אוניברסיטת תל אביב

AESOP

אוניברסיטת בן-גוריון בנגב
המחלקה לגאוגרפיה ופיתוח סביבתי

Wednesday 7th – Friday 9th November, 2018 | Ben-Gurion University of the Negev

ABSTRACTS,
Program and List of participants

PROGRAM

Wednesday, November 7 | Ben-Gurion University of the Negev, Beersheba	
8:45 AM	Registration and morning coffee
9:15 AM	Opening & Icebreaker
10:00 AM	Keynote lecture: **Prof. Ehud Meron**, Department of Solar Energy and Environmental Physics, Ben-Gurion University Discussant: Dr. Sayfan Borghini
11:00 AM	Coffee break
11:30 AM	Session 1: **Theorizing urban complexity** Chair: Itzhak Benenson From the Synthesis of Form to Sequences – the development of Christopher Alexander's thinking on handling complexity in the built environment | *Yodan Rofe* Planning and rationality: a multi layered perspective within a complex environment | *Gert de Roo and Camilla Perone* Cellular Automata, Agent-Based Modeling… What Comes Next? | *Itzhak Benenson, Yonatan Almagor, Daniel Czamanski*
1:00 PM	Lunch break
2:00 PM	Session 2: **Patterns in a complex urban world** Chair: Ward Rauws How to visualize urban complexity, diversity and uncertainty through the impact analysis of Airbnb on contemporary cities | *José-Miguel Fernández-Güell* Patterns of Un-Secured Areas in the Built Environment | *Dalit Shach-Pinsly* When contradicting patterns of public space collide: The case of Palestinian Israeli towns | *Maisa Totry-Fakhoury*
3:30 PM	Coffee break
4:00 PM	Urban Complexities, Textual Complexity: Hermeneutics as an Ethical Key for Planning | Roy Lavee and Moshe Lavee Beersheva: A conversation with The Southern District Planner and with the City Architect
5:00 PM	A tour in Beersheva as an evolving metropolitan center
7:00 PM	End of the first conference day: out for dinner (own expense)

Thursday, November 8 | Ben-Gurion University of the Negev, Beersheba	
8:30 AM	Morning Coffee
9:00 AM	Session 3: **Towards responsive governance** Chair: Gert de Roo Agile Governance: Opportunities and barriers for the adoption of IoT data in Manchester's urban governance | *Ulysses Sengupta, Deljana Iossifova, Amir Khorasani, and Robert Hyde* A political-economic geography of informality | *Tomer Dekel*

10:00 AM	Session 4: **Adaptive cities** Chair: Jenni Partenan Anti-Adaptive Urbanism | *Nurit Alfasi* Getting grip on Adaptive Planning | *Ward Rauws* Project-Based View of Urban Dynamics as a Basis for Analysis and Modeling | *Yulia Grinblat and Itzhak Benenson*
11:00 AM	Coffee break
11:15 AM	Workshop: **Emergent patterns of informal urban structures**
1:00 PM	Short lunch break
1:30 PM	Moving to Tel-Aviv via Jerusalem: A bus trip to Jerusalem
3:30 PM	A meeting with Jerusalem's city planners
4:00 PM	A tour in the Old City of Jerusalem
7:00 PM	Dinner at a local restaurant (own expense)
9:00 PM	Starting our way to Tel-Aviv (expected arrival: 10:00 PM)

Friday, November 9 | Tel Aviv university, Tel Aviv	
9:00 AM	Morning Coffee
9:30 AM	Session 5: **Planners and planning: Coping with complexity** Chair: Yodan Rofe Planning for self-organization with complementary system of rule based and case based planning | *Jenni Partenan* Planning from emerging patterns: the role of planners | *Paulo Silva* Action and the city: Emergence, complexity, planning | *Stefano Cozzolino and Stefano Moroni*
11:00 AM	Coffee break
11:30 AM	Session 6: **Modelling and measuring complex urban structures** Chair: Paulo Silva Urban movement: Between street networks complexity and cognitive simplification of distance | *Itzhak Omer* Urban Structure and Complexity: Mathematical Modeling to Inform Policy | *David Burg* Urban life cycles – when and where power laws? | *Dani Broitman, Itzhak Benenson, Daniel Czamanski* Building digital societies: potential contributions of Micro-simulation and Big data in tourism research | *Inês Boavida-Portugal*
1:00 PM	Wrapping up and going to lunch (own expense)

List of participants

Nurit Alfasi, Ben-Gurion University of the Negev, Israel, nurital@bgu.ac.il

Itzhak Benenson, Tel Aviv University, Israel, bennya@post.tau.ac.il

Dani Broitman, The Technion - Israel Institute of Technology**,** Israel, danib@technion.ac.il

Sayfan-Guilia Borghini, Holon Institute of Technology, sayfanst@gmail.com

Daniel Czamanski, Western Galilee College. Israel, danny@czamanski.com

Inês Boavida-Portugal, University of Groningen, Netherlands, i.boavida.portugal@rug.nl

David Burg, Shamir Research Institute, University of Haifa, Israel, biomodel@research.haifa.ac.il

Stefano Cozzolino, ILS, Research Institute for Regional and Urban Development, Aachen University, Germany, stefano.cozzolino@ils-forschung.de, stefano.moroni@polimi.it

Tomer Dekel, Ben-Gurion University of the Negev, Israel, tomerdkl@gmail.com

Yulia Grinblat, Tel-Aviv University, Israel, solo2307@gmail.com

Nava Kainer-Persov, The Technion - Israel Institute of Technology, Israel, nava.kainer.persov@gmail.com

Roy Lavee, Munucipality of Beersheva, Israel**,** royil@br7.org.il

José-Miguel Fernández-Güell, Universidad Politécnica de Madrid (UPM), Spain, josemiguel.fernandez@upm.es

Itzhak Omer, Tel-Aviv University, Israel, omery@post.tau.ac.il

Jenni Partenen, Tampere University of Technology, Finland, jenni.partanen@tut.fi

Ward Rauws, University of Groningen, The Netherlands, w.s.rauws@rug.nl

Yodan Rofè, Ben-Gurion University of the Negev. Israel, yrofe@bgu.ac.il

Yaara Rosner, -Gurion University of the Negev, Israel**,** yaara.rosner@gmail.com

Gert de Roo, University of Groningen, The Netherlands, g.de.roo@rug.nl

Camilla Perrone, University of Florence, Italy, camilla.perrone@unifi.it

Dalit Shach-Pinsly, The Technion – Israel Institute of Technology, Israel, dalitsp@technion.ac.il

Paulo Silva, University of Aveiro, Portugal, paulosilva@ua.pt

Maisa Totry-Fakhoury, Ben-Gurion University of the Negev, Israel, totryfak@post.bgu.ac.il

Ulysses Sengupta, Deljana Iossifova, Amir Khorasani and Robert Hyde, University of Manchester, u.sengupta@mmu.ac.uk

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Planning for Self-Organization with Complementary System of Rule Based and Case Based planning | Jenni Partenen

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ABSTRACTS

Anti-Adaptive Urbanism: The Long-Term Impacts of Constructing Anti-adaptive Neighborhoods in Israel

Nurit Alfasi

The term 'Anti-Adaptive Urbanism' relates to places that appear to have difficulty to change and to adapt to new circumstances. This paper is dedicated to discussing and examining these places, in three stages:

First, the paper relates to the typical patterns of anti-adaptive urbanism and highlights the qualities that make specific neighborhoods so stubborn. One is the comprehensiveness of the neighborhood plan, meaning that neighborhoods are built in accordance with a complete plan prepared in advance that includes the public and private elements; another is the hierarchical design dedicated for creating an inward-turned residential areas.

Second, the paper refers to prevalent models of neighborhood planning and assesses the degree to which they are adaptive/anti-adaptive. Specifically, the paper related to the influence of early-modernist models as 'neighborhood unit' and 'towers-in-the-park'. The claim is that although theoretical models of planning neighborhoods have changed since the midst of the 20th century, this is not necessarily the case with the practice of planning and building new neighborhoods. We therefore relate to these models and explain why they are in fact anti-adaptive.

Finally, and with respect to the first two stages, the paper examines the long-term implications of building such anti-adaptive neighborhoods. We do that through presenting pairs of old and new neighborhoods constructed in five cities throughout Israel. The old neighborhoods were built by the government in the 1950s and 1960s whereas the new ones were built by private developers in 1990s and early 2000s. The study examines changes in residents' characteristics over the period of 1983-2013, assesses the municipal maintenance and services, and evaluates resident's point of view. The results reveal the deep stagnation of old anti-adaptive neighborhoods and raise bothersome questions regarding the fate of the new ones.

Urban life cycles: when and where power laws?

Dani Broitman, Itzhak Benenson, Daniel Czamanski

There are persuasive arguments for the existence of urban scaling laws. Linear rank-size log-log dependencies successfully approximate different aspects of various urban systems at different times. Despite the vast empirical work on this topic, the theoretical explanation and empirical validation of the laws remains controversial. We still lack dynamic mechanisms that generate rank-size rules and the very concept of urban scaling remains inherently statistical, representing configuration status of a system of cities at a specific point of time. In order to conceptualize the interaction between (dynamic) life cycles of cities and the scaling laws observed for their instantaneous images, we present an urban model that focuses on evolving firms and simple economic rules that govern their behavior in regards to the competition for workers, salary inequalities and innovation. We create several dynamic scenarios that result in a various rank-size patterns that sometimes reflect only a momentary configuration of an ever-changing system.

Building digital societies: Potential contributions of Micro-simulation and Big data in tourism research

Inês Boavida-Portugal

Tourists are increasingly using social media to browse and share information about destinations and experiences. The term ‘Wisdom of Crowds’ was coined by Surowiecki (2005) and refers to the idea of collective intelligence. One of the most well-known examples worldwide is the Wikipedia project where user generated content is provided, feed and shared. In the book the author revolves around why the many are smarter than the few and how collective wisdom is shaping societies and businesses. Tourism is not an exception: the proliferation of Web 2.0 (e.g. TripAdvisor) is shifting the marketing paradigm from a businessto-consumer to a peer-to-peer model for the sharing of information (Lu, Mao, Wang, & Hu, 2015) . These information agents (Travel 2.0 users) represent a more reliable and trustworthy source than the business suppliers (Miguéns, Baggio, & Costa, 2008)

. Litvin, Goldsmith and Pan (2008) state that interpersonal influence and word-of-mouth (WOM) are the most important information source in tourist decision-making process. Tourists look for information in user generated content websites to support their decisionmaking process on peer reviews, WOM is shifting to electronic WOM. In some countries Web 2.0 surpasses personal recommendations as the preferred means of obtaining travel information.

In this paper the discussion focuses on the potential big data offers as an alternative source of information to the understanding of critical constructs such as purchasing behaviour, brand/destination loyalty, intention to recommend, awareness of a destination, and information sharing through social networks. Micro-simulation models provide an alternative means (for example to structural equation models) of conceptualizing and simulating issues influencing tourist awareness, perceptions and experience within a destination. Microsimulation models fueled by big data hold promise in addressing several key aspects of tourism and provides a "virtual social laboratory", a tool to think and experiment with. In the tourism planning context Agent-based modelling (ABM) give the opportunity for planners and stakeholders to engage and experiment with possible future paths and adopt management approaches and policies accordingly, avoiding trial-and-error and reactive planning and assessing impacts of real and/or hypothetical planning decisions (Johnson & Sieber, 2010). The ability to represent and visualize a multitude of individual decision-making behaviours constitutes one of the main advantages of an ABM-based PSS. One image states more than a thousand words and stakeholders pointed out as beneficial to visually analyse the impact of possible futures through iterative experimentation (Johnson & Sieber, 2011). The possibility of co-developing the model with a group of potential users (e.g. stakeholders) with multiple viewpoints, a process called companion modelling, is believed to make the use of an ABM-based PSS more relevant to planning issues (Barnaud, Promburom, Trebuil, & Bousquet, 2007; Becu, Perez, Walker, Barreteau, & Le Page, 2003; Farsari et al., 2011; Stevenson et al., 2009; Zahra & Ryan, 2007; Zellner, 2008). However, despite several potential areas of application for ABM within tourism planning, Johnson (2009) identifies several barriers to the adoption of an ABM-based PSS. ABM by itself is not going to implement a policy or make decisions, these are in the hands of the planners and ABM is just one tool in the planners' toolbox.

Urban Structure and Complexity: Mathematical Modeling to Inform Policy

David Burg

Cities are complex systems of interacting networks eliciting emergent properties. The past decade has seen a proliferation of multidisciplinary techniques to research the patterns of cities, especially their macroscopic properties. For example, topological analysis of infrastructure networks has been shown to be useful in urban research. The results indicate a powerful recurring pattern in the data of these socio-historical phenomena. We present here the effectiveness of a number of mathematical methodologies to model the performance of an urban system, using the Israeli urban system as an example. One application permits an apples-to-apples comparison among municipalities, even over orders-of-magnitude differences. More, important insights into the dynamics of the complex built environment of the physical infrastructure, as well as many more variables, can be gained. These modes of macroscopic analyses of sociological structures, coupled with the dynamical evolution of the system, allows the elucidation of a powerful new theory-based paradigm to inform decisions of policy-makers at all levels of government.

Action and the city Emergence, complexity, planning

Stefano Cozzolino and Stefano Moroni

Since Jane Jacobs' pioneering, ground-breaking work, cities have increasingly come to be seen as complex, dynamic systems. This has had a significant impact on descriptions and explanations of urban phenomena, but far less on the issue of planning regulations and measures. In short, a seriously consideration of the issue of complexity poses entirely new challenges for planning; challenges which demand new responses.

This article assumes action to be a crucial aspect of complexity. Yet it makes a clear distinction between (i) individual actions and (ii) the interaction between them. This distinction not only introduces relevant descriptive aspects regarding, for

instance, the nature of (complex) urban dynamics but also (and primarily) highlights a number of key issues that must be taken into account by planners who wish to tackle complexity. Therefore urban complexity challenges (public) planners as they are inevitably forced to deal with problems of limited knowledge and ignorance about future events. In practice, this means that (i) not only the chances for planners to guide urban development towards predetermined, specific outcomes are inexorably limited, but (ii) also that complexity itself is something that must be preserved, and not fought or avoided. In other words, the main responsibility of planning should be to favour the development of cities that are congenial places for complexity to flourish.
In order to delve deeper into these issues, we will first of all consider a fundamental question: why is the city complex? Answering this question will help in reconsidering another crucial issue: what is the role of planning in complex cities?

A political-economic geography of informality

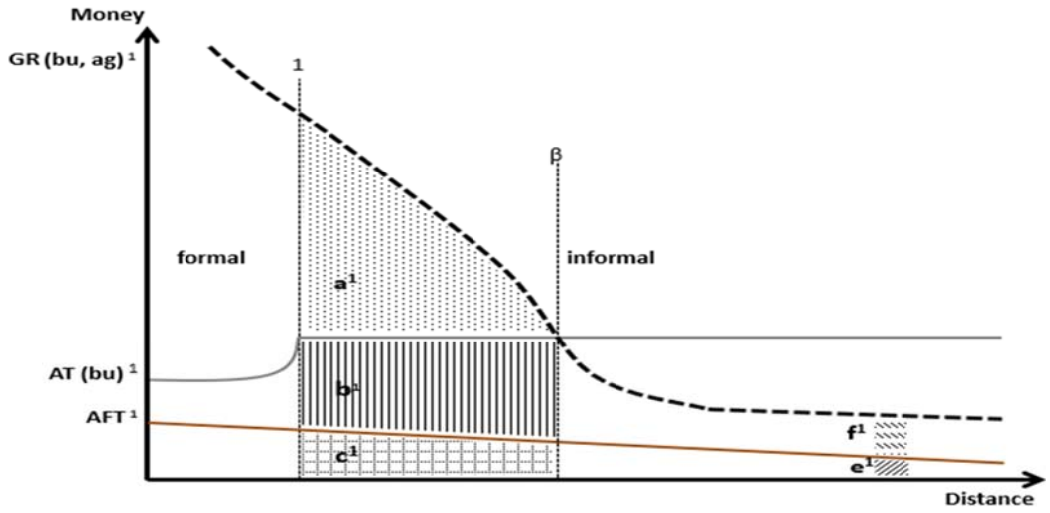
Tomer Dekel

In my lecture I wish to present a new theoretic model in political-economic geography that attempts to propose a temporal and spatial understanding of the spread of informal spaces around (south-eastern) metropolitan cores – a prevalent phenomenon that affects the lives of more than a billion people around the world today. Informality is only recently receiving proper scholarly attention, but this attention is largely concentrated around the politics of informality and its economic underpinnings, without investigating its spatial dispersal and implications. Particularly, there is lack of theorization regarding the conflicts between governments and development coalitions to the informal inhabitants and their political allies. These conflicts are rising in number and influence where formerly under-developed metropolitan cores experience fast economic growth and therefore spatial expansion, thrusting against the informal periphery that surrounds them. My research attempts to provide a first of its kind geographic theorization of informality and its related conflicts, drawing especially from the well-established 'rent gap hypothesis' about gentrification in inner city neighborhoods.

I start with analyzing a hypothetic metropolis by separating it into two periods: (1) under industrialized and (2) industrializing. Two ground rent curves (GR) are drawn for each period, with a familiar climax in the core and a gradual decent with

distance towards the outer rings. The curve of period 2' is significantly higher and wider than in period 1'. Next, threshold lines a drawn: an aggregated threshold for owners (state of private) to implement any land-use, regarding the costs of such use (agriculture and building are taken into account) in relation to the potential ground rent to be extracted. Under a certain threshold, rational owners will leave their plot vacant until a future rent increase. This means that the dispersal of vacant plots have a spatial pattern – from a certain distance of the core and outwards.

During period 1', anywhere from a given distance (point 1') is left vacant. In contrast with north-western contexts, in the south-east these plots do not stay vacant but become the target of (largely) impoverished classes that cannot afford taking part in the formal housing market and turn to squatting. When we reach period 2', all or most of the territory from point 1' outwards is informally occupied. Any attempt by state or private owners to extract the rising potential ground rent off of their land must take into account interaction with the occupiers. This interaction, while political in nature, can be also quantified in costs, regarding three possible policy routes: enforcement (evacuation and resettlement); formalization (providing the squatters with titles); or business-as-usual (continuing informality). The model proposes a measurement of the costs and profits from each policy. Enforcement is expansive and is not economically profitable if the potential returns is less than the threshold costs for the land-use together with the enforcement costs (aggregated threshold, AT). In the diagram, a' represents the profit after enforcement, what implements that enforcement is economically favorable. In formalization the potential ground rent is forfeited, but a certain rent can be extracted from the inhabitants, given that this does not surpasses an average housing affordability threshold (AFT) of the lower classes. Any rent above it will be practically too expansive and will drive them for more informal squatting. C' in the diagram represents the potential rent from formalization, which implies substantial economic loss. The ratio that gives us the 'Rent Gap Effect' (RGE), a tool to consider the economic weight behind each policy is: $RGE = \frac{2a}{c}$



A policy of business-as-usual is most probable anywhere where there is no rent to be extracted from informal occupiers ($c' \leq 0$) but there is also no rent to be extracted beyond the needed costs ($a'=0$). The model not only provides a policy assessment measurement, but also a theory of actual policies implemented around metropolises. It dives beneath the passionate political discourses to uncover the sound economic logic behind the informal politics and clashes of our time. The model is tested in Be'er-Sheva metropolis, where existing rich research did not pay attention so far to any economic dynamics behind the conflict over the Bedouin informal peripheries that surround the emerging metropolitan core.

Project-Based View of Urban Dynamics as a Basis for Analysis and Modeling

Yulia Grinblat and Itzhak Benenson

The conceptual simplicity of Cellular Automata (CA) makes them a standard tool for simulating urban phenomena. CA view of the city is based on the representation of urban space as a uniform grid of square cells that reflects the structure of the standard satellite Remote Sensing images. Gird-based representation of urban reality demands dealing with the meta-features – land parcels, roads, construction projects, etc., each being an aggregate of the elementary cells. If so, shouldn't we directly base on these meta-features in our modeling exercises?

We investigate the above idea by considering city as a pattern of development projects of different kinds and size. Within this framework, urban dynamics is a self-

organizing process of establishing new projects each being an outcome of a compromise between developers and regulators – planning offices and municipalities. The regulators establishes special and temporal restrictions that aim to enforce the developers to follow the development plans, while developers aim at maximizing economic utility of their projects and always try to loosen these restrictions.

Projects' type, size and location critically impact urban growth pattern. These characteristics depend on developers' economic abilities and define the time necessary to obtain construction permission and construction time. Even before completion, projects influence development in surrounding areas; some of them draw new developments around thus preserving the attractiveness of the entire area for further development, while the other do not.

The paper presents a project-oriented empirical study of the land-use dynamics in three Israeli cities, Netanya, Haifa and Safed during 1960s-2010s. Based on aerial photos taken at five moments of time within this 40-years period, we estimate the relative importance of factors that can determine projects' role in urban dynamics – project's type, size and location that can be within already constructed area, on the urban fringe or beyond it. We demonstrate that the majority of new development projects are relatively small and located within the city fringe. Industrial projects tend to be larger than residential ones, but the latter attract more development around. Projects that are established in the vicinity of existing ones are larger beyond the fringe than within it and often of the same type as the initial projects.

The results of our analysis will provide a basis for project-based model of urban dynamics that accounts for decision-making of developers and planners and interaction between them.

Evaluating Housing Regeneration Programs from a Social Equity Point of View

Nava Kainer-Persov and Naomi Carmon

Housing regeneration projects became popular in many large cities around the globe in the first decade of the 21st century. These projects are significant in that they affect the lives of a growing fraction of the population - especially the most vulnerable. The large number of these projects in Israel makes it a "laboratory" for housing redevelopment strategies. The research analyzed strategies of housing regeneration and suggests a methodology for evaluating them from the point of view of social equity. Three dimensions of justice were studied from the standpoint of those who lived in the old housing before the renewal project took place: distributive justice

(cost and benefits), procedural justice (participation in the decision-making process), and social mix (the mix and the nature of contacts between those long-timers and new higher-status residents). For each of the three, the measurement included: outputs (immediate results), outcomes (medium-term results), and impacts (long-term results). The methodology was implemented in an empirical study in Israel. A post-occupancy evaluation study using quantitative and qualitative methods was conducted in housing projects of redeveloped according to two housing regeneration strategies: Demolition and Redevelopment, and housing densification via the 'TAMA 38' National Plan. The findings are based mainly on interviews with local residents in the renewed housing; both long-time residents and new residents. The analysis and discussion of social equity includes issues of gentrification and displacement (only 40% of long-time residents remained in the renewed neighborhood) and investigation of distributive justice in the form of benefits and costs in the scales of the household, the neighborhood, and the city. Theoretical insights and practical recommendations were derived, including suggested changes in regeneration plans and the provision of affordable housing.

Urban Complexities, Textual Complexity: Hermeneutics as an Ethical Key for Planning

Roy Lavee, and Moshe Lavee

Cities, as any other complex system are characterized by the seemingly "natural" emergence of unplanned structures and patterns, reflecting the conglomerate effect of various agents, factors and actors in the urban sphere. The act of planning, as understood in the modern era, aspired to set a grid of disciplined order over space and society. Acknowledging the city as a complex system, as a continuously evolving entity, contemporary planning does not govern the city, but rather participates from within, listening to the living rhythm of emerging patterns. The challenge of connecting the urban being with the living actors within the city demands a search for sources of inspiration typify be similar models of rich multilayered complexity in which the planning vector and the actual actors corresponds in a continuous encounter .

In this talk pursue a journey begun in former works and lectures, tackling principal urban planning questions through a correspondence with Jewish textuality,

exploring analogous aspects in the history and the continuous living language game within Jewish textuality as a helpful tool to think through planning challenges. Urban planning, demands awareness to pre-conceived paradigms, and to the ethics, responsibilities and power relations attached to Planning .

The history of Jewish textuality, and especially of legal discussions and interpretations reveals an interesting relevant pattern if tension between "massive planning interventions" and organ complex growth. Once in few centuries there appears a new canonical work, which offers a new structure and arrangement of the legal corpus. Following the reception and canonization of such a work, a novel activity of discussions and interpretation of this work begun, preserving the key structure of the work. However, the new structure does not entirely replace former modes of knowledge arrangements, and some textual activity continues to follow the earlier structures. Drawing the different maps of textual activity, the fraction of divergent mega-grids and complex growth as well as their co-existence is suggested here as a potential inspiration for tackling the ethics of planning .

We will examine how these textual paradigms can provide a helpful reflective framework for decision taken on a practical daily basis when considering planning interventions in Beer-Sheva old city. Here we can see how coerced Western planning grids encountered local patterns of organ growth, creating a rich and unique urban setting. Aspiring to preserve the encounter between the two provokes various questions: How deep should planning go? How much should be defined and decided from above and how much may be left open? To what extent social, economic and other fields may enrich the discussion of planning in such circumstances? Can deliberations on textual history and Talmudic textuality inspire in fostering an ever evolving urban space that corresponds with a set of written and unwritten rules?

How to visualize urban complexity, diversity and uncertainty through the impact analysis of Airbnb on contemporary cities

José-Miguel Fernández-Güell

Planning is evolving towards a more holistic approach in order to manage the growing complexity, diversity and uncertainty inherent to contemporary cities. Nevertheless, despite the emergence of new technologies the capability of urban planners to provide an integrated vision of our cities is still very limited. Eventually, many plans fail to understand the complexity, diversity and uncertainty that characterize our cities. Additional difficulties arise when planners try to involve local stakeholders into analyzing complex urban issues as part of a futures study.

Since the 1960s, various quantitative approaches have attempted to replicate urban complexity and dynamics with the purpose of projecting urban development into the future. A brief review is given of early urban quantitative models and its subsequent criticism, the work of Institute of Santa Fe on Complex Adaptive Systems (CAS), the application of innovative techniques by smart cities initiatives and the sociological contributions of Niklas Luhmann on systems theory. Besides their dubious technical results, quantitative approaches have been always difficult to implement in a collaborative planning process with stakeholders from multiple professional backgrounds. Despite recent innovations in the realm of urban modeling, the challenge remains for planners to display the complex nature of cities in a friendlier way so that urban stakeholders can be involved effectively in urban analysis and policy making processes.

Construction of conceptual frameworks which could depict all major sectoral systems, key local agents and functional relationships within a city in a comprehensive and holistic manner would certainly help in that endeavor. Though being simple and of qualitative nature, such frameworks would allow for the subsequent development of tools to evaluate multidimensional aspects of the current and future state of urban systems. Eventually, these frameworks would have the ability to assess the implications of spatial and urban policies.

Therefore, this paper presents a conceptual model which visualizes the city as a set of different interrelated subsystems: urban demand segments, urban supply-side functions, spatial elements, and technological devices, altogether subject to external change factors. This systemic conceptualization of the city has several advantages: it

displays a simplified, intelligible abstraction of urban complexity; it emphasizes functions and processes rather than spatial patterns; it shows a city's dynamic evolution over a period of time; it analyzes relationships between urban components; and it exposes the dominance or dependence of stakeholders over functional subsystems.

To check its operational feasibility, the model is implemented to analyze and display the impact on cities of the short-term homes rental business. This growing sector is clearly led worldwide by the company Airbnb, which uses a collaborative platform on internet to market homes on tourism destinations based on the so-called "peer-to-peer" (P2P) modality. Indeed, this is an interesting case to study because it is a complex urban phenomena which does not only facilitate a commercial interface between tourists and hosts, but it also generates significant negative impacts on real estate prices, shrinking offering of housing rentals, tourist mass invasion of central districts and growing opposition from city residents.

Therefore, the Airbnb business is analyzed and displayed according to the proposed conceptual model. Firstly, the model is used to expose multiple impacts of Airbnb business not only on tourist districts but on the city as a whole; and secondly, a future vision is elaborated following the framework of the conceptual model to assess potential urban policies that could minimize Airbnb impacts. The above mentioned modeling exercises are supported by secondary sources and experts contributions.

Finally, some tentative conclusions are drawn from the proposed model of the urban functional system in terms of implications for policy making, collaborative planning, foresight studies, and innovative educational processes. Just as well, present limitations of the conceptual model are discussed at the end of the paper.

Urban movement: Between street networks complexity and cognitive simplification of distance

Itzhak Omer

In this study I suggest viewing the spatial pattern of human activities in urban environments as one result of inherent interactions between the built environment's complexity (i.e., the structural relations between its spatial components) and the individual's cognitive simplification of that complexity (i.e., a person's tendency to cognitively simplify spatial relations in the built environment). The investigation discussed employed an agent-based model in order to simulate and then analyze the relations between individuals' spatial behavior, street network structure and resulting movement flow patterns in several cities that differ in the pattern and size of their street networks.

The study findings indicate that actual movement flows are not a straightforward result of the conjunction between the street network's structure and individuals' spatial behavior. That is, the assumption that street network structure creates movement potentials that are utilized solely according to the ways in which individuals perceive distances (i.e., angular, topological and metric distances) and subsequently calculate shortest routes in the network is shown to be problematic. Instead, as the simulation experiments reveal, the (simulated) movement flows exhibit some degree of 'independence' from agents' spatial behavior. As I will argue, this 'gap' can be attributed to two interrelated process: the complex structural relations between the street network's movement potentials, by type of distance, and the cognitive simplification of those distances initiated by individuals during movement.

Examination of the structural relations between the shortest paths by different distance types across scale for all origin-destination pairs in the network show that they may overlap to some degree, especially at local scales. However, this structural overlap is asymmetric – angular and topological distances tend to dominate along the cities' main streets, which enjoy relatively high movement volumes, while metric distance tends to dominate secondary (or local) streets, experiencing relatively low movement volume. These structural relations, found to be nearly identical in the study cities, may help explain the dominance of angular centralities in the correlations found in movement flows at a higher scale as well as the relative dominance of metric centralities at local scale. Moreover, these structural relations, which fully emerge

from the network's structure, are similar and even homological to the individual's acquisition of spatial knowledge and conceptions of cognitive distance. The literature shows that people tend

to compute the shortest routes by using angular (least-angle) or topological (fewest-turns) distances, which are considered cognitively simplest relative to the shortest metric routes (i.e., they minimize the cognitive effort require for learning, remembering and calculating shortest routes), especially at larger scales, where the shortest paths are longer and hence more complex. In other words, the systematic structural relations found in the examined street networks correspond to the way people perceive and cognitively represent distances and routes at different geographic scales.

This corresponding, or homology, between the structural properties of the street network and the cognitive simplification of distances will be discussed in light of the similarity observed between the study cities in terms of street network complexity and that complexity's interaction with simulated movement patterns of the selected agent types (agents who calculate shortest routes according to topological, angular or metric distances).

Planning for Self-Organization with Complementary System of Rule Based and Case Based planning

Jenni Partenen

Self-organization of cities is increasingly recognized as a key promoter of urban dynamics. Emerging autonomously within the system from multiple urban actors' - firms, individuals, associations and institutions - unintentional interaction, this phenomenon produces often surprising large scale impacts in urban environment. Many of these spatial or activity patterns, movement dynamics or social conventions may be beneficial for cities, but certainly not all. Planning is needed to guide urban dynamics and processes by allowing and supporting the preferred phenomena while hindering the undesired ones in a resilient, consistent manner. The planning must be able to respond to and guide the positive self-organization.

The current planning system is limited in how it recognizes unintentional self-organizing configurations particularly in socio-economic context. However on the

practical level, the urban planners are well aware of this phenomenon. Planners have found their ways to respond the actors' needs - usually by organizing patterns, trends and dynamics emerging on the regional scale are poorly assessed. This creates a dual system of normative planning rules attempting to guide the urban dynamics, and planners responses to react to self-organization, also governed by certain emergent regularities or rules.

Conceptually, these two sets of rules are characteristically different. Rules emerging within a selfC organizing process could be called descriptive rules and they reflect the urban actor-interaction, everyday human practices and choreographies of life. Metaphorically, they resemble the linguistic rules in common speech – how the language is used by a native speaker. The normative planning rules guiding the dynamics could be called prescriptive rules – somewhat resembling the formal grammatical rules of the language. However in cities, while the prescriptive rules guide the system, essential is that they must reflect the descriptive rules for the sake of urban dynamics' continuity and successful urban evolution.

The prescriptive rules need to be general, and hence statutory and under-inclusive. To consider the descriptive, emergent rules in the system, a complementary (subordinate) procedure is required for monitoring the self-organizing patterns. In this article I suggest a coupled system of characteristically prescriptive rule-based and complementing, descriptive case-based planning procedure. Rule based system is intrinsically conditional: If a condition is met, Then the rule fires.

In such a system the rules would reflect the statistical or other general regularities in the city, while the case-based system uses implemented cases restored in the case library to estimate contrasting or rulec confirming, hidden self-organizing trends in urbanity. For each new case, the rule is followed unless a
convincing self-organizing pattern for similar previous cases is discovered in the case base. The rule remains statutory until it is (infrequently) updated for repeatedly occurring, compelling evidence of new urban dynamics – responding to occasional major transitions in societies (shifts in production modes, demographics, economics, or ecosystem services).

The operation of this coupled system is elucidated by introducing a case concerning hypothetical application of the rule-based/case-based -system in the planning of a mixed use neighborhood of Lielahti, in Finnish city of Tampere.

From the Synthesis of Form to Sequences: The development of Christopher Alexander's thinking on handling complexity in the built environment

Yodan Rofè

One of the responses to the complexity of the natural and built environment is as sense of fatalism, and acceptance of the status quo. Understanding complex systems, predicting their trajectory, and controlling them – seems at times to be beyond human capacity. To combat this sense of fatalism, this acceptance of things as they are, it is useful to follow the development of Christopher Alexander's thinking over the course of his career, as a guide to consciously designing and planning in a complex world.

Christopher Alexander was among the first to be aware of the problem of complexity in design, architecture and urban planning. More specifically, he was concerned with the absence of local adaptation and the lack of fit between the design and construction of the contemporary built environment and psychological and social human needs. In his seminal book Notes on the Synthesis of Form he understood form, as the resolution of a complex set of forces and conflicts: functional, social, psychological and structural. The rest of his life's work from "A City is not a Tree", through A Pattern Language to the four volume The Nature of Order is a continuous struggle to understand the evolution of form at different scales, and in both natural and built environments, and more importantly, to develop methods of shaping form as a life giving, and beautiful complex whole.

The problem, for Alexander, was our inability to handle consciously problems of complexity, and therefore our reliance on models and representations, or simple images, in order to resolve them – forgetting that our images and representations are always abstractions – and leave out many of the necessary details that allow the resolution of the real forces at play in any situation. Having tried (in Notes on the Synthesis of Form) to resolve this issue technically, he later recognized the limitations of a technical approach (as declared in A City is not a Tree). Alexander then turned to a combination of technical, political and in the end epistemological instruments to resolve the problem.

In A Pattern Language and its associated books the main idea was political – to restore to people the ability to design and plan their own environments. The role of the patterns was to codify evidence and precedent to create a planning and building

culture that would help people make wise decisions. Patterns were a way to break down the complexity of the built environment into relatively simple problems – resolvable intuitively with the help of clear instructions which encapsulated the minimum topological requirements necessary for a good solution. The structure of the connections between patterns, their hierarchy and their embeddedness into each other, were supposed to insure that the sequence of decisions will gradually allow a complex whole to emerge as a result of a series of steps, each solving a relatively simple problem.

While A Pattern Language become one of the best-selling books ever in Architecture, and had a huge influence on other fields such as computer programming, education and organization studies, it didn't quite work out as a guide to building and planning as Alexander hoped. People who tried to work with pattern languages on their own created interesting and unique buildings – full of pleasant details, but the buildings lacked the order, force and simple beauty of traditional buildings and architecture from all human cultures. Alexander's response was to dig deeper, into the very nature of geometrical order in the built and natural world (The Nature of Order). He came to realize the crucial role played by the building process in allowing complex order and wholeness to emerge.

In the last phase of his work, Alexander started working on an idea akin to patterns, but incorporating within it a procedural aspect – sequences. The idea is to develop for a series of typical problems or issues in the built environment a list of instructions, allowing the planner, designer or a community group to gradually form a vision, to plan and to execute, or direct the execution, of their project. These sequences are to be released into the world, preferably using mobile computing technology, and hopefully work as memes - be adopted and adapted by users – and gradually make their way into the building culture of society. Thus they will change step by step the way we plan and build, so as to allow humans once again the capacity to build beautiful, whole and complex ensembles.

Alexander's journey is of importance to us in the context of complexity and planning, because his many innovations, particularly his emphasis that humane and sustainable places and settlements emerge and evolve under the guidance of a wholeness or structure preserving process can inform our search for rules of planning and governance systems that will allow such processes to flourish.

Planning and rationality: a multi layered perspective within a complex environment

Gert de Roo and Camilla Perrone‘

If there is one theme that runs through all the discussions and debate on planning, it is that of rationality’ concluded John Friedman. And indeed, planning theory is very much a debate that developed from a technical rationale in the fifties of the past century towards a communicative rationale from the nineties onward. It must have been ten to fifteen years ago that alternative views beyond the communicative rationale are being proposed. Discursive approaches were introduced, area specific strategies were pushed further, from the complexity sciences a non-linear understanding was adopted to reason about adaptive types of planning, multi-level governance became a popular notion, and so on. Not only within the debate of planning changing developments were proposed. Also in the empirical world of the urban changes cannot be ignored. In various European countries the government is withdrawing, for various reasons. Aside from no longer having the knowledge and the means to govern at every layer of existence, also the modern citizens of today – well educated as they are – do become more and more independent and have a growing desire to divine their own environment, including the qualities that come with it. This development ‘from the bottom’ will as well influence the planning debate. We see this development positioned outside the planning debate on rationality. This planning debate is more or less positioned in between the technical and communicative rationale, and is very much if not fully related to a government involvement. This is no longer the only possible view. What we see is a desire to add to the planning debate on rationality additional layers of understanding, layers which relate to collectives and civil initiatives as well as individual behaviour. This would mean that aside from the government related spectrum of the technical versus the communicative rationale two other spectra will be emphasized, giving expression to rationales which frame the behaviour of collectives and individuals. The moment these rationales are positioned within a wider frame of reference in conjunction with the traditional understandings of rationality, alternative approaches to planning might be deducted. These alternative approaches to planning are still very much governance related, however with a focus on (independent) collectives instead of a government or the authorities. Aside from command-and-control government and shared governance,

also processed of self-governance, do-it-yourself (DiY) urbanism and self-organization of urban processes will be addressed. The result is a multi layered perspective, inspired by the Complexity Sciences. With this multi layered perspective on rationality we hope to contribute to a search for alternative and meaningful routes of planning beyond the communicative rationale .

Patterns of Un-Secured Areas in the Built Environment

Dalit Shach-Pinsly

Designing safe and secure urban areas with a sense of personal security is an important aspiration of urban designers, planners and city decision makers for controlling urban environments. The sense of security has major influence over people's life and needs. The knowledge and performance of security measures is critical to the understanding of human behavior in the built environment and is valuable informative knowledge for the practice of urban planning and design. Patterns of un-secured areas exist in every urban environment, however, we lack methods and tools for identifying these unsecured areas in the built environment, based mainly on morphological data. This article presents the Security Rating Index, a GIS-based mapping model, for identifying and rating unsafe and unsecure urban areas in the built environment. By using this new approach to quantify secured urban features with a new analytical model we can understand the security rates of different areas in the urban fabric and are able to promote development of better place-making.
Many researchers noted that security threats are integrated components within the urban environment and point out diverse urban elements, which highly affect various security threats in the built environments. For example, Gehl (2010) searched for architectural elements to create a better sense of personal security in the city such as: creating a clear distinction between different urban territories, definition of visibility distances, etc; the PTED- Crime Prevention through Environmental Design (2003) theory, established four main strategies for implementing this approach as an assessing duty for the police force, including: 1) natural surveillance; 2) natural access control; 3 (territorial reinforcement; and 4) maintenance and management; Dumbaugh, (2008) identified four trategies addressing safety, security and mobility needs for the elderly based on urban elements and community design factors, such as:

access points in residential road networks, disconnected residential street networks, reduction of walking distances, and more; Lee, et., al, (2017) developed a model for predicting street crime at the neighborhood level by analyzing physical characteristics of the streetscape in low-rising housing areas based on elements affecting natural surveillance, image maintenance factors, and territoriality (such as the entrance facing a street, fences, walls and more).

The Security Rating Index is demonstrated on three case studies in several urban scales, in Tel-Aviv and Haifa, Israel and Portland, U.S. The results of this analysis suggest urban changes for improving unsecured urban parameters, such as suggestions for secured walking routes for the different communities during the day and night, changes for urban usage locations, etc. and developing an urban decision-making process for potential renewal and improved secured areas in central urban neighborhoods. As a whole, applying the Security Rating Index can aid designers in securing urban areas, improving security levels of existing and new urban areas and including security considerations in the urban decision-making process.

Planning from emerging patterns: the role of planners

Paulo Silva

With this proposal, we intend to address the process by which planners allow their conceptual processes to evolve with future and unforeseen emerging patterns. We anticipate the division of this emergent patterns into three levels: the emergent patterns which are ignored by planners, the emergent patterns which are embedded into planning regulations; and the emergent patterns which are the basis for future regulation .

Inspired by the theme of the meeting - Emerging Patterns in the Built Environment: analytical tools & responsive governance – our proposal focuses on the role of the planner on creating analytical tools to deal with emergent patterns from the built environment .

Planners are trained to design (in the broader sense of the word) territories either through policies or plans or either through projects. In corresponding processes, planners are themselves trained to produce normative tools in which a linear way of thinking is present. However, in specific built environments, emergent patterns are

clearly present and quite often ignored. Planning education focuses on enabling students the use of positivist behaviour towards planning. Planning rules tend to be simple and straight forward to treat equally all the urban actors, intentionally trying to generate equity among them and order within the city fabric – in a simplistic way, order is perceived as homogeneity, proportion, continuity and so on. Kevin Lynch qualities of the urban form are a good example. By imposing this kind of order, we do not know if we are missing other types of order. What we know is that that by doing this, other types of order, based on emergent patterns and not drawn by imposed rules are not considered. At least two types of urban fabric escape to the way of doing city based on standardised norms: the pre-industrial city and the informal city. The problem consists on imposing rules to these two types of cities .

Bearing this in mind, the research will have as reference the following question – how can plans introduce in their regulations the result of emerging patterns, unfolding on the following sub-questions - which kind of rules can emerge from pre-existent patterns; in which cases can the urban fabric benefit from them; and how can governance specific governance arrangements boost them.

The answer to the question and sub-questions will be given by discussing at the theoretical level the nature of rules, based on emergent patterns. To do so literature review will be helpful to situate the character of rules regarding pre-existing patterns. In addition, we will illustrate it with one recent experience in dealing with the urban fabric of one kampung (a type of informal settlement) in Bandung, West Java, Indonesia. It is a settlement which has been consolidated through the years and in recent times in risk of eviction. The settlement's urban fabric not only consolidated its shape along decades, occupying former rice field terraces, as it also developed architectural features regarding residents' needs and constant negotiation between neighbours and with different other groups (from academia and from local government) .

The framework of this research intends to combine governance arrangements and emergent patterns of the built environment based on the identification of new analytical tools. To do this, we propose to analyse contexts which can contribute to understand how from pre-existing urban fabric can emerge new types of planning rules.

The undergoing research uses cartographic elements, photographic material, interviews to residents and information collected in meetings with residents. The data

collection on site took place in the periods of February 2017 and of April 2018. In these periods joint studios involving students from the Institute of Technology of Bandung and the University of Sydney took place in which the author participated as invited speaker and mentoring and discussing results regarding the entire periods the surveys made by students.

Based on the theoretical framework and on the collected data the discussion will be centred on the way that built patterns emerge, how can they be analysed and how they intertwin with governance arrangements .

When contradicting patterns of public space collide: The case of Palestinian Israeli towns

Maisa Totry-Fakhoury

The logic, meaning and functioning of public spaces differs substantially between cultures and places. While western public spaces are affected by democratic urban regimes and enhanced commercialization, public spaces in traditional Muslim, Middle Eastern cities emerged in a different pattern. Public spaces in Muslim towns developed in line with cultural and norms under the close community supervision; therefore, they are not easily adapted to contemporary changes .

This paper thus analyzes the unique pattern of public and open spaces in Palestinian Israeli towns, reflecting the coexistence of two typical orders, two sets of rules and spatial arrangements. The research shows that what appears as the spatial competition of two generative orders is also affected by global economy and national political complexities

Current public and open spaces in Palestinian towns consist of two different built environments; the old neighborhoods are based on the traditional Muslim pattern of hierarchic, socially-affiliated public spaces, and the new neighborhoods are based on the Western-oriented pattern, created by the Israeli modern planning system, strictly dividing public spaces from private ones. The analysis provides a comparative framework discussing the collision of these different patterns and how it affects the performance of public spaces. The research exposes the co-existence of two different spatial orders and the mutual relations between them.

Agile Governance: Opportunities and barriers for the adoption of IoT data in Manchester's urban governance

Sengupta Ulysses, Iossifova Deljana, Khorasani Amir and Hyde Robert

With the increasing availability of urban IoT (Internet of Things) data from automated and user based sources, there is a growing area of research into data enabled governance. A relatively new area of this research is the ongoing co-evolutionary process between urban governance and data technologies enabling policy actions based on new understanding of socio-spatial patterns through utilisation of frequently updated urban data .

As part of DACAS (Data and Cites as Complex Adaptive Systems) a multi-disciplinary strategic network, we explore new possibilities for urban insight through a combination of spatial data analysis and urban simulation. The research framework uses an understanding of complexity theories from multiple disciplinary perspectives and explores the possibilities for concept transfer in specific situations. The project presented here utilises a complexity theory perspective to contribute to the area of responsive governance in the context of technological transitions .

This paper presents ongoing research into the opportunities and barriers for the adoption of IoT data in Manchester's urban governance and policy development processes. Empirical research maps the structure and processes of formal teams/services, and the creation of temporal teams working across these silos to address policy areas driven by external factors (data, funding, political priorities) and/or high visibility problems (homelessness, air pollution). Opportunities for utilizing the potential of IoT enabled real-time data is explored at the level of team formulation and at multiple strategic points within the governance process and team hierarchies. Significant barriers to adoption of new technologies based on historic data strategies, structures and the lack of close to real-time analytical tools beyond data visualisation are identified .

Based on mapping the governance and decision-making processes of Manchester, through three workshops with senior operational and strategy managers of Manchester City Council, an 'IoT-enabled Agile Governance' approach/methodology is proposed. The approach aims to enable local governments to integrate data technologies into their operational and policy planning processes .

This study is part of an EU-funded large-scale pilot – SynchroniCity. This project aims to deliver an IoT enabled Digital Single Market for Europe. It is funded through Europe's Horizon 2020 programme and connects 34 partners, 8 European Cities and 11 countries over four continents. This project aims to help cities adopt new services that tackle urban challenges using the Internet of Things (IoT) and other urban data technologies. The project aims to tackle challenges of standardisation and risk of vendor lock-in in Smart City infrastructure projects. SynchroniCity will address these challenges by creating a single digital market place for IoT enabled smart cities. This synchronised market place will be created and demonstrated through pilot projects in eight European cities. Namely Manchester, Helsinki, Eindhoven, Antwerp, Milan, Porto, Santander and Carrouge, as well as three other partner cities in Mexico, USA and South Korea.

Cellular Automata, Agent-Based Modeling… What Comes Next?

Itzhak Benenson, Yonatan Almagor and Daniel Czamanski

Socio-economic modeling started in 70s and 80s, aiming to apply the knowledge on complex physical and chemical systems in socio-economic applications. This did not materialize, as the models neither passed the stages of parameters' estimation and empirical validation nor go beyond the qualitative resemblance between socio-economic phenomena and the phenomena that were revealed and explained in physics .

Clear understanding of the difference between physical and human-driven systems came in 1990s, together with the recognition between animated (humans and human institutions) and non-animated (land and infrastructure units) objects. Socio-economic modeling is now built on explicit representation of the urban spatial infrastructure with the Cellular Automata and of the human behavior with the human agent acting on top of the CA, bringing Agent-Based Modeling today to the crest of its popularity .

But… are we now able better to quantitatively predict the dynamics and evolution of complex socio-economic systems and exploit this knowledge for management and planning? Not really. The reason is that we are still far away from a definite quantitative representation of human decision-making rules which is

necessary for estimating human behavior in emergent “model reality.” Our vague knowledge of human behavior and, especially, of planners’ and developers’ behavior, results in over-wide and researcher-dependent spectrum of model’s dynamics that, eventually, prevents quantitative forecast .

Game-Based Modeling (GBM) has recently been proposed as a way to immersive studying of human behavior in unexperienced or unexpected situations that can emerge in the model. GBM is a spatially-explicit serious game that is built upon the background of an ABM. Human players act and interact with artificial agents within the GBM. The agents adopt the behavior of humans and the evolution of the human-agents society is thus driven by humans facing the emergent dynamics of the complex system and behaving respectively. The paper presents yet traditional planning-oriented behavior-based models of urban dynamics and discusses the perspectives of the GMB approach to studying complex human-driven urban systems.