measurement of the concept. In addition, the question of whether such a measurement can adequately address the ongoing or emerging needs of local stakeholders and governments remains in agenda.

To tackle this challenge, this study first intends to synthesis the needs of local stakeholders in community resilience measurement to serve both as a shared vision of resilience measurement missions and as a basis for developing a technical procedure for operationalizing community disaster resilience. Next, based on the defined needs, we propose a synthesized procedure that highlights how the needs of local stakeholders can be translated in measurement process. Finally, the developed framework is applied in order to perform a quality assessment of the 10 most well-known and related measurement frameworks.

This synthesized approach, therefore, can bridge the gap between the visions and actions in resilience measurement and provide a measurement that is need-based, proactive rather than reactive, and action-oriented. Furthermore, it can predispose local stakeholders, leaders, and planners to prioritize those actions that are needed more to build and sustain resilience. The quality assessment demonstrates in-depth information regarding the characteristics of each measurement framework, which can be used to identify weaknesses and limitations of current disaster resilience measures and to improve them where needed, in order to meet the risk preparation and planning needs of stakeholders, decision makers, and urban planners.

109 Building bridges between theory and practice: A normative analysis of resilience

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There is an increasing number of academic works produced on the salient term 'resilience' that seems to be replacing the term 'sustainability'. The complexity of the term's further conceptualisation goes along with that of its actual realisation. It is essential that tools, which are being developed for the quick and efficient responsiveness of cities towards for example crises, disasters and terrorism, come under scrutiny.

Therefore, the paper will focus on the following: Firstly, in the legal and social context, resilience needs to be considered as part of policies that will consider justice and fairness in the decision-making processes and the equal distribution of benefits and problems. Secondly, translating theory into practice, resilience needs to be discussed and translated into policies, considering the huge underlying socio-economic disparities and the landscape of uneven development in the big cities. Reproducing unevenness while carrying out projects of urban resilience, jeopardises the future of cities' smooth development and functionability. Looking at the other side of the coin, only when strategies towards resilient cities include the less privileged groups, would make more sense because in times of crisis (floods etc) those are most affected. Thirdly, it is of utmost importance while actualising resilience to bring together scholars and practitioners from diverse disciplines, as only then an action plan will be an all-encompassing set of expectations.

The paper aspires to contribute to the literature on addressing legal and socio-political matters and to normatively analyse resilience to help build bridges to policy practices. In doing so, it responds to a current challenge scholars face in developing a theoretical framework covering a variety of dimensions. It looks into the subject in a multi-disciplinary way – addressing legal, socio-political and engineering aspects – also reflecting the profile of the research team.

110 From subordination to resistance and solidarity: transformative citizen action and energy vulnerability in Barcelona

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The substantial increase in energy poverty levels occurred in Spain since 2008 has run in parallel to a rapid surge in unemployment rates and domestic energy prices, resulting in thousands of households facing the risk of disconnection from basic utility services because of late payment or non-payment of bills. As a reaction, citizen-led initiatives such as the *Alianza contra la Pobreza Energética* are supporting vulnerable households in the metropolitan area of Barcelona and its surroundings – especially those in risk of disconnection from electricity, natural gas and running water supply. At the same time, they raise awareness, give voice to the disenfranchised, and provide a platform for citizens to become politically engaged around issues of affordability and access to domestic energy services. The paper studies the potential of such responses to transform individually experienced conditions of vulnerability into networks of citizen solidarity and resistance through which resilience is enhanced both individually and collectively. By joining and engaging with this community of mutual support, it is argued that underprivileged households reclaim their agency and become more empowered; and therefore more capable of influencing the conditions under which energy poverty arises and confronting their status of isolated, vulnerable individuals subordinated to conditions set by more powerful state and corporate actors.

111 Gentrification-resilient cities. Urban livability and anti-gentrification requirements for improving cities and social life

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Nowadays, gentrification insinuates in the historical urban corridors and produces strong repercussions on the right to the city, pushing up the purchase and use prices and forcing the residents to move away. This process interlaces with other global phenomena, such as the turistification, urbanization and brandification, and dramatically accentuates its consequences which contribute to endanger sustainability and livability of cities. From this background, the goal of a gentrification-resilient city is to re-orientate policies towards a more sustainable model. We describe an operational framework for recognizing, prefiguring and intervening in the landscapes of gentrification that affect urban quality with anti-gentrification and livability indicators in different fields of action. It starts from the analysis and representation of the phenomenon in the city of Barcelona. This framework looks towards the elements that mark a change in the growth horizon of urban opportunities, by indentifying specific areas of interest, parameters and guidelines to cope with the phenomenon coming from sectoral policies, tools and practices under two points of view: (1) the social innovation practices, that play a key role in the implementation of a consistent policy for improving urban resilience and livability, more stable over time; (2) the socially-oriented urban models with anti-gentrification measures, by guaranteeing basic services with homogeneous methods of interaction and stable quality levels. Each area of interest is identified by characters, operational objectives and project attentions, aimed at planning interventions that guarantee a minimum level of basic goods and services in the organization of urban contexts according to a gentrification-resilient and livable city scenario. The implementation of the operational tool in the district of Sant Antoni clarifies how project attentions can address strategies to remain resilient to gentrification, by recognizing the propulsive role of cohesion forms and by supporting decisionmakers towards a common policy for improving cities and social life.

112 Impact of culture on urban resilience: Exercising inter-organizational collaboration through scenarios

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The objective of the paper is to characterize the cultural dimension of Disaster Risk Reduction (DRR) efforts in a context of building urban resilience, and to identify a set of key objectives, activities and competencies in the planning phases involving many organizations.

Resilience, defined as the capacity to recover from severe adversity, benefits from pre-existing system-based resources and their mobilization. This mobilization requires inter-organizational coordination and collaboration across activities and timeline. Learning to exercise such mobilization of resources involves identifying sectors, actors, roles, expertise, assets, vulnerabilities, and timeline of actions. What types of communication and of competencies can optimize efficacy? First, a framework providing a heuristics for planning and actions allows to set the key principles. Then, a scenario-based study enables enactment of the communication and decision-making at various stages. Observations of the simulation provide both empirical evidence on the processes at play, as well as training opportunities to improve efficacy.

To examine the dimension of the culture of DRR planning, a polycentric network-based model of the disasters is firstly defined. Polycentric networks are composed of a multiplicity of independent decision-making centers sharing at times common goals and resources but also having individual distinctive goals and proper resources with an overarching system of institutional and of cultural rules. The network is dynamic with nodes entering and leaving the network following rules and circumstances.

The dimension of the culture of the network and critical decision-centers will be described by considering shared (or not) meanings, beliefs, assumptions, understandings, norms, values, and knowledge. Learning from the data gathered across team pods and tasks, a set of objectives, activities and competencies will be identified considering the different tasks associated with urban resilience and different dimension of culture; and a reflection of how to integrate such lessons in urban resilience implementation will conclude the article.

113 Informal Economy in the Fragile City as a Driver of Social Resilience. Lessons for the disaster risk reduction. Focus on informal workers in the public space of Bogota, Colombia.

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The informal economy accounts for more than 50% of the non-rural working population in Latin America, Sub-Saharan Africa and South and East Asia. Being the informal workers of the public space, the most affected not only by being constantly exposed to the environment but also to the social conditions of a hostile society that perceives this practice as negative and illegal, it is often disregarded their great capacity to anticipate, absorb and adapt and therefore, their high level of social resilience. Understanding the adaptation and survival mechanisms of the informal workers could help drawing lessons for the field of disaster risk management more specifically on how this is related with the production of social resilience. Social resilience has attracted great attention from researchers of various disciplines, focusing mostly on the creation of methodologies for assessment and implementation at the city and regional level. There is, however, a growing need to find appropriate strategies to produce social resilience in communities, especially the most vulnerable ones. By analysing selected literature, we identified twelve attributes clustered in six sub-dimensions of Social Resilience, mutually transferable between the field of Informal Economy and Disaster Risk Management. Then, we evaluated their presence in daily activities of informal workers of the public space in the city of Bogota, Colombia. We recognized 10 out of the 12 attributes (excluding Social Demography and Fair Access to Basic Needs and Services) in the observations and semi-structured interviews performed. According to our analysis and informal workers answers, a set of recommendations is proposed to enhance social resilience to disasters at the community level. We further identified conditions of corruption, conflict, displacement and inequality, placing this research within the spectrum of Fragile Cities. Our results are a call for science and practice to reframe resilience not as a repeatable equation but as a context-based dynamic.

114 Italian Disaster-Resilient Small Urban Communities

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Resilience became a must in many policy agenda, but still lacks clear guidelines for its implementation and a proper system of monitoring its performance. In relation to disaster resilience, there are many frameworks and metrics for assessing and measuring urban resilience, but some context dependent variables still discuss their usefulness and replicability.

This paper draws a set of indicators about social capacities and behaviours, mostly linked to the influence played by city structure and related to the context-dependent administration mechanisms. These factors enhance the understanding of which are the key determinants guiding the recovery of community life after a disaster. This set of factors are compared before and after the disaster happened in two central Italy selected case studies: the small urban centers of Fermo and Rieti. For each case-study we collected and to map urban density, population characteristics, the number and type of the recent past disaster experiences, the social and physical networks, the number and type of common shared places and common goods among other community-related indicators.

This research results highlight that in central Italy cases the availability of economic resources for reconstruction for them self could not lead toward community sustainability and wellbeing. Monitoring the soft variables related to urban resilience and its implementation is key to better understand and describe policy performance. Furthermore, because of the context dependency of the soft variables, this paper contributes to the call for framing local, or regional, urban resilience observatories.

115 Landscape, community and resilience: migration and inclusive cities

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Mass migration in the face of natural and human-induced disasters has grown into one of the major urban resilience challenges of the 21st century. We examine forced displaced communities and look at migration as a powerful opportunity for building community resilience using two case studies — Beirut, Lebanon and Vancouver, Canada. Both cities offer different approaches and responses to some of the most challenging urban resilience issues: forced displacement from home communities and respect for their cultural needs, mass migration and city response plans (shelter, work, play), acceptance, and assimilation.

In Lebanon the flood of refugees across a shared border has created a displaced and marginalized Syrian community that is surviving through informal coping mechanisms and strategies that sustain livelihoods despite being spatially confined and atypically clustered in informal and temporary living spaces with little sensitivity to cultural customs.

In far-distant Vancouver, several thousand Syrian refugees arrived between 2015 and 2018 under a federal government assisted resettlement (GAR) program strongly supported by the Canadian people. Immigration plays a key role in Canadian culture. Upon arrival, most Syrian GAR families desired, and were placed in neighbourhoods of similar ethnic backgrounds and languages with shared cultural customs and experiences.

In both Beirut and Vancouver, the emphasis on place as a cultural resilience mechanism implies that one central component of the experience of migration is the role of the physical environment or landscape. Syrians forced to migrate to both neighboring and distant countries are building relationships with the new places they live in by shaping new spaces and landscapes that embody both past memories and new emotional experiences. There is much to learn from Syrian mass migration that can inform building community resilience for disaster risk reduction – whether human-induced disasters such as economic meltdowns and climate change, or natural disasters of all types.

116 Linking the gentrification of traditional retail markets and the resilience of centres of commerce

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Within an evolutionary process that has been more intense since the middle of the 20th century, retail has changed dramatically and new retail concepts have been putting into question the stability of urban retail systems. Using the adaptive resilience perspective, some recent studies have been discussing how the retail structure of some urban districts and neighbourhoods has adapted to changes in the respective retail systems. Within these studies, retail resilience is broadly understood as the ability of a certain retail system to adapt to shocks and disturbances and be able to supply the population. Currently, some of the main changes in retail are related with the rehabilitation of some retail stores and precincts that transformed them into gentrified retail spaces. Nowadays, retail gentrification has been gaining prominence in a great degree due to the global increase in world tourism, putting added pressure on old stores that still serve local residents and traditional passersby.

This presentation arises from an ongoing investigation. Using a case study methodology, we will focus on Campo de Ourique, a Lisbon traditional neighbourhood. Although located outside the main tourist routes of the city, at the beginning of this decade, its enclosed traditional retail market was rehabilitated, which eventually culminated in its gentrification. Following an intervention model seen in other countries of Europe and Latin America, Campo de Ourique traditional retail market is currently a medium and high-class leisure and consumption destination. Based on theoretical considerations on retail resilience and retail gentrification, in this presentation we aim to examine the impacts that are produced by the gentrification of that retail precinct in the commercial fabric of the district and in what way these impacts questioned the stability of the neighbourhood's retail system and its resilience ability, thereby threatening the ability to supply the local community.

117 Measuring Informal Urban Settlements' Pathway to Resilience Building

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More than half of the world's population (54%) lives in urban areas, due to internal migrations and climate change among other factors. This figure will continue to rise and worsen urban resilience conditions, taking into account that most people migrate into informal urban settlements that increase their vulnerability. Resilience must be based on a profound analysis of who resilience is being built for, resilience to what and through what. Programming for resilience building, decision making or advocacy must be context-specific and evidence based to produce real sustainability through time. The Analysis of the Resilience of Communities to Disasters (ARC-D) Toolkit is a user-friendly tool used in more than 11 countries to measure resilience through in-depth interviews and participative focal group discussions with key community members. The discussion is carried out around 30 key components of resilient communities, grouped in 8 system sectors: economic, environment, political/governance, health, infrastructure, social/cultural, disaster risk management and education. Each component is appraised and assigned a score between five levels of resilience, one being the lowest and depicting minimum resilience and 5, the highest describing maximum resilience. The summative score of all 30 components provides an overall figure of a community's resilience to a specific risk scenario. GOAL Honduras has been applying the ARC-D toolkit in informal urban settlements in Tegucigalpa since 2015. This research has shown that the smallest administrative levels facilitate the most consensus in terms of resilience measurement and that resilience strategies must be specific for each community. It has also proven that to achieve the maximum level of resilience in informal urban settlements, a system thinking and social behaviour change approach is necessary to guarantee that community members and key systems actors understand root causes, potential barriers and build strong linkages with local authorities to contribute to build resilient cities.

118 Rethinking Urban Commons in the Age of Transductive Territorial Production: A Study on Relational Networks in Rapidly Growing Asian and Australasian Cities.

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Considering socio-spatial cohesion a primary factor for the sustainable and resilient development of cities, this paper explores the implications of the changing nature of relationality networks in our advanced digital age. It focuses on problems caused by growing urban fragmentation, polarisation, and inequality, as well as opportunities emerging from expanding diversity, complexity, and networkability. By acknowledging the effects of the pervasion of digitally augmented networking processes, it explores the spatial production of key common urban assets in contested central urban spaces.

The working hypothesis is that a revised approach to the interpretation of urban commons – particularly public space – as a premier collective asset with “more-than-spatial” properties grounded in their performative nature and transductive relationality, enhances the contribution of the disciplines of architecture and urbanism to the sustainable development of cities. This approach would provide a better understanding of the characteristics of the civic infrastructure needed to support relationality and collaboration, and illuminate the identification of new pathways to address problems caused by a growing urban socio-spatial fragmentation, deprivation and alienation.

For the analysis of such associations, a theoretical framework inspired by the notion of *the right to the city* is proposed, and a multidimensional socio-spatial perspective that identifies key mechanisms triggering public engagement is delineated. A comparative urbanism framework, informed by direct hands-on experience in Asian and Australasian contexts, is used to provide empirical grounding and validate the theoretical construct. Evidence is gained from case-studies of recent conspicuous urban transformation processes with situated high impact on material, social, cultural and emotional spheres. Discussion and conclusion contribute to the understanding of the socio-spatial impact of radical on-going changes in the role and function of the public sphere and call for an important redefinition of the approach to urban commons towards a resilient and sustainable urbanism.

119 Social cohesion in multi-ethnic urban neighbourhood - Strengthening community resilience through urban planning

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Sociological research into the ability of communities to withstand disasters has coined the term of “community resilience” as a mechanism of social systems for dealing with unexpected external disturbances. The concept of community resilience locates adaptive and coping potentials in both individual and collective capacities of members of society, which are developed and proven in everyday social life. However, in multi-ethnic societies trustful relationships among neighbours and an active participation in social life are frequently put into question: The more diverse a society or a community, the lower the willingness of its members to develop close ties with their fellow community members and to intervene on behalf of a common good. Urban planning thus faces the challenge of developing convivial neighbourhoods that promote social cohesion and a sense of community in an increasingly heterogeneous context that enables diverse communities to pursue collective-action efforts and to provide for collective goods. In answering the question of what mechanisms are needed for enhancing community resilience, we understand urban planning in a broader context in which spatially based approaches are embedded in the cooperative work of community development and neighbourhood organisations. Against this background, we will introduce findings from the German research project ResOrt (Resilience through social cohesion – The role of organisations). Rooted in Robert Sampson’s “collective efficacy”-approach and adapted from an extensive review of policy papers and practical guidelines the presentation will be based on guided interviews with experts from a broad variety of organisations in the fields of district development and community work. The focus of the presentation will be a practice-oriented model comprising different dimensions and interdependences of social cohesion and community resilience, proposing future directions for integrating community resilience building efforts into an extended structure of urban planning and district development processes.

120 Social resilience during and after the crisis. The case of Gdańsk-Gdynia-Sopot Metropolitan Area in Poland

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Social resilience is defined as the ability of groups or communities to cope with external stresses and disturbances as a result of social, political and environmental change. Key determinants of social resilience are: livelihoods, i.e. human capital, participation, and social capital (social networks). As part of the social capital, linking capital is distinguished. It is defined as the relationship between individuals and government officials, leaders or human agents.

The author of this paper presents how regional and local agencies reacted to economic crisis and attempted to build social resilience in the context of labour market. The analysis is based on the results of a qualitative research for ESPON project entitled Economic Crisis: Resilience of Regions. Over 30 interviews with representatives of labour institutions, business chambers, NGOs, entrepreneurs, regional and local authorities were conducted.

The results show that the high adaptability and flexibility stem from the relatively high qualifications of population and flexible labour market. The common goals of human agents allowed to maintain jobs during the crisis and create new ones after it. Building consensus between business owners and employees and sharing risks turned out particularly important. The research demonstrates that reframe practice from taking care of companies' income to maintaining jobs was of great importance for the resilience. The paper presents also that entrepreneurial spirit, occupational mobility, self-reliance, flexibility and a lack of demanding attitude turned out significant and bridge social and human capital theory and practice.

121 Space production by migrants in urban villages in China: the case of Beijing

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The urban village is a specific phenomenon arising in modern China, whose rapid urbanization is characterized by its urban sprawl and accelerated growth of urban population. Due to the dual urban-rural land system, local villagers have the right to make extensions on their homesteads to the existing houses, which they rent out to migrant population. In recent years, the mechanisms of developing urban villages and redevelopment strategies have been widely discussed. However, most scholars rather focus on the interest of local villagers and the profit of government and developers. The interest and contribution of migrant stakeholders, the largest and most vulnerable group in urban villages, are often neglected. Borrowing Gilbert's (2007) insight, if the word "slum" has to be adopted there, these villages are "slums of hope" to large extent thanks to the migrant community. Contrary to common perception, neighbourhood attachment among migrants is stronger than assumed (Wu, 2014). This paper aims to study and describe how the migrant community shapes urban villages in Beijing through space production (Lefebvre, 1991). Besides absolute "physical space", "space of activity", "space of power" and "space of linkage" are defined in the research. It is hypothesized that migrant population not only passively adopts the space, but also actively builds relationships with and within particular spaces, and gives these spaces certain identities. Having constant linkages in two directions with both originating hometowns and established city (Saunders, 2011), migrants are trying to create an unfamiliar rootedness and promote resilience in the new social and physical environment and affect the social-spatial transformation of urban villages. Extensive field research was conducted adopting qualitative methodologies. Comparison study was made between two case villages, representing two kinds of urban villages in terms of the groups of migrant population they accommodate.

122 The community resilience challenge - a case study from Sweden

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The research literature and the international frameworks of disaster risk reduction (DRR) (Hyogo and contemporary Sendai) stress the need for involving all scales and spheres of society. At the local level the necessity to involve the public in reducing vulnerabilities and building resilience is highlighted. The assumption is that community resilience can be created by applying a bottom-up approach to DRR. This entails proactive efforts to involve the public as a means to reinforce local communities' capacity to prepare for, act on as well as recover from extreme events.

This paper presents an explorative study of the Swedish city of Örebro focusing on local actor's efforts to involve the public in preventive DRR related to climate change risks with the explicit aim to create resilience. The perspective is that of leaders of this work in local government and civil society organizations and the method used is documents studies and interviews aiming at uncovering the attitudes towards the utility and challenges of involving the public and particularly in relation to groups that are considered especially vulnerable. The result is then discussed within the theoretical framework of community resilience developed and the utility of this framework in the Swedish context is assessed.

We find positive attitudes towards involving the public, primarily as a resource in emergency crisis management. Network-building and collaboration, with the aim to gain information about how people perceive their reality and to build knowledge about the needs of the public regarding information and support is considered important. We identify some constraints – related to communication, collaboration, knowledge, etc. – but also some opportunities – related to networks, voluntarism, connecting public and civil society actors, etc. – for creating community resilience. The results will help the development of theories of community resilience and reinforce practice.

123 The structure of collective-based working and living settlement: The case of local-specific urban kampong in Jakarta

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Jakarta is home to many communities; some are enjoying the concept of the modern city, others are living in areas characterized by pre-modern forms. Kampongs, which refers to the latter type of communities, is where people integrate spaces for living and working. The community of micro-entrepreneurs living in Kampong has managed to cope with the pressure of modernization and contribute significantly to the livelihood of the urban population, especially the low-income. They provide skills and services that vary from garment and furniture industry to upcycling office furniture, automotive spare parts, and urban farming. This paper makes a case of Kampong Rawa, whose residents reside in integrated settlements and share a living and working environment of producing tofu and tempeh (read: soybean cake). Further, this paper explores the determinants of a collective institution in organizing the production activities and dwelling facilities. Despite all pressures to be economically competitive and to overcome internal disputes between members of the community, Kampong Rawa represents itself as an alternative urban way of life.

By using a grounded research methodology, the analysis shows that demand for city-wide development trend has triggered the adaptation process within the kampong. Kampong depicted as a traditional urban form transforms beyond what is defined by the rational economic principles. The transformation of the kampong takes place by respecting its local collective consciousness.

124 The Value of Collective and Individual Assets in Building Urban Community Resilience

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Bangkok, Thailand's capital, has experienced disruptive flood events and remains vulnerable to sea level rise and subsidence. Those living in low-income communities are often most exposed to climate risk, living along canals, in housing and with infrastructure that is not adapted to climate change. Ensuring that Thai cities plan for resilient and inclusive growth is therefore important for achieving a sustainable urban future. Urban resilience here encompasses not only physical resilience to climate change impacts and other shocks, but also socioeconomic resilience, such that vulnerable population groups are not left behind.

This paper aims to foster inclusive urban governance which integrates communities' well-being along with considerations of physical environment – including systems of land use, water and solid waste management. The findings highlight how low-income communities prepare for a potential shock for example flooding, drought or an economic crisis. Which individual and collective assets– internal and external – are at risk, and which can be used to overcome those risks? Do residents apply mechanisms of coping, adapting, or something new, and is collective action applied? The data draws from a household survey and interviews across three communities, and an innovative resilience toolkit developed in order to foster community dialogue around what is required to achieve community-based resilience strategies. Known as 'Kin dee you dee' (live well, eat well), the interactive community-level toolkit focuses on 7 types of assets used by community residents and their potential for building resilience: water, food, shelter and people, economic resources, community assets, and new resources made from old.

Our findings highlight different approaches to achieving inclusive planning approaches which support climate resilient and sustainable development pathways at community and city scale - including the potential offered by multisectoral, multiactor responses drawing on private, public and civil society actors and assets.

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125 Translocal networking as a cornerstone for community resilience: Activities by the Asian Coalition for Housing Rights (ACHR)

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Research on community resilience has focused strongly on the *local* features of communities backing resilient behaviour. However, the argument of the paper is that the relationship building of communities beyond the locality represents a significant aspect of community resilience. The aim of this paper is to extend the notion of community resilience by highlighting that in today's world locality is characterised by connectivity. Communities organized on various levels are considered better equipped to deal e.g. with natural disasters and therefore more resilient. Translocal social resilience approaches mostly focus on migration. Translocal social networks and capacities can be found in migrant communities, but also in those communities that have mobilized into networks beyond their locality around livelihood issues. This translocal community resilience as an emerging concept can learn from earlier studies on transnational urbanism by including aspects of horizontal learning, peer-to-peer support and mobilization to collectively address issues of injustice. The paper refers to findings about the networking of urban poor communities (Herrle, Ley and Fokdal, 2015) and an expert group workshop organized at University of Stuttgart "Collective action and resilience in emerging city regions" (April 2017). Case studies on translocal and transnational community networks in Asia related to the Asian Coalition for Housing Rights (ACHR) will serve as illustrations.

126 A Small Island Community Development at Pulau Panggang, Jakarta, Indonesia: Toward Resilient and Sustainable Housing and Livelihood

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Pulau Panggang is an inhabited island in Kepulauan Seribu islands, on the off-shore of Jakarta. With a 12-hectare in total area and 350 persons/Ha in density, Pulau Panggang becomes one of the densest small islands in Indonesia. Around 55% (4.200 inhabitants, on 2016) are subsistent fishermen. In addition, members of households are also petty traders of daily needs and/or working in the main land (greater Jakarta area). However, Pulau Panggang is also a part of Kepulauan Seribu Marine National Park (KSMNP), which means that some restrictions to its utilization are also applied.

The combined challenge of rapid population growth (2.3%/year) and low carrying capacity of the island (limited availability of fresh water, electricity and land) has led to multiple problems. The problem of housing, for instance, is traditionally answered by practicing two approaches: traditional reclamation (by piling coral, sand and local waste), and/or 2-3 close families inhabiting a house. With this reclamation method, an additional 3 Ha of reclaimed land had been earned in the last 10 years.

Our on-going action research was intended to fill the gap concerning models of sustainable housing and livelihood for small islanders that is also conservation friendly. Initiated since 2016 by Universitas Tarumanagara, this research has been supported by Local Government and local community. To meet such a purpose, three stages have been taken. First, identified the needs of the community and the parties, using such methods as in-depth interviews. Second, conducting continued communication and negotiations with concerned parties in order to formulate acceptable criteria for housing, livelihood and conservation. Third, discussions and selection of alternative models of housing and livelihood. Results obtained is expected to meet the ultimate purposes of resilience against changes in environmental settings in one hand and sustainable housing and livelihood in the other.

127 Advancing research and policy for sustainability: a framework for urban observatories

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Contemporary environmental problems, such as climate change, loss of biodiversity, and resource depletion (quantity and quality of water, energy, etc.) present formidable challenges for 21st century resilience. Transition to resilience is a particularly salient idea for cities, which are often conceptualized as complex socio-environmental adaptive systems. Making cities inclusive, safe, resilient and sustainable will require a conceptualization of urban resilience that connects knowledge production to implementation action. Resilience, both general and specified, depends on the ability for cities to create and diffuse innovative sustainable solutions to complex social and environmental challenges. Research and development of urban resilience theory and knowledge is burgeoning, yet the uptake to policy has been slow. To bridge data gaps and improve information availability, urban indicators have played a key role connecting knowledge to policy at least since the 1992 United Nations Conference on Environment and Development. Combining data on indicators, including lessons learned from urban indicator projects, with new urban data streams (both designed and organic) new pathways are created for data-driven approaches to resilience planning, policy, and theory. Beyond data issues, an integrative and holistic approach is necessary to develop effective sustainability science that synthesizes different sources of knowledge, relevant disciplines, multi-sectoral alliances, connections to policy-makers and to the public. This paper emerges from an effort to develop an interoperable, networked infrastructure of urban observatories to generate a baseline of standardized long-term, large-scale datasets about human and natural dimensions of metropolitan systems in the state of Texas. Informed by and informing resilience theory, we conceptualize an “observatory” of urban data that allows for strategic research and decision-making oriented towards the mitigation of the consequences of urbanization and climate change. The Texas Urban Observatory project is part of Planet Texas 2050, a University of Texas-Austin grand challenges initiative.

128 Advancing the evidence base for sustainable city-region food systems

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The growing appetite of cities is one of the greatest future challenges. There is no set menu for meeting this appetite, but a trend is observed in which city authorities focus on region-based food provision. Regionalism is motivated by the importance of increased self-reliance. Besides, regional food systems, are associated with more sustainable production and reduced carbon footprints, the reconnection of consumers with production, and the increased uptake of whole foods in urban diets. However, the question remains to what extent region-based food systems may become self-reliant? How may they contribute to improved sustainability and healthy lifestyles? With the Dutch city of Almere as a case in point this paper provides a food flow data-based analysis of the opportunities and limitations of regional based food system approaches. The paper sets-off with defining the concepts of sustainable self-reliance and regionalism. Next, it describes the methodology of measuring and mapping the actual food flows. We combined secondary, publicly available, with primary quantitative and qualitative datasets, involving regional businesses, urban policymakers, and residents. Our study uncovers the coinciding disconnect and interconnectedness of local, regional and global food systems. The regional scale offers opportunities for tackling many food related challenges, however, sustainable urban food security demands connections beyond the regional sphere and beyond the food domain.

Our research provides an evidence base for policymakers striving to shape a sustainable city-region food system. Although food production and food retail are not in the hands of local and regional policy-makers, their decisions on issues such as logistics, business licensing, and subsidies directly impact urban food provision. To assess the effects of the policy options available at the local and regional level, a solid evidence base is essential. This paper advances the development of evidence-based methodologies to monitor and inform food system policies.

129 Community Participation in Slum Rehabilitation in Mumbai, India

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The Mumbai Development Plan 2034 raises several questions about citizens' rights to the city and their involvement in the decision-making process.

Housing shortage in Mumbai, the capital of the state of Maharashtra, India is a well-documented and much researched topic. More than half the city's population including the poor as well as the lower middle classes are forced to find shelter in slums. Successive governments have tried various policies to address this issue with limited success.

The current policy, dating from 1995 and in keeping with the neoliberal policy environment, gives an important role to the free market in slum rehabilitation schemes. Paradoxically, while this policy requires increased support from civil society and NGOs to work and while the corresponding legislation calls for 'obligatory participation' of the slum-dwellers, it has come under criticism for being more oriented towards the demands of the market. Not only has the number of people benefiting from the policy been low, but also the quality and nature of the housing provided have resulted in recidivism where beneficiaries are either forced to the outskirts of the city or back into slums.

It thus becomes necessary to examine the role that communities play in this paradigm. The paper will look into various cases of slum rehabilitation in the city of Mumbai and investigate the actual level for community participation and the impact it has had. The paper will also look into relevant legislation and the provisions therein which allow for community participation to take place.

Finally, the paper will suggest ways to incorporate the learnings from the study into slum policies so that communities can be empowered to participate in the process of rehabilitation. The findings can further inform research into bringing about an authentic, non-token participatory urban planning process.

130 Community resilience and wellbeing in face of disasters: theory and practice dimensions from Brazilian cases

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Brazil has experienced several environmental related disasters throughout the present decade. Although this reality affects its different regions, the State of Rio de Janeiro, an intensively urbanized and unequal territory, experienced two of the biggest disasters in the country's recent history, with the landslides in the 'Morro do Bumba' (Niteroi city -RJ) and in the mountain range close to Rio de Janeiro metropolitan area. Those events were representatives of how resilience and vulnerability play a central role to explain disasters dynamics. However, disaster driven research and policies in Brazil still focus on the physical event that generates the impact. The study of the sociodemographic dimensions of disasters is still rare in Brazil, although there was a significantly development during the recent period. In this sense, this paper seeks an understanding of disasters and resilience considering this discussion. We understand the disaster as a phenomenon that occurs in the interaction between hazards and social and environmental vulnerability, generating impacts. To a better comprehension of disaster and resilience, two analytical scales are used. First, we present an indicator of disaster resilience for the 92 municipalities of the State of Rio de Janeiro, containing a set of results and maps of environmental, social, institutional and political dynamics that could potentially word as the background for disaster resilience. Secondly, three case studies were carried out. Considering the complexity of resilience and disasters, we analyze the social and processes related to resilience of Morro do Bumba landslides, the torrential rains in the mountain range close to Rio de Janeiro metropolitan area and landslides risks on Rio de Janeiro city. Analyzing these results, its considered that the connections among wellbeing and resilience needs to be addressed in a contextual manner and with a community based perspective, as some understandings of development and policies enhances vulnerability.

131 Community-led practices for triggering long term processes and sustainable resilience strategies. The case of the eastern Irpinia, inner periphery of southern Italy.

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The Council of Europe's Framework Convention on the Value of Cultural Heritage for Society, originating from war and anthropogenic violations of cultural heritage, marks a milestone in the transition process towards a social approach to cultural heritage. With the notion of "*heritage community*", attention shifts from the cultural heritage in itself, towards people, their relationship with the surrounding environment and their active participation in the process of recognizing the values held in it and their transmission to future generations. The value of the cultural heritage and its transmission for "making cities and human settlements inclusive, safe, resilient and sustainable" and for Disaster Risk Reduction is an integral part of Agenda 2030 of the United Nations.

In the European inner peripheries, cultural heritage has peculiarities that distinguish it from core areas. It is affected by extreme global (climate crisis, scarcity of resources, migration, weakening of social capital, etc.) and local risks (depopulation, uncontrolled exploitation of the territory, erosion of cultural capital and identity of places, degradation of the landscape, etc.). This contribution describes a case study in an inner periphery of southern Italy. Here, in the course of few years many community-led practices have been developed, based on the reinterpretation and renewal of the local material culture (workshop related to local craft traditions, international artistic festival based on the reinterpretation of rituals and traditions, tourist events of rediscovering ancient routes, etc.). These actions have reinforced the networking of local actors, triggering some long-term processes. In this scenario, a group of researchers, designers, scholars propose to carry out Resilience Laboratories as places of learning, participation and decision. They must start the process of building a resilient and sustainable landscape and, in the medium to long term, act as permanent support to the traditional tools of planning and management of the territory.

132 Creative Destruction and Social Innovation dynamics comparison: San Juan, Puerto-Rico (US) and Barcelona.

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Marcus and Colding (2014) and Soane et al. (2012) have argued for the need to use the **adaptive cycle theory as a conceptual tool of analysis** and approach focusing on urban systems behaviour. This heuristic focuses on Gunderson & Holling's (2002) adaptive cycle and panarchy theory [1], which divides the dynamics and resilience of social-ecological systems (SES) in two distinct loops: the front-loop, which includes growth and conservation phases, and the back-loop, which includes collapse, and reorganization phases. Most recently, Herrmann et al. (2016) have used the tool to compare the growth and collapse of cities, highlighting the complementarities of the two loops, as well as their time and spatial dimensions.

Despite these recent developments on research have seldom used Holling's adaptive cycle theory to examine the dynamics and resilience of urban planning (Marcus and Colding 2014, and Schlappa and Neill 2013). In particular, the novelty is to focus on real estate and its associated policy when analyzing a city's adaptive cycle. We use the adaptive cycle theory to improve our understanding of cycles of urban hazards and change and offer a powerful narrative with practical implications for better understanding the vulnerabilities and windows of opportunity of these dynamics.

The objective is to contribute to bridge theory and practice and consolidate the use of *Resilience Thinking* as a methodology to identify thresholds for urban change, analyze urban SES evolutionary dynamics, and forecast forthcoming SES dynamic processes for community resilience. We use the methodologies and tools developed by the *resilient thinking* concept to conduct and compare two parallel SES dynamics and their evolution using empirical case studies such as the city of San Juan, Puerto-Rico, US and Barcelona, Spain after systemic crisis.

[1] Holling, C. S., & Gunderson, L. H. (Eds.). (2002). *Panarchy: understanding transformations in human and natural systems*. Island Press.

133 Criteria for urban resilience assessment: Building indicators for the CDMX resilience strategy.

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Mexico City is one of the world largest megacities, with a metropolitan area of 22 million inhabitants and located in an area exposed to multiple risks including geological and hydrological shocks, as well as political, economic and social stresses. In 2013, the city was selected to be part of 100 Resilient Cities. This initiative brought an opportunity to build capacities for urban resilience and the implementation of actions to improve adaptive capacity, disaster response and infrastructure with a resilience design for the city. Three years later, the Resilience Office published Mexico City Resilience Strategy, aimed to “... guide the government, the private sector, the civil society and the scientific community to respond to the main shocks and stresses in the city through an integrated cross-sectoral, multilevel approach ...”. The Strategy identifies key pillars and goals in order to build resilience at the community and city levels; however, after applying the National Council for the Evaluation of Social Development Policy (CONEVAL, Consejo Nacional de Evaluación de la Política de Desarrollo Social) methodology to assess policy design it has been identified the lack of indicators to evaluate it, in terms of adaptive transformation. The development of urban resilience in Mexico City requires specific criteria to achieve success. This paper looks at different assessment frameworks developed for similar initiatives around the world (ARUP, Global X-Network, Resilience Alliance). Additionally, analyses different assessment methods and frameworks and discusses insights from experts, researchers, consultants and government officials by carrying out a workshop, and identifying key elements as redundancy, resourcefulness, diversity and robustness to build adaptive capacity for resilience at the urban system level. Note the this paper identifies key criteria, and transformation indicators to assess the Strategy’s pillars. Finally, it recommends a road map to create a monitoring and evaluation system.

134 Delving into the politics of resilience: the role of social resilience cells and their alliances in the co-implementation of housing plans. The case study of HousingNOLA.

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This paper approaches 'resilience' through the new concept of 'social resilience cells' (SRCs). SRCs are defined as affordable housing providers or housing policy implementers who mobilize different discursive and material practices in their aim to influence the recovery profile of a post-disaster city, both socio-politically and through their housing initiatives. The analytical lenses of SRCs advance the political interpretation of resilience by elevating the notion from a single capacity of a system to resist shock and bounce back or forward in a linear, monodirectional way, to a highly politically sensitive, continuously changing, socially transformative process, with various 'bounce-forward' imaginations and trajectories steered and materialized by a heterogeneity of SRCs. This paper aims to further delve into the microphysics of resilience politics by shedding light on the politico-institutional role of SRCs, and more specifically on the practices, actions and strategies adopted by SRCs and their alliances to co-produce and co-implement more thoughtful and egalitarian post-disaster housing plans. The work is inspired by theories of social resilience, social and institutional capital and multi-level governance and relies on empirical data from ethnographic research of the Greater New Orleans Housing Alliance (GNOHA) and HousingNOLA; the institutionalized housing policy program in New Orleans that focuses on securing affordable housing for all city residents by 2025. The paper analyzes the ways in which alliances of SRCs such as GNOHA mobilize their members' social capital characteristics (endogenous and exogenous, individual and collective) in their interactions with institutions and decision-makers in order to monitor and ensure the implementation of jointly formulated housing plans. The analysis seeks to highlight the importance of the constant political presence of SRCs and their alliances in recovery governance arenas for the co-implementation of recovery plans that uninterruptedly treat all disaster affected-individuals and neighbourhoods in an equal way.

135 Dutch resiliency in the coastal Delta, by alert people (post PhD questionnaire research among Zaandam citizens)

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The Western coastal Delta zone of the Netherlands is the relatively more crowded area of the country where ten of the seventeen million people live. The governmental prognosis is that this number of people will increase to thirteen million three-times more. This is the picture in more Delta zones globally. In the light of climate-change this asks for a growing alertness on the topic of resiliency for this and comparable areas. Approaches of resiliency are often dominated by governmental rescue planning and believe in technology solutions. By comparing the flood disasters of the 2005 Katrina and 2012 Sandy thunderstorms that hit respectively New Orleans and New York we can learn that the behaviour of people can make the difference in overcoming climate change impact disasters. Post-PhD research with focus on the Dutch Zaanstreek-Waterland area near the city of Amsterdam where in 1916 a severe flood happened proved such. The outcome from focus group sessions was that the alertness and availability to act of the people makes the positive difference, if the memory of the area inhabitants is kept alert. The result is that the definition of resiliency could be improved into: the interplay in a triangular relationship of civil servants, technicians and residents. This Zaanstreek-Waterland research showed that the disaster from 100 year before still kept the inhabitants alert into resiliency. Therewith the question arose: 'how alert are the people of other Dutch Delta areas without such stored memory'. To prevent difference between theory and practice advanced questionnaire research among Zaandam citizens will be done, special for the IFoU 2018 conference. The results will be presented in Barcelona. An Old Dutch saying is 'God created the world, but the Dutch created the Netherlands'. The question is can the Dutch people continue this message in the future too.

136 Glasgow, environmental justice and community resilience

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I begin by identifying five primary discourses of resilience in Scotland in relation to climate policy; city resilience; regeneration; public health; and more recently 'transformational' community resilience. These simultaneously operate at national, city and neighbourhood scales, indicating a need for critical reflection on their impact across multiple levels and diverse publics.

As a member of the 100 Resilient Cities Network, Glasgow aspires to use a values-driven approach to address inequality through the lens of resilience and asset-based community empowerment. Drawing on Schlosberg's (2004:521) 'trivalent' conception of environmental justice (consisting of distributional, procedural and recognition dimensions), I explore the intersections between local socio-environmental concerns, environmental justice, the discourses of resilience and socially just climate policy.

Schlosberg reminds us that 'generalised social injustices are manifest in environmental conditions' (2013:40), and Glasgow's story reflects how Scottish urban socio-environmental concerns are inextricably linked with the economic and social legacy of rapid deindustrialisation, the failure of previous regeneration strategies, and the consequent number of isolated buildings and derelict land (Fairburn et al., 2005). Using participatory action research in a neighbourhood of multiple deprivation, I identified the current absence of an environmental justice discourse to challenge the health inequalities of living in proximity to vacant and derelict land and poor local environmental quality (Maantay 2013). This was reflected in a disconnect between community development initiatives and a range of fragmented environmental interventions which, if better coordinated, could facilitate an inclusive *well & green* narrative.

By introducing an environmental justice frame at a neighbourhood and city level, I subtly shift the focus from assets to rights, sustainable consumption *and* inequality for low-income neighbourhoods. I conclude by proposing an integrated social, environmental and climate justice framework to crystallise and navigate the discourses of resilience towards 'transformational' community resilience.

137 Incremental Urbanism: Designing a Resilient Urban Strategy for the Ger Districts of Ulaanbaatar

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For thousands of years, Mongolians have been living in *gers* – portable structures made of timber, felt and canvas. Throughout the history of Mongolia’s capital city, Ulaanbaatar, the *ger* has remained the predominant dwelling for new migrants, a resilient typology indifferent to technological progress or to the radical political and economic shifts occurring after the 1990 democratic revolution.

Since 2002, land reforms have accelerated the migration of nomads to the city. The ease and speed of replication of the *ger* in numbers reaching hundreds of thousands has created sprawling districts lacking basic urban infrastructure. During extreme winter temperatures that reach -30°C, residents use coal to heat their homes leading to toxic levels of air pollution. Over 60% of the city’s population live in these districts. The urban risks associated with this form of settlement are becoming increasingly threatening, particularly with respect to sanitation, freshwater supply and air quality. Additionally, as the *ger* is designed for singularity rather than collective living, the notion of the civic, or forms of community are absent.

The paper demonstrates that the *engineered* resilience of the *ger* as a dwelling typology has led to unsustainable urban development. By analysing the process of transformation of *ger* districts, the objective is to propose a framework for incremental change that advocates a position for *social-ecological* resilience. The essay will investigate the disadvantages of current approaches to *ger* district redevelopment and will report on the impact of the construction of a series of architectural prototypes including an affordable housing unit, a community innovation hub and a waste collection facility that have been developed as part of the incremental plan. The strategy is a unique example of how urban resilience can be addressed through interventions that tackle urgent issues yet can allow for future adaptation and transformation.

138 Influence of grassroots initiatives on forming urban resilience within communities

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Grassroots initiatives are nowadays gaining importance as defenders of widely-understood aspects of humanity and leading critics of neoliberal, nationalist or austerity policies. This paper reviews and examines the impacts of grassroots initiatives – more specifically solidarity movements – on forming urban resilience within urban communities in Germany and Greece.

Therefore, the paper addresses the following questions:

4. What role do initiatives play in the political-administrative system and what influence do they have?
5. What contribution can initiatives make through their commitment to the resilience of a city?
6. How and to what extent do the undertaken activities contribute to strengthening urban and in particular community resilience?

By combining literature research, field studies and qualitative interviews with representatives from solidarity movements, politicians and public actors in the field of urban development in selected German and Greek cities are conducted. It aims to analyse the influence of urban communities and grassroots initiatives on urban resilience.

Based on a comparative research approach, the paper shows that initiatives in German cities tend to criticise socio-political grievances whereas initiatives in Greece are inclined to an active struggle to reduce the occurrence of socio-economic and political difficulties. The actions of German initiatives have risen significantly in the last years and are mainly reflected in severe criticism of political ventures, a fight for human equality, as well as in inclusion of the vulnerable society. Conversely, the Greek solidarity movements aim to diminish post-crisis austerity symptoms and combat the ubiquitous non-respect of the human rights of Greek citizens by politicians.

139 Integration and instability: the resilience of urban refugees in Dar es Salaam, Tanzania.

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Recent global trends have seen a steady increase in both the levels of urbanisation and forced displacement worldwide. This nexus of challenges is evident in the Great Lakes region of sub-Saharan Africa, where protracted conflicts have produced large populations of refugees, in tandem with the rapid growth of cities such as Dar es Salaam, Tanzania. For an urban municipality, the presence of a burgeoning urban refugee population in Dar es Salaam presents a number of difficulties. As a city with 5.6% annual growth, Tanzania's primary city is already struggling to contend with migration from rural areas, poor infrastructure, the effects of climate change and widespread informality. To successfully integrate refugees into a host community with whom they will have to compete with for employment and access to basic services requires the municipality to support the refugees' own resilience strategies, and facilitate wider community resilience through urban institutions. This paper will examine what types of resilience strategies have emerged, both at an individual and institutional level in Dar es Salaam, as a consequence of the urbanisation-displacement nexus. Using Ager and Strang's integration framework, the limitations and opportunities inherent to creating a more inclusive space in the city will be considered.

140 Local knowledge mobilization: The potential for participatory GIS and photovoice methods as community resilience strategies

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Community resilience can be defined as the ability of complex socio-ecological systems to adapt and continually transform in order to overcome the strains and disturbances faced within the system. In recent decades, resilience implementation measures and their outcomes have increasingly demonstrated that in order to foster such an ability, they must be founded upon an understanding of the context-specific social dimensions of vulnerability—understanding the needs, the contexts, the social capital and the interests at play within communities. Contemporary literature has illustrated the short-sightedness and disastrous results that come from risk assessments and conceptions of vulnerability that have failed to take into account social context and local knowledge. In order to develop resilience strategies that support and sustain thriving communities, local knowledge must be integrated into decision-making processes, giving voice to multiple stakeholders and building towards a more equitable and inclusive social support system.

This paper explores how urban resilience strategies can pursue the fullest representation of diverse communities. Two participatory research methods are presented as tools for mobilizing community knowledge in the development of resilience capacity. Here we argue for the potential of photovoice and PGIS (participatory global information systems) as methods for investigating community knowledge and experience, in order to most effectively capture and integrate this knowledge into context-specific resilience policies and plans. By exploring the principles and practices of these two qualitative methods, their successes and challenges, and their particular aptitude for gaining unique community perspectives, this paper demonstrates the potential of participatory research methods for informing urban resilience strategies to bridge the gap between broader development agendas and social need.

141 Making Neighbourhoods Resilient: The Social Construction of an Identity

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In the last three years, in the PROHABIT project (www.prohabit.org) we have carried out a study about the roles of communities in the urban transformations in three neighbourhoods of Barcelona: Plus Ultra, Trinitat Nova and Vallcarca. In all three districts, and after persisting in their claims during a long time, neighbours have gotten the city council to change their plans. Community resilience has overcome the contingencies associated to the economic and political changes over more than two decades. Neighbours' associations, civic organizations and activist groups have defended what they considered to be the essential features of their neighbourhoods against the plans and regulations approved by the successive municipal governments. In this confrontation, neighbours had first to build an image of what they thought the neighbourhood really is and then defended against political and economic powers. This image is a social construction unique in each neighbourhood built with personal memories of their residents. In Plus Ultra and Trinitat Nova, the holders of these memories were the eldest residents who settled when the first houses were built. In Vallcarca, the leaders have been young activists who have made the memory of their neighbourhoods their own.

The research we have conducted to examine the process of social construction of an identity has been based on interviews with key actors, non-participant observations of public spaces, literature analysis and participatory actions. The analysis of the collected information has been carried out using an open quality data analysis tool specifically created for this research project (www.prohabit.org/mapper). With this system, the analysis carried out by researchers is available to the citizens. Navigating through this information system becomes enables experts and laypeople to understand the links between social and physical structures in the three studied neighbourhoods in a comparative manner.

142 Managing Resilience in Neighbourhood against Over-Tourism. Case study on Kyoto.

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Over the decades, tourism has experienced continued growth and become one of the fastest growing economic sectors in the world. However, in some cities like Venice, Barcelona and Kyoto, tourism has become an important political issue; “overtourism”. It has become clear that too much concentration of touristic activities in some destinations in a city often could make inhabitants feel that there are too many visitors and that the quality of life in the area or the quality of the experience has deteriorated unacceptably. The advent of sharing economy for tourism accommodation like Airbnb has also provoked serious tensions between local residents and incoming tourists. Barcelona is struggling to cope with the sheer numbers of visitors, and the debate has erupted on a global stage, with residents’ rising anger and frustration over the intolerable rising land price and its following lack of affordable housing, which have been blamed on private accommodation being rented illegally. Japanese cities are not the exception. In recent years, the growing demand for touristic accommodation in Kyoto has been apparent due to explosive increase of foreign tourists. Among others, the number of cheap lodging house including holiday rental of private rooms has been emerging very rapidly. Therefore, this study aims at 1) identifying a trend of site location of holiday rentals, 2) examining social impacts to its neighbourhood and 3) arguing possible counter measures from urban planning perspective to improve living condition and resilience of neighbourhoods that have been struggling for the overtourism. The implications are as follows; 1) holiday rentals have started to be located in residential area and in the narrow alley, 2) the number of accommodations owned by private corporate is increasing and the increase of those accommodation might produce the rapid increase in land prices and subsequent urban and social change of neighbourhood.

143 Proposed scenarios for the use of Social Resilience Digital Tools in the assessment of refugees' integration process in the Greek cities

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Since 2015, the influx of refugees in the Greek cities has resulted in social instability, exacerbating an already tenuous situation accrued by the economic crisis, as denoted by Sakellis et al (2016). In the light of the Smart City narrative and the use of digital tools in everyday urban practices, Greek cities have done very little to incorporate digital technologies and fortify their social resilience.

This study explores the potential use of co-creation digital platforms in the social-led regeneration process of urban open spaces in Greek cities under refugee shocks. The literature review includes the terms of Resilience and its typologies, Urban Informatics, Urban Big Data and Digital Tools. Furthermore, the research hypothesis refers to the extent of the use of new digital technologies contributes to the capacity building related to timely self-organization, sustainability and social resilience. In this context, the use of emerging technologies could enable Communities of Practice, as denoted by Afzalan et al. (2017), to become the administrators of digital platforms, to identify Communities of Concern, as defined by UNHCR (2018), to bring them together and advance their capacity. Therefore, in the current proposed scenarios, local communities could incorporate digital tools to facilitate Focus Group Discussions, identify problems and propose solutions, as well as implement ideas that promote the productive use of urban open spaces in economic and social aspects, such as pop-up stores for refugees' products, open markets, collective kitchens and cultural events.

In the end, the described scenarios include both locals and refugees as stakeholders in decision-making processes and open a dialogue on how the use of digital tools could sustain the cultural co-habitation in urban open spaces, feeding the discussion about the empowerment of an increasingly diverse social capital in the "arrival" cities of Greece.

144 Real-World Labs for co-producing Urban Resilience

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Urban resilience is understood as “the ability of an urban system [...] to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity (Meerow et al 2016, 39).” Urban systems are understood as „social–ecological–technical/built system (SETS)” (McPhearson et al 2016, 207). Active citizens can increase the resilience of various SETS and contribute to a sustainable transformation of cities (Frantzeskaki et al, 2016). To strengthen and to implement such contributions into public planning practice, new instruments for cooperation are needed that support citizens and municipalities to co-produce urban resilience. Therefore, concepts for the governance of socio-ecological systems like adaptive co-management (Folke et al, 2005) have to be adjusted to urban system dynamics including urban developments, spatial conflicts and underlying power structures (Crowe et al, 2016). To develop such instruments the paper suggests applying real-world-labs, as they provide a framework to bridge theory and practice in urban resilience research. In real-world-labs researchers intervene with the aim of gaining socially robust knowledge about transformation processes. They build upon a transdisciplinary perspective, aim to initiate mutual learning processes, and foster sustainable transformations on both a local and global scale (Schneidewind et al, 2016). Within my research I use the Gängeviertel in Hamburg as a real-world-lab. The quarter was occupied in 2009 and is now developed by the City of Hamburg in cooperation with citizen organisations to create apartments, studios, workshops and a sociocultural centre. In doing so, the cooperation partners co-produce an urban space that strengthens the resilience of the city. (Ziehl, 2018). The paper illustrates the applied research method and presents recommendations for action to co-produce urban resilience as a contribution to future research about urban co-management instruments for more resilient cities.

145 The Actualization of local-specific Urban Culture: The Case of Traditional Street Markets in Jakarta.

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In our previous studies on traditional market conducted by the Urban Laboratory of Tarumanagara university, we have identified the different typologies of the traditional market and its positioning in the city today. One important finding is that the traditional street market has the function not only to provide the surrounding neighbourhoods with everything they need for everyday life, but it also plays relevant role for the existence of local-specific urban culture.

The paper provides a better understanding of the traditional market as a local-specific urban institution in general and the contribution of the specific role of street market to the diversity of urbanity in particular. The research argues that the original concept of “City for All”, which should be understood that the city for all must include “local-specific interpretation of urban way of life” that would contribute to redefining the model of resilient urban system.

To evaluate the current urban policy with regards to the “City for All” concept and how it has been implemented by the public and private actors, the research employs qualitative data collection methods through series of field surveys at the selected locations, interviews with the relevant stakeholders, and document analyses.

The paper finds that the circulated misinterpretation of the concept “City for All” has led to the marginalization of the local-specific urban tradition. Moreover, the city of Jakarta has systematically erased the traditional market away from the city map by subordinating them under the “modern retail” or simply by prohibiting the street market to operate as the expense of better traffic. Consequently, the city becomes incapacitated and loses its ability to synergize the old-existing part of the city with the new model of urban form.

146 Urban gendered 'we'ness of resilience

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Feminist urban theorists, Peake and Rieker, argue “the urban, now more than ever, is a political stake that opens up and close off new possibilities and constraints” (2013, 12). The vital yet invisible (Escobar, 2012) role of women’s groups who serve as providers of social and economic resilience (Katz, 2004) in ordinary cities warrants consideration. This ‘we’ ness (Simone, 2015) of women’s groups cannot be underestimated because it allows for unexpected yet powerful manoeuvrings through social mobilization. We should not be using the word ‘community’ in relation to urban, rather the emphasis could be on the word “we” or ‘collective’. These two words convey the fluidity of movement that occurs in the city.

I argue urban resilience should also be linked with gendered aspects of the city. Women provide social reproductive services within their communities as well as economic safety nets. Using the rapidly urbanising context of Nepal, an evidence based conceptual space is created to showcase the invisible and vital resilience function of women’s groups in under researched cities. The urban risk governance landscape allows women to be resilient but they are not allowed by the existing governance structures to rework the urban to suit the needs of themselves, their families and their networks.

SDGs number 5 (gender equity) and 11 (sustainable cities and communities) are intertwined and require understanding and debate because they are fundamental to our collective future world. There are opportunities for intervention to foster progressive change and sustainable development by attacking the root causes of structural inequality. Given the current context in Asian cities where the local level is the site where risk governance is increasingly decided, socially just futures can be gained by making visible, listening to and engaging with women more substantively.