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# Roots of Urban Morphology

Sigríður Kristjánsdóttir\*

## Abstract

This paper provides a comprehensive review of the research field of urban morphology: the study of urban form. Urban morphology is a growing field of cross-disciplinary research, attracting worldwide interest among scholars in architecture, geography and planning. It aims to decipher the physical form, the urban landscape or townscape of complex contemporary cities. This paper discusses the evolution of urban morphology, from its conceptual foundations in research on the physical form of urban areas. Interestingly, the roots of urban morphology can be traced back to different disciplines in different countries. This discussion will cast light on various research perspectives of urban morphology, as well as discussing similarities and differences between the geographical and the architectural approaches to urban form studies. This is followed by a closer look at the theories developed by Gianfranco Caniggia and MRG Conzen. Their work has been an inspiration for many practitioners and researchers, including Whitehand, Maffei, and Moudon to name a few. Finally, a schematic diagram is presented, which reflects the heightened activity of research on physical form that is currently occurring in several disciplines simultaneously, and showing the relationships between research traditions and authors. As the formation and development of the urban landscape becomes ever more diverse, it is necessary to revisit and use

**Keywords:** Urban morphology, geographical perspective, architectural perspective, Caniggia, Conzen.

\*Associate Professor, Director of the Master program in planning Agricultural University of Iceland, Keldnaholt, Árleyni 22, IS-112 Reykjavík, Iceland [ORCID](#)  
Email: sigridur@lbhi.is

the concepts and methods established by Caniggia and Conzen in the management of urban landscape changes.

## URBAN MORPHOLOGY

*Urban morphology is a branch of urban studies that deals with the form and structure of a settlement. It studies complex and intricate types of forms and how different factors set their mark upon the whole city. In this way urban morphology examines the configuration of the urban form as well as the relationship between the individual forms and the city as a whole, from the formative years of the city through its subsequent transformations.*

(Kristjánsdóttir, 2007, p. 1)

Urban morphological researchers are concerned with the form and structure of an urban landscape. It was the great poet and philosopher Goethe (1790) who first expressed the essence of the idea of morphology in his writings describing internal structure and the history of variation in form. The word ‘morphology’ was first used in bioscience to describe form and structure, but now is increasingly being used in geography, architecture, geology, philology and other disciplines. The term urban morphology refers to the study of the physical (or built) fabric of urban form, and the people and processes shaping it (Larkham & Jones, 1991). According to Larkham and Jones (1991), English usage of the term dates at least from Leighly’s (1928) study of towns in central Sweden. Much later, Larkham (2015) re-examined Leighly’s (1928) study in terms of its background and the influence of Carl Sauer (1889–1975) (1925), the founder of cultural geography at the University of California at Berkeley.

However, in urban design, the term is principally used to describe “... a method of analysis which is basic to find[ing] out principles or rules of urban design” (according to Gebauer & Samuels, 1983). However, they also note that the term can be understood as the study of the physical and spatial characteristics of the whole urban structure, which is closer to the geographer’s usage (Larkham & Jones, 1991).

The roots of urban morphology lie in geography in Britain and Germany, and architecture in Italy and France.

While the beginnings of the urban morphology ‘discipline’ can be traced back to the end of the eighteenth century, it did not become the main research approach to the urban landscape until after the Second World War. In fact, urban morphology can be viewed as part of a much wider movement that arose as a reaction against

Modernism in architecture and urban planning during the period 1959 to 1961. At this time, several studies were published that represented an attack on the current approach to city planning and rebuilding, for example Kevin Lynch's *The image of the city* (1960), Gordon Cullen's *Townscape* (1961), Jane Jacobs' *The death and life of great American Cities* (1961), Muratori's study of Venice (1959), and Conzen's study of Alnwick (1960), which was followed up by Alexander, Ishikawa, and Silverstein's (1977) study of urban patterns, entitled *A Pattern Language*.

### **The Geographical Perspective**

Within geography, Otto Schlüter (1899a; 1899b; 1903; 1906; 1919) played a central role in the development of the morphology of the "cultural landscape" (*g. Kulturlandschaft*) as the object of research in "cultural geography" (*g. Kulturgeographie*), which for him was the most important aspect of human geography (Whitehand, 1981). Schlüter asserted that geographers should consider the form and spatial structure created by visible phenomena on the earth's surface as their unifying theme. In other words, mountains, rivers, pastures, forests, roads, canals, gardens, fields, villages and towns become the object of study for the geographer. Further, Schlüter regarded economic, racial, psychological and political conditions as not of primary geographical interest, arguing they should be studied only as part of the explanation of material distributions (Holt-Jensen, 1999). Therefore, it was not only a descriptive morphology that he envisaged, but also an explanatory morphology. He was fully aware of the interdependence in geography of the three aspects of form, function and development (history) (Whitehand, 1981).

Schlüter systematically divided the cultural landscape according to the categories –settlements, land utilisation and lines of communication, thus giving rise to the three subdivisions of human geography, namely settlement geography, economic geography and transport geography. Settlement geography was then further subdivided on the basis of rural and urban settlements. Schlüter regarded the physical forms and appearance of the town, the "urban landscape" (*g. Stadtlandschaft*), as the main object of research within urban geography, viewing it as a distinct category of cultural landscape and as such, a regional unit in its own right. As JWR Whitehand (1981) points out, Schlüter's work imparted a marked morphological emphasis to human geography in general and urban geography in particular that was to become increasingly evident over the first three decades of the twentieth century.

Urban morphology was further developed by a number of researchers in German speaking countries, including Hassinger, Schaefer, Geisler, Dörries, Martiny, Fritz, Meier, Gradman, Rietschel, Frölich, Rörig, Hamm, Scharlau, Klaiber, Meurer, Siedler, and Louis. This development is documented in JWR Whitehand (1981, pp. 3-7).

MRG Conzen (1907–2000) was a student at the Geographical Institute of the University of Berlin from 1926. He was inspired by pioneers in the field of geography at that time, attending their seminars and field excursions. He was especially taken with the ideas of Schlüter and the work of Herbert Louis (1936). He was also influenced by geomorphology, the line of research within physical geography that focuses on studies of landform.

Conzen was interested in the man-made landscape and human settlements and applied ideas from geomorphology in his research, particularly in terms of the search for process and the forces underlying them. The development of the history of urban morphology within geography during the first half of the twentieth century, and its diverse research traditions, have been the subject of recent investigation (Slater, 1990; Whitehand, 1981, 1987, 1988) focusing on the urban morphogenetic tradition and the central role played by MRG Conzen.

### **The Architectural Perspective**

In Italy there is a strong link between urban morphology and urban design, as urban morphology developed as a critique on modernist doctrines of architecture and planning. Architect Saverio Muratori (1910–1973) is the seminal figure in the development of systematic ways of investigating the evolution of the Italian City. Muratori was an architectural student during a period of profound renewal of Italian teaching institutions, with architecture well positioned to bridge the divide between art and engineering (Cataldi, Maffei, & Vaccaro, 2002). As a student in the late 1920s, he was inspired by great scholars in contextualised architecture, especially Gustavo Giovannoni among others such as Fasolo, Foschini, Calandra and Piacentini.

Muratori's work was based on the Roman interpretation of Italian rationalism. He believed that urban planning and urban design theory systematically ceased to be cultural devices deeply rooted in the history of the place during the first half of the twentieth century. Accordingly, Muratori saw urban analysis as a form of operative history, offering both an alternative to and criticism of the programmes and the methods of Modernist architecture and planning. His interest was to recover a sense of continuity in

architectural practice. He devoted his life to the creation of a new theoretical framework to explain the creation and transformation of urban form over the centuries in the belief that “only a systematic understanding of history’s laws of reproduction could recreate the role previously claimed by urban design” (Cataldi et. al., 2002, p. 3).

In *Vita e storia della città*, Muratori (1950) identifies the need to determine the characteristics of an urban organism and then to adapt modern building to it. He emphasises the town as a living organism and collective work of art, and, for the first time, raises the idea of planning new buildings in continuity with the building culture of a place.

During post-war reconstruction in Italian towns, Muratori was responsible for the Tuscolano district in Rome, where town planning and building were influenced by the contemporary so-called Scandinavian empiricism. He also planned four major public buildings in three different Italian towns: the church of S. Giovanni al Gatano in Pisa, the Ente Nazionale di Previdenza ed Assicurazione Sociale office building in Bologna, the headquarters of the Christian Democratic Party in Rome, and the incomplete church of Tuscolano in Rome. All four stand out from the international panorama of contemporary architecture because the themes they embody were decades ahead of their time. Muratori’s experience as a practising planner and architect led to his dissatisfaction with the evident conceptual gap between the plans of entire town quarters and the later designs of modern architects.

In 1952, Muratori was appointed Chair of the Istituto Universitario di Architettura of Venice and was one of the first architects in Italy to openly criticise Modernist doctrines of architecture and planning (Samuels, 1990). As a professor at the School of Architecture in Venice from 1952 to 1954, Muratori was able to re-examine the first urban surveys of the city’s hub and the theoretical assumptions of his 1950 essay, employing the fundamental concepts of type, fabric, organism and operative history (Cataldi et. al., 2002).

Venice played a leading role in the development of his ideas, through lectures and student surveys. He required his students undertake investigations of the evolution of Venice through direct observation and examination of documentary evidence, the results of which were to be published as an ‘operational history’ (Muratori, 1959). Through these studies Muratori wanted his students to become technicians of the urban fabric, by learning to

interpret the influence of societal needs in transforming the inherited urban fabric. He emphasised to his students that architects must have detailed knowledge of the medium in which they conduct their work, and that the proper basis for design was a thorough understanding of buildings. In *Studi per una operante storia urbana di Venezia*, Muratori (1959) re-examined the first urban surveys of the city's core and the theoretical assumptions underpinning the ideas he had put forward in his earlier paper, *Vita e storia delle citta* (Muratori 1950). As such, Muratori (1959) defines and applies the fundamental concepts of building type, urban fabric, urban organism, and operative history or working history.

His Venetian experience provided the trigger for his idea of operative history. Later, as a Professor of Architectural Composition in Rome from 1954 to 1973, he used it to provide the basis for students' plans, despite opposition from other tutors and students (Kropf 1993; Samuels, 1990). Muratori's rejection of the Modern movement before the popular rise of Post-Modernism led to criticisms that he was favouring the status quo instead of searching for new forms. His teaching was aimed at understanding the various values inherent in the phases of urban formation, ranging from the influences on and implications of projects involving existing buildings in historic downtown areas, to projects concerned with the creation of suburbs.

During his time in Rome, a team of resident assistants formed around Muratori, some of whom collaborated with him on the great atlas, *Studi per una operante storia urbana di Roma* (Muratori, Bollati, Bollati and Marinucci 1963) (Cataldi et.al., 2002). Muratori and his wider team got the chance to carry out his ideas in a design competition for a real town, creating the winning project for the S. Giuliano Sandbank competition in Venice in 1959. The idea of design in stages was presented as a logical result of "reading" the town's development (Cataldi, 1998).

One can do anything but invent new things: real invention lies in not inventing anything (Muratori, quoted in Cataldi 1998).

Muratori was concerned that modern architecture was in crisis because architects were more focused on raising monuments rather than continuing the process of adding to the inherited form, as realised through history and so expressing the local culture. His stance on Modernism eventually cost him his post at the university. Saverio Muratori's work is documented in detail in a book dedicated to him, and edited by Cataldi (2013).

Caniggia was one of Muratori's assistants, and was similarly concerned that the thread running through built inheritance had been broken because of the methods used by modern architects. As described later in more detail, he carried on Muratori's ideas, developing a typo-morphological approach to architecture and urban design (Cataldi 2003). Cannigia (1997) advocated studying the steps involved in the creation and evolution of the built environment in order to understand an urban landscape.

### **The French perspective**

A third perspective on urban morphology was established in France in the late 1960s. As in Italy, the French school, based principally at the Versailles School of Architecture, was established as a rejection of the Modern movement (Moudon 1997). Muratori's work influenced French architects, along with that of Aymonino, Brusatin, Fabbri, Lena, Loverro, Lucianetti, & Rossi (1966), and Rossi (1964 [1966]; 1982). The French school took a much broader perspective, aiming to understand the city in a multidisciplinary context (Moudon, 1994). A connection was soon established between the French and the Italian schools, however they differed in two important aspects of their approach to urban morphology – their approach to the dialectic of urban form and social action, and the dialectic of modern versus non-modern. As distinct from the Italian method, the social component is always the primary focus within the French school due to the influence of the French philosopher and sociologist Henri Lefebvre (Petruccioli, 1998b). Lefebvre introduced the concept of the right to the city in the book, *Le Droit à la ville* (Lefebvre 1968), after which he published several influential works on cities, urbanism, and space. *The Production of Space* (Lefebvre 1974) became one of the most influential and heavily cited works on urban theory.

The French school has generated extensive methodological knowledge for the analysis of urbanisation processes and related architectural models. The focus is the dialectical relationship between the built landscape and the social world, with each shaping the other and placing emphasis on the importance of built space for sustaining social practices. Castex (2013), Levy (1999), Darin (1998, 2000) and Ducom (2003a, 2003b), as well as Philippe Panerai and Jean Depaule, are a few representative members of the French school.

### **The Conzenian Approach**

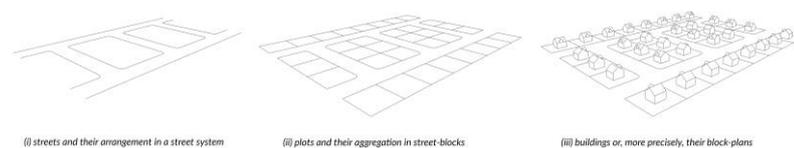
Conzen's study of Alnwick, Northumberland (first published in 1960; revised edition published in 1969) is the seminal work in the field of urban morphology in Britain. The method for town

plan analysis that Conzen put forward in the Alnwick study, which is further elaborated in his studies of central Newcastle (Conzen 1962) and Ludlow (Conzen 1966, 1975, 1988), inspired much of the English-language work on plan analysis in the second half of the twentieth century, and established a basic framework of principles for urban morphology. Derived in part from earlier German work (Whitehand, 1981), concepts and terms developed by Conzen have become widely used in geography and other disciplines (Kropf & Larkham, 2000).

Conzen's approach was historical and evolutionary in looking at the form of the town as the result of the sequence of events in its formation. These events are seen as part of the social and economic development of the local, regional and national context in which the town lies (Kropf, 1993). The systematic inclusion of plots as the fundamental units of analysis is one of the major contributions of Conzen's method. Before Conzen's Alnwick study, plots and plot patterns had received little attention in urban morphology (Conzen, 1960, p. 4). Conzen's work generated an extended technical vocabulary, terminology and procedures for analysing the town plan, the aim being to explain the geographical character of towns, which he believed was determined by significant economic and social factors within the regional context.

According to Conzen, the townscape is a combination of a town plan, and patterns of building forms and urban land use (Conzen, 1960). Conzen describes the town-plan as the topographical arrangement of an urban built-up area and all its man-made features. The town plan itself is subdivided into three constituent parts or elements (Figure 1):

- (i) *streets* and their arrangement in a *street system*;
- (ii) *plots* and their aggregation in *street-blocks*; and
- (iii) buildings or, more precisely, their *block-plans* (Conzen, 1960, p. 5).



**Figure 1.** A schematic diagram showing the three distinct but integral kinds of town plan elements, based on Conzen 1960.

The elements which make up any plan or layout are:

*Street:* a space (street-space) in a built-up area bounded by street-lines and reserved for the use of

surface traffic. It is a plan element (Conzen, 1969, p. 130).

*Plot*: a parcel of land representing a land-use unit defined by boundaries on the ground. It is a plan element (Conzen, 1969, p. 128).

*Block-plan of a building*: the area occupied by a building and defined on the ground by the lines of its containing walls. Loosely referred to as the 'building'. It is a plan element (Conzen, 1969, p. 123).

A plan-unit is formed by individualised combinations of these three elements that are unique to their site circumstances, creating a measure of morphological homogeneity or unity in some or all respects over the area, in different parts of the town. Within the town, a geographical group of morphogenetic plan-units forms a plan-division. The urban plan-divisions arrange themselves in a hierarchy, with each successive order comprising a combination of divisions of the next lowest order (Conzen, 1969, p. 128). Morphogenetic regions are formed of a combination of the town plan, building fabric, land utilisation pattern and the site (Kropf, 1993, p. 38). A morphological period represents any period in the history of an area that creates distinctive material forms in the urban landscape to suit the particular socio-economic needs of its society (Conzen, 1969, p. 127). The Alnwick research provided the foundation for further research in urban morphology, and gave rise to the Conzenian tradition (Whitehand, 1981) and a number of concepts, including the burgage cycle, morphological frame and fringe belts.

### **The Caniggian Approach**

Gianfranco Caniggia, an assistant of Muratori, continued Muratori's work on building types. Caniggia made his own contribution based on his research applying the interpretation method. *Lettura di una città: Como* is a study of Como, a town of Roman origin in northern Italy (Caniggia, 1963). Caniggia divided buildings into residential and special buildings. The latter are buildings whose principal function is not as a dwelling – for example mosques, convents, or even palaces. This work is the basis for the material presented in *Composizione architettonica e tipologia edilizia*, published in four volumes.

He published the first two volumes with Gian Luigi Maffei (Caniggia & Maffei, 1979; 1984). The first volume, *Composizione Architettonica e Tipologia Edilizia: 1. Lettura dell'Edilizia di Base*, or *The Interpreting basic building*, contains a series of lectures,

which focus on the residential building as the formative element of city building. The second, *Composizione Architettonica e Tipologia Edilizia: 2. Il Progetto nell'Edilizia di Base* further demonstrates Caniggia's ideology with examples from all over the world and includes exercises for students so that they can master his methodology. Together they form a manual for the interpretation and design of basic buildings, principles which are taught in many architectural courses. The first volume has been translated into Spanish, French and English. The final two volumes on the interpretation and design of special buildings were still in draft form at the time of Caniggia's death (Cataldi et.al., 2002).

Caniggia argued against the methods used by modern architects. In his view, the crisis in modern architecture arose out of a disparity between the products of building and the intentions of those using them. He addressed the tendency for modern buildings to be an expression of individual architects' personal language of forms, rather than an expression of common concerns or desires using a common local language of forms. If the common form is lost, the knowledge, experience and memories connected to it are not transmitted between generations. The aim of Gianfranco Caniggia's theoretical approach is to understand the built form by examining the historical process of its formation. He studied the steps involved in the creation and evolution of the built environment in order to understand the continuity of cultural inheritance. Then in order to understand the built environment, he reconstructed the city. Through examination of existing buildings and documents, he retraced the steps in its formation to learn how the components are put together.

The past is the key to the present and therefore by studying buildings, their rules of construction and development can be uncovered through systematic interpretation of the built form. Caniggia's approach can be compared to research in linguistic structuralism (Kristjánsdóttir, 2005). In the hierarchy of linguistic structuralism, the smallest element is the letter. Letters then combine to form words, and words are arranged into sentences, which in turn are grouped into paragraphs. Language is a living form that changes through the centuries with collective use, while reflecting the time and place that formed it. Architecture, as language, is a living form, through which people have achieved a sort of unwritten building codification by identifying history and structure (Kristjánsdóttir, 2005).

According to Caniggia, each society has unwritten rules on certain things (e.g., behaviour, language). Such rules are built on the

common knowledge held by a society, which is based on its culture, and what is considered right or wrong – or what Caniggia and Maffei (2001, p. 43) refer to as spontaneous consciousness. These rules include the concept of a house. This concept is so well embedded within the society that when people refer to a house, they have the same picture in mind. This picture is called a leading type (*i. tipo portante*), and is the ideal to which everyone refers when building a house (Caniggia, 1997).

Within many cultural areas, the origins of the leading type can be traced all the way back to the first settlement within the area. The evolutionary process for building types across the world is documented in Cataldi (2015).

However, when a society undergoes major change, it loses connections to its roots. The commonly held picture of the house is lost, and the question what a house should look like remains. Critical consciousness takes over when the a priori type vanishes and a new type can be formed (Caniggia & Maffei, 2001, pp. 45-7). When people act with critical consciousness they are able to choose what they are doing, but, let us be clear, they do not choose having acquired greater maturity. In the absence of a community codifying what is right or wrong, there will be uncertainty. According to Caniggia, "...they have to deliberate because they have no firmly established way of acting, i.e. they have 'to think about it' because their behaviour in a certain state of need has a margin of possibility which ends up by turning into a margin of indifference as to whether to act in one way or another, evidently induced by a codification crisis of the community's response to that state of need" (Caniggia & Maffei, 2001, p. 45).

Caniggia and Maffei (2001) define type (typo) in the following way:

During a moment of greater civil continuity, builders, guided by their spontaneous consciousness, can produce an object "without thinking twice", only unconsciously conditioned by their cultural background. That object will be determined out of previous experiences in their civil surroundings, transformed into a system of integrated cognitions, assumed unitarily to satisfy the particular need to which that object has to correspond (Caniggia & Maffei, 2001, p. 50).

And further:

The term building type was used in the past and still is today to indicate any group of buildings, with some characteristics, or a series of characteristics, in common (Caniggia & Maffei, 2001, p. 50).

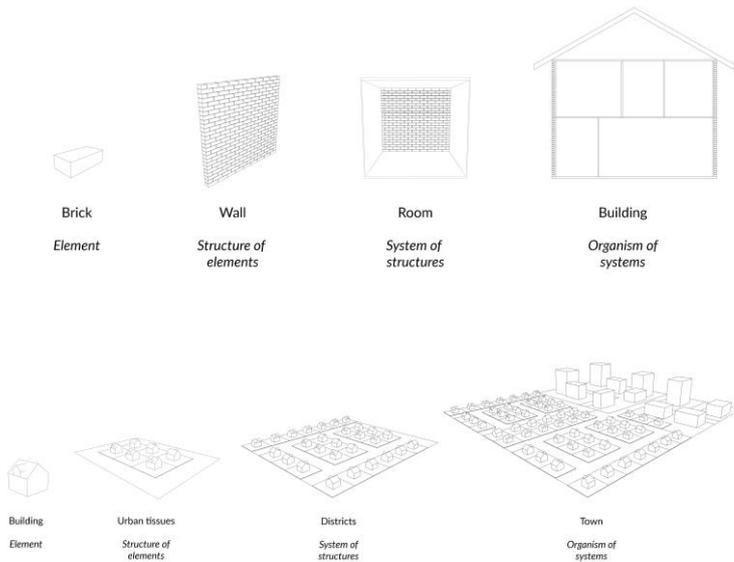
In his analysis, Caniggia starts by making a distinction between the spatial correlation of built objects (copresence) and their temporal correlation (derivation), or the typological process. He looks at the form (type) and studies how individual forms are put together in time and space over the development of the city.

Notions of the form in space and time, i.e. *copresence* and *derivation*, are the fundamental 'conceptual tools' necessary for reconstructing a town.

The typological process is the reconstruction of the changes a type has undergone over time in significant intervals that are called phases. A phase is defined as a reasonable distance in time that allows distinctive and consistent differences between two consecutive types to emerge. The exception to the rule is always around the corner, as evidenced by all the exceptions that are realised under less optimal conditions, or synchronic variations due to topographical problems, or problems with placement in a block or in an incongruous tissue. The typological process is as complicated as the urban landscape it lies within (Petruccioli, 1998a).

Caniggia starts by looking at the smallest elements of construction – the individual stones, examining how these are grouped together to form walls, rooms and houses. The stones, walls and rooms of a particular house can be units formed centuries apart.

Caniggia's examination of the *spatial correlation* of built objects is based on a set of subdivisions that forms a hierarchy (Figure 2). The components are: elements, a structure of elements, a system of structures, and an organism of systems.



**Figure 2.** A schematic diagram demonstrating the spatial correlation of a building and a town according to Caniggia (1997).

Figure 2 shows a hierarchy of spatial arrangement. Elements are the smallest units of the system studied. Grouped together, the elements form structures that are the building blocks of the system itself. These building blocks can be different, but they are all formed by grouping together in some way a number of elements of the smallest type. A number of particular structures grouped together in a similar manner form a unit of a higher order, i.e. the system. The same idea can be taken further, whereby a grouping of systems forms a unit of an even higher order. In Caniggia’s terminology, this is known as an organism of systems. To provide further clarification, it is useful to consider examples of how Caniggia used these concepts in his work.

Caniggia applied this schema to individual buildings. An element could be a brick, timber, tile etc. A structure of elements is formed through the combination of building materials, for example walls, interior floors, roofs etc. Arrangements of the latter into rooms, stairs, corridors, etc. is the system of structure, with the organism being the building (Caniggia, 1997).

He applies the same schema to the town, where a building is the element and the structure of elements is an aggregate of the buildings, referred to as urban tissue. Urban tissue is defined as the ‘aggregation of building type, surrounding space and access ways’. The combination of tissues forms regions or districts (i.e., the system of structures (Figure 2), which together form the organism of the town (Caniggia, 1997).

Caniggia defines urban tissue as follows:

Formative laws and categories that are as typological as the “building type” can be summed up in one single term, urban tissue. A tissue is to an aggregate what building type is to building: tissue is the concept of the coexistence of several buildings existing in the minds of builders before the act of building, at the level of spontaneous consciousness, as a civil result of the experience of putting together several buildings and summing up all interesting aspects, including aggregation. Briefly, it is “a priori synthesis” of “building type”; we can then transfer to the term “tissue” the characteristics of both “building type” and “type” in its more general accepted meaning (Caniggia, 1979, pp. 118-119).

In Italy, universities such as Florence University, the University of Ferrara and Bari Polytechnic have followed in the footsteps of Muratori and Caniggia, teaching their theories and approaches. In recent years, there has been growing interest in the work of Gianfranco Caniggia. A major conference on his work, followed by an exhibition, was held in the city of Como in 2002 (Samuels, 2002). Further, a recent volume by Strappa, Ieva, and Dimatteo (2003), *La città come organismo. Lettura di Trani alle diverse scale*, is a useful addition to research on Muratori and Caniggia in Italy.

### **Whitehand’s Urban Morphology Research Group**

Today urban morphology is a growing subject, with research taking place all over the world. JWR Whitehand has played a central role in this development. He has not only extended MRG Conzen’s work, but also encouraged academics from other fields to conduct urban morphology research. His knowledge and enthusiasm have provided the spark necessary to convince others to apply the principles of urban morphology and test the concept around the world. As a result, the concept is now firmly established in a global context.

Founded by Professor Whitehand in 1974, the Urban Morphology Research Group (UMRG) at the University of Birmingham is the major centre in the United Kingdom for the study of the geographical aspects of urban form. In 2000, the MRG Conzen Collection was opened at the School of Geography and Environmental Sciences at Birmingham University by Conzen’s son, Professor Michael P Conzen. It comprises MRG Conzen’s extensive archives.

JWR Whitehand has supervised several doctoral and postdoctoral students who have carried on with his line of thought, including Peter Larkham, Kai Gu, Karl Kropf, and Sigríður Kristjánsdóttir to

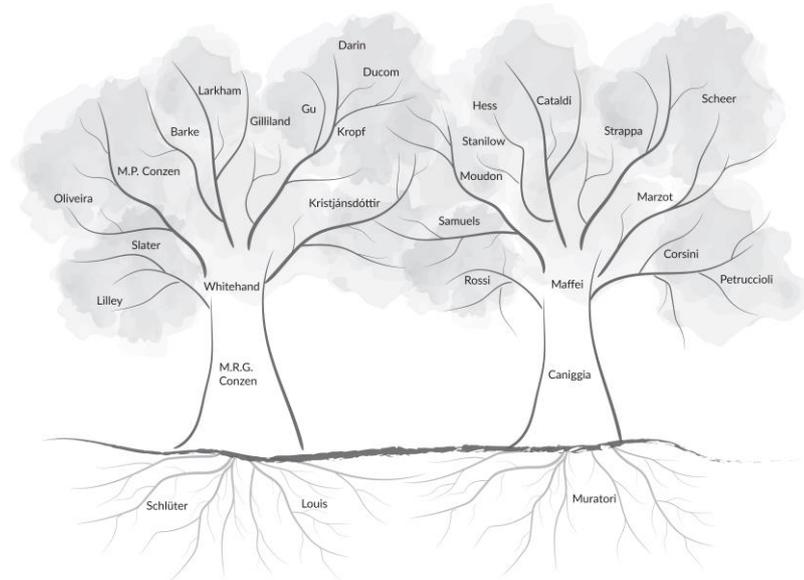
name a few. On the occasion of his 80th birthday, a book was published to honour his contribution to urban morphology (Oliveira, 2019). Earlier, Larkham and Conzen (2014) had dedicated their book, *Shapers of Urban Form Explorations in Morphological Agency*, to Whitehand.

Kristjánsdóttir (2001) discusses a possible integration of Caniggia's theory on typological process with the fringe-belt concept put forward by Conzen. She introduced the concepts of fringe belts and leading type in Iceland (Kristjánsdóttir 2003, 2005, 2006). In her recent research Kristjánsdóttir (2015, 2018) & (Kristjánsdóttir & Sveinsson 2016) continues the exploration of how concepts from urban morphology can be applied and integrated in research on the urban landscape, analysing how town elements correspond to economic boom and bust in Iceland.

Kai Gu (2001), followed by Whitehand and Gu (2003), applied the concepts of urban morphology to study the Chinese city of Pingyao. Subsequently, an edited book of key papers on urban morphology (Tim, Gu, & Tao, 2014) introduced the topic in China and inspired new interpretations, such as Manfredini (2017). Gu's recent research involve analysis on Chinese cities (Wang and Gu 2020) and applying these approaches in to planning (Gu, Li and Zheng 2019), and teaching urban design (Gu 2018).

## ISUF

The formation of the International Seminar on Urban Form (ISUF) in 1994 provided a stage for debate and diffusion and comparison of knowledge on the urban form around the world. ISUF seeks to advance research and practice in fields concerned with the built environment, drawing members from several disciplines including architecture, geography, history, sociology and town planning. In fact it has spread its seeds and several subgroups have been formed. ISUF publishes the journal *Urban Morphology* and holds conferences every year, providing an international framework for communication between members. There is not room here to list all the articles published in the journal, but safe to say it has been a major influence in communicating the results of research on urban morphology (figure 3). Hitherto, it is necessary to acknowledge all the work that Professor Whitehand and his wife Susan have put into editing the journal, which publishes manuscripts by authors for whom English is a second language.



**Figure 2.** A schematic diagram depicting the heightened research activity on physical form that is currently occurring in several disciplines simultaneously, and showing the relationships between the various research traditions and authors.

In association with ISUF, several research groups that focus on specific cultural areas that often share the same language have formed, and teaching of urban morphology approaches has also grown worldwide (Oliveira 2016, 2018).

The contemporary city is a complex phenomenon. It is necessary to revisit and use the concepts and methods established by Caniggia and Conzen in order to understand it and better manage urban landscape changes.

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### **Resume**

*Sigríður Kristjánsdóttir is an Associate Professor and the Director of the Master program in Planning at the Agricultural University of Iceland. Kristjánsdóttir is an active contributor to international research projects, particularly collaboration between the Nordic countries and has written reports, book chapters and journal articles on various aspects of Icelandic planning, sustainability and the urban landscape.*