

# Dossier Editorial

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## Space syntax

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Space Syntax was developed at the University College London (UCL) in the late 1970s. It is best described as a research program that investigates the relation between human societies and space from a theoretical perspective based on the structure of inhabited space in its diverse forms: buildings, settlements, cities, and landscapes. The word “syntax” establishes a bridge between the dual motivations of Space Syntax; namely describing the built space and its occupancy, and understanding how these patterns enable us to recognize and construct society and culture. The fundamental statement of Space Syntax suggests that it is possible to break buildings or built spaces down into their spatial components so as to analyze the interrelationships of these components and to yield information about the pattern of space which is meaningful and functionally relevant. Over 35 years, Space Syntax has been applied with success for various purposes ranging from the master planning of entire cities to revealing the imprint of culture in domestic settings.

Today, Space Syntax is adopted and further developed in hundreds of universities and educational institutions as well as professional practices worldwide. Built on quantitative analysis and geospatial computer technology, Space Syntax provides a set of theories and methods for the analysis of spatial configurations of all kinds and at all scales. The Space Syntax approach was conceived to help architects, planners and urban designers simulate the likely impacts of their designs on the people who occupy and move around in these spaces, whether they are buildings or urban settlements. Since then, it has been adopted around the world in a variety of research areas and practical applications including archaeology, criminology, information technology, urban and human geography, anthropology, and cognitive science.

Since the introduction of Space Syntax in 1997, the international network of researchers and practitioners meets once every two years at the Space Syntax Symposia (SSS) to present and discuss their most recent work. The International Steering Committee, which is comprised by leading Space Syntax researchers, makes sure that the most advanced and innovative research in the field are presented in the Symposia. As a member of the International Steering Committee since 2003 and the chairwomen of the 6<sup>th</sup> International Space Syntax Symposium in İstanbul which was held at İTÜ in 2007, I was

well aware of the need to spread this research to a wider audience. When I shared my idea with the members of the Steering Committee in our meeting during SSS9 in Seoul, I received favorable reactions and full support from them for which I am most grateful. This special issue on Space Syntax is the end product of this process. Twelve papers included in this issue were selected by the members of the Steering Committee from the studies presented in SSS9 Seoul, Korea (2013) and SSS8 Santiago, Chili (2012). The papers then have been reviewed once more by international referees most of whom also serve as referees for the Space Syntax Symposia. The authors of the papers, which were accepted, reworked on their papers based on the comments they received from the referees. Two of the papers in the issue were not presented earlier in the Space Syntax Symposia, and they were included in the issue for their novel approaches. To conclude, I can proudly say that the papers in this special issue on Space Syntax address not only the state-of-the-art in the field, but also the most recent methods and implementation tools.

1.

In their paper titled **“Space and Planned Informality: Strong and Weak Programme Categorization in Public Learning Environments”**, **Caue Capille** and **Sophia Psarra** address a significant and a current issue – analyzing the relation between the requirements of programme, use and space of public buildings with their spatial and social structuring– with the aim of deriving strategies of how to modify public buildings while keeping up with the technological advances. The novelty of the paper lies in its development of a mapping system to understand how spatial programming affects the distribution of activities in public buildings. The use of detailed empirical data of user activity within selected buildings enhances the depth and strength of the arguments developed and the conclusions derived in the paper. The authors reached the conclusion that the categorization of a building as strongly -or weakly-programmed depends on how social scripts are embedded in spatial configuration, and this relation will influence how use, movement and interaction take place in space or otherwise spatial practice.

2.

A fascinating piece of work comes from **Sonit Bafna** and **Earle Chambers** with their article entitled **“The Influence of Spatial Organization of the Home on Social Sedentary (Inhabitant) Activities”**, which delves into the local environment of the home, and in particular how spatial layout might influence activity levels of inhabitants. Activity levels and hours of sedentary pursuits is a topic of current concern due to the potential associations with health outcomes. In their work, Bafna and Chambers present a strong and challenging research design and new knowledge on inhabitant activity in relation to spatial configuration by applying methods that have never been used. With its brand-new perspective on the topic, the work, although exploratory, makes a significant contribution to the field.

3.

Another interesting paper titled **“Beyond Analytical Knowledge: The Need for a Combined Theory of Generation and Explanation”** comes from **Sophia Psarra**, in which she argues the need for an architectural theory that accounts for a “combined theory of freedom and necessity” or explanation and generation. By interrogating three paradigmatic cases -the city of Venice, the Venice Hospital and the novel “Invisible Cities” by Italo Calvino- the author demonstrates that “Ars Combinatoria”, the art of uncovering combinatorial

rules and restrictions that govern a system, is necessary to activate one's imagination that guides dynamic generation of meaning. In other words, stimulating one's imagination is like tapping into a "fundamental instrument of knowledge" that enables one to create new meanings. In order to recognize the importance of Ars Combinatoria, the author points to the need for architecture that aims to structure alternative worlds. As such, the paper highlights the need for a new perspective in architectural theory -a theory that is capable of accounting for dynamic processes of interaction and association.

4.

In his work titled "**Towards A Psychology of Syntactical Readings: The Case of Applying a Cognitive Task Analysis Method in Acquiring and Utilizing Configuration-related Knowledge**", **Konstantinos Ioannidis** addresses an innovative approach that researches the use of Space Syntax in both studio teaching and comparative studies which integrate psychological and morphological techniques. Due to its novel approach to the use of cognitive task analysis in utilizing spatial knowledge, the paper found a place among the three papers selected to be presented in the plenary session in the SSS9 in Seoul. This is an interesting paper that aims to delve into the cognitive processes during a syntactic reading of a settlement. The main argument is based on the premise that perceiving subjects in a space as syntactic agents or as readers of space is a different phenomenon than the readers of a book. The paper can be described as part of the Space Syntax literature that interrogates the human dimension as an active agent in the spatial exploration.

5.

In recent years, the planning and design of the walkable environments has been receiving increasing attention for its various benefits related to public health, sustainability, economy, and social life. Walkability studies, which involved detailed statistical analysis on the amount of time spent walking and the factors related to the built environment, have proved that individuals' walking behaviors are highly related to the condition of the urban form. In this special issue, there are two papers that address walkability. The first one is titled "**Walkability and the Complexity of Walking Behavior**" by **Eunyoung Choi**. Choi's work investigates the complexity behind the relation between walking behavior and urban form. The goal, effort, and intensity of walking activity determine the qualities of the pedestrian desire and priorities. The results of this study illustrate that an area which is highly walkable in terms of density, connectivity, and the diversity of land-uses not only attracts higher amounts of pedestrians but also accommodates various walking behaviors. The conceptual approach, which involves revealing different types of walking (such as utilitarian, social, and recreational) that shape the activity in its purpose, destination, route choice, attitude, etc., presented in different parts of the city is a novel one. In addition, this research, which investigates the different mechanisms behind walking, not only contributes to the existing knowledge on walkability but also holds the potential to make an interesting contribution to urban studies in general.

6.

The other paper on walkability is authored by **Özlem Özer** and **Ayşe Sema Kubat** titled "**Walkability: Perceived and Measured Qualities in Action**", and it addresses important urban issues. The main research question posed in this article is about how a combination of spatial and qualitative

characteristics defines the walkability of an urban area. The major finding of the paper, which is a very significant proposition and is supported by evidence, suggests that in areas where qualitative characteristics (such as attraction, beauty, liveliness) evolve with the spatial structure of the area, and states that spatial configuration continues to function as the main predictor of movement in such areas. However, when the relation between space and the perceptions of people falls apart, the space becomes less important, and qualitative measures take over. The paper confirms certain insights which are already raised in earlier studies (such as the findings on correlations between spatial configuration and pedestrian movement), but it also is a successful attempt to introduce new techniques that involve the use of questionnaires of user appreciations.

7.

Within the context of pedestrian movements, an interesting article titled **“Configurational Exploration of Pedestrian and Cyclist Movements: A Case Study of Hangzhou, China”** comes from **Xiaoling Dai** and **Wenbo Yu**, and it provides an analysis of the relation between spatial configuration, and pedestrian and cyclist distributions. The paper offers important and detailed discussions on the correlation between spatial configuration, and pedestrian and cycle movement in a Chinese example, and it adds on to the application of Space Syntax in cities of different cultural origins. The novelty of the paper lies in the way it discusses different ways of representing urban spaces with various properties. The research utilizes both axial and angular segment models; and the statistical analysis then demonstrates that the angular segment model is superior to the axial model in explaining the movement patterns. The paper’s findings in terms of the relation between spatial configuration of the street network and the pedestrian/cyclist distributions contribute to the available literature on Space Syntax, but more importantly the problems and questions posed in search for a new way to represent the existing urban conditions in graphs, which can address different techniques of mapping space, is compelling.

8.

In their paper titled **“Historic City Centers Under Threat: The Case Of Sharjah, UAE”**, **Ayşe Sema Kubat**, **Yasemin İnce Güney** and **Özlem Özer**, address the challenges of revitalizing the historic city center of Sharjah in the United Arab Emirates by identifying, understanding and providing solutions to the problems that have emerged during the recent and rapid growth in the city. The main goal of the paper is to develop an analytical framework that can be utilized for the future development strategy and urban design guidelines for the revitalization of Sharjah’s historic core, by using Space Syntax as a diagnostic tool to understand how the history and evolution of the city’s structure had led to the existing patterns of density, land use and socio-economic settlement. The research uses pedestrian and vehicular counts as well as the Space Syntax method to analyze the street pattern in Sharjah. The authors present their findings which belong to a time period that followed an important functional change in the city’s development: the shift of Sharjah from a center of trade with an active port to a historic/cultural city after it was named as the Cultural Capital of the Arab world by UNESCO in 1998. The paper lays out some of the major changes that occurred throughout this transition, such as the decrease in the amount of activity at the waterfront, and the creation of new cultural spaces within the city. It also explains the effects of this shift on the pattern and use of the streets in the city. The results provide insights on

the significant shifts in the development of a port city, and these may apply to many other cities around the world, and provides a novel way of representing and analyzing the effects of this shift. It also offers an important snapshot of Sharjah's development through history as an historic emblematic port and may be revisited at a later date to compare/contrast findings.

9.

The paper titled "**Gender and Space Use**" authored by **Yasemin İnce Güney**, introduces a novel quantitative way of examining human movement patterns in urban spaces based on gender differences by using Space Syntax methodology and the tools it offers. The study includes a visibility analysis of the historic city center in an Anatolian city, Balıkesir, and pedestrian movement observations at the selected locations within this center. The results of the study demonstrate that male users dominate the city center at all times, while female users are much lower in density, even lower than the teenagers. Furthermore, the findings indicate the existence of some correlations between different genders and the spatial properties of spaces. In contrary to what the available research on Space Syntax assumes, the study identifies gender as an issue which is not merely related to residential environments, and emphasizes that it would also be important for future Space Syntax research to consider gender issues in urban areas as well. Considering the male dominance in urban spaces, it would be important for us as designers to question what we can do to ease or even encourage women's spatial freedom to use public spaces.

10.

In recent decades, there has been a significant growth in the amount of research on the physical form of urban areas. This is particularly evident in the increasing number of publications on both urban morphology and built environment. Space Syntax provides spatial models of settlements with quantitative descriptions, which are simple, realistic and possible to analyze. Therefore, it makes contribution to the studies which analyze urban form by its methodology. With their article titled "**A Comparative Study of the Morphological Characteristics of Residential Areas in San Francisco**", **Mehmet Topçu** and **Micheal Southworth** make an innovative contribution to this special issue not only by presenting a study on urban morphology by adapting Space Syntax but also by focusing on an interesting case area, San Francisco, which is a unique city in the USA in terms of its urban texture. In their work, the authors compare various residential neighborhoods with different gridiron patterns by some structural properties in San Francisco in order to assess the livability of these areas. They investigate the important inputs that lead to better designs for urban residential spaces and urban design as a whole. While comparing the nine residential neighborhoods they selected, they use some morphological evaluation parameters with a focus on street-block and building-lot relationship including accessibility, intelligibility, density, livability index, and time period. The study also puts a particular emphasis on the role of Space Syntax, which enables the evaluation of the street system of the urban form in relation to the theories and concepts offered by urban morphology.

11.

**Yu Ye** and **Akkelies Van Nes**, in the article titled "**The Spatial Flaws of New Towns: Morphological Comparison between a Chinese New and Old Town through the Application of Space Syntax, Spacematrix and Mixed**

**Use Index**” examine the reasons behind why new towns lack the thriving street life, small businesses, and variety of social activities of the old towns from a spatial point of view. For this purpose, morphological features of an old and a new town in China are selected as case cities to quantitatively compare and to identify various design spatial flaws. Quantitative tools such as Space Syntax, Spacematrix, and Mixed Use Index (MXI) are first used separately and then are integrated into a GIS platform to juxtapose the results provided by each tool. The challenge is the integration of the linear street network data derived by Space Syntax with the polygon-based morphological features from urban blocks through the grid analyses of GIS. The major contribution of the study lies in its attempt to combine Space Syntax with Conzenian urban morphology in order to fulfill a more comprehensive morphological analysis with a quantitative approach.

12.

The article titled **“The Spatial Dimensions of Trade: From the Geography of Uses to the Architecture of Local Economies”** authored by **Laura Narvaez, Alan Penn and Sam Griffiths**, is based on a large amount of empirical research which underpins a spatial economics theory using network and configurational analysis. The research presents a study across different scales in the city, which combines three different types of distances in the street network –metric, topological and angular- with rent values of commercial and residential properties. The aim is to understand how urban economics is approached in an analytical way by using Space Syntax techniques with “bid rent curve” model. The article has a very clear and strong structure, and a series of arguments that complement each other; and the use of network and Space Syntax analysis in urban economics makes it highly original. Such form of representation and analysis offers an innovative methodological tool that contributes not only to Space Syntax, but also to urban economics and urban morphology.

13.

Another impressive contribution to Space Syntax comes from the article titled **“Patterns of Sustainable Mobility and the Structure of Modality in the Randstad City-Region”** by **Jorge Gil and Stephen Read**. The article addresses a significant and current issue –the relation between urban form and sustainable mobility patterns – from a different perspective: by building a descriptive, multi-modal network model that allows for the analysis of different modes of environment. The introduction of a multi-modal network, and the discussion of multiple analyses and measurements that explore the connection between different urban form characteristics of the Randstad region in the Netherlands, which is one of the paradigmatic polycentric city-regions in Europe, and different modes of movement, provides an interesting approach for the Space Syntax literature. The novelty of the article lies in its definition of a new urban-form-based method, which allows evaluating the potential of different mobility modes through different urban network metrics. The sets of analyses and models developed to measure the relation between modality and mobility contribute significantly to the literature and provide an interesting approach to design for sustainable cities. The study also is grounded on filling the gap in transportation studies regarding the role of mobility infrastructure networks. The paper develops an excellent model that links different modes of transportation including their speeds and boarding times. This makes the article a major contribution to Space Syntax for it proves itself as an eligible technique in transportation research.

14.

A unique contribution to this special issue is the article titled “**Can Spatial Form Support Urban Ecosystem Services: Developing Descriptions and Measures to Capture the Spatial Demands for Pollination Using the Framework of Space Syntax**” by **Lars Marcus, Asa Gren and Meta Berghauser Pont**. The main research question of the article is related to whether the biotope demands and the range of action for different species of bees can be formulated as typical spatial forms and configurations necessary for bee abundance and, can and if such typical configurations are possible to be identified in highly urbanized areas. The research extends the application of Space Syntax methodology to a different but relevant field -the ecological sub-systems of cities, which is an innovative approach and makes the paper quite novel.

As the guest editor of this special issue on SPACE SYNTAX, I would like to extend my deepest gratitude to the members of the SSS Steering Committee for all their support throughout this process. I also would like to express my sincere thanks to **Akkelies Van Nes, Ayşe Özbil Torun, Başak Demireş Özkul, Claudia Yamu, Daniel Koch, Jean Wineman, Kayvan Karimi, Lars Marcus, Laura Vaughan, Margarita Green, Nabil Muharreb, Özlem Özer, Serdar Kaya, Sophie Psarra, and Yasemin İnce Güney** for their efforts during the peer review. My sincere thanks also go to the dossier’s secretary, urban planner **Belgin Gümrü** who is also a PhD student at İTÜ, for her dedicated and meticulous work. She provided great help at all stages for the preparation of this issue, and without her it would have been impossible to finalize this process. And finally, I would like to thank my colleague Assistant Professor **Yasemin İnce Güney**, with whom I have been making productive and gracious collaborations for most of my recent Space Syntax studies. Words will not be enough to thank Yasemin for her support during the preparation of this special issue and for all her help over the years.